



VOLUME
LXIV

JANUARY
JUNE 1893

THE BUILDER

THIS : ILLUSTRATED : WEEKLY
NEWSPAPER : FOR : THE
ARCHITECT : ENGINEER : ARCHÆ-
OLOGIST : CONSTRUCTOR : SANI-
TARY : REFORMER : & : ART-LOVER

CONDUCTED BY

H. H. STATHAM,

FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.



"EVERY man's proper mansion-house, and home, being the theater of his hospitality, the seat of self-fruition, the comfortablest part of his own life, the noblest of his sonne's inheritance, a kind of private principedom, nay, to the possessors thereof, an epitome of the whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully adorned." ♦ ♦ ♦ ♦ ♦

"Architecture can want no commendation, where there are noble men, or noble mindes."—SIR HENRY WOTTON. ♦ ♦ ♦

"OUR English word To BUILD is the Anglo-Saxon Bylsan, to confirm, to establish, to make firm and sure and fast, to consolidate, to strengthen; and is applicable to all other things as well as to dwelling-places."—DIVERSIONS OF PURLEY.

"ALWAYS be ready to speak your mind, and a base man will avoid you."—WILLIAM BLAKE. ♦ ♦ ♦ ♦ ♦

OFFICE: 46, PATERNOSTER-ROW, LONDON-W.C.



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THE BUILDER

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Chartres Cathedral and Town.—Drawn by Mr. J. Pennell	Four-Page Ink-Photo.
Restoration of the Villa of Hadrian at Tivoli: North-West Face.—By M. P. J. Esquié, Architect	Four-Page Photogravure.
"The Tree of Life": Design for Mosaic for Church of St. Paul, Rome.—By Mr. E. Burne-Jones, A.R.A.	Double-Page Ink-Photo.
"Summer": Decorative Painting in the Hôtel de Ville, Paris.—By M. Puvis de Chavannes	Double-Page Ink-Photo.
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English Architecture of the last Half Century.



N commemorating the fiftieth anniversary of the existence of this journal, it is natural to look back and consider the achievements and the progress of English architecture during that period; a period

which, if architecturally speaking it has been uncertain, varying and divided with its aims, has nevertheless been one of great activity and energy in building; which has seen the production of some of the most important English buildings of the modern era, besides a host of smaller buildings many of which, considered singly, have been of great architectural merit, and which taken collectively represent a very remarkable total of architectural achievement.

Several causes have combined to promote architectural enterprise during the past half century. In regard to our great public buildings, those of national importance

especially, we have been in a state of transition. While the machinery of Government in these modern days has become more and more complicated, the old buildings which had served their purpose somehow during the previous century had become more and more palpably insufficient for the accommodation demanded. The fire which in 1834 destroyed the old Houses of Parliament probably only hastened by a few years a rebuilding of the palace of legislature which must have been very soon recognised as a necessity of the times. Indeed, those who are acquainted with the illustrations of the Houses of Parliament as they existed just previous to the fire may well wonder how we had managed up to that period to be content with such miserably inadequate buildings, whether considered practically or architecturally; buildings with no kind of architectural dignity, and planned like a rabbit warren. Following on the rebuilding of the central home of legislature arose naturally the ambition to provide more suitable and more centralised accommodation for the great official departments connected with the Government service, and hence arose the competitions for new Foreign Offices,

War and Admiralty offices (the latter abortive in a great measure), and for rebuilding and centralising the Royal Courts of Justice. Provincial towns caught the spread of the movement; they would also have their municipal life architecturally illustrated, and hence the successive springing up of the large town halls and municipal offices, which is still going on. Concurrently with this spirit of renovation in Government and municipal concerns, came the spirit of church revival, shaking up a church and church-going people from their long placid acquiescence in the unpicturesque church and perhaps rather somnolent ecclesiastical life of the early part of the century; holding before them the Mediæval idea of passion aspiration and passionate mysticism, and leading them to desire the erection of buildings more in accordance with the new spirit which had entered into the national church. Whether this ecclesiastical revival was either in an intellectual or in a spiritual sense an unmixed good—there are those who still think it an unmixed evil—is a point which we are not bound to consider here; we are only concerned with its effect upon architecture, which was indubitable. New churches, intended to emulate the spirit of the Mediæval

buildings, with due regard to necessary economy ("say thirty shillings more and have a tower and spire at once," as Pugin once wrote to a church committee), sprung up everywhere, and this modern phase of English feeling has left its architectural mark over the length and breadth of the land. For with the sympathy for Mediaeval faith came the sympathy and even passion for Mediaeval architecture, which ruled for some forty years in the land: it is perhaps difficult to say which feeling arose first; no doubt each reacted on the other; but in all probability the revival of Mediaeval church architecture was mainly due to the revival of Mediaeval religious feeling; the two things are connected together, just as the revival of Queen Anne architecture is connected with that reflux of feeling which has created of late years a new sympathy for the literature and thought of the formerly much-reviled eighteenth century.

The new interest in house and street architecture, which is a prominent feature of the last twenty years, it is not so easy to account for. It is probably to some extent the result of the education of taste in regard to matters of decoration and furniture, which has been gradually progressing in this country since the 1851 exhibition; an exhibition crowded with objects of what we should now think the most vulgar taste, but which nevertheless was the starting-point of a new era, a suggestion of the idea that the national cultivation of taste in decorative art was an object worth striving for, and which paved the way for the Kensington Museum and much "culture." It may not follow necessarily that those who have learned to appreciate a good style of design in furniture and decoration should be desirous to have the exteriors also of their houses decorative, since we know that in the last century it was not so. The great square lump of Lord Carrington's house, for instance, till recently facing the Horse Guards, had nothing architectural to commend it externally, yet it contained the most charming and refined interior decoration, as was the case with many other eighteenth century London houses. The fact perhaps was that in that period the outside of the house was not thought of much importance in an architectural sense; it was the weather screen only, and the artistic amenities were reserved for the interior; the house, in fact, was regarded only as an interior. Now, we have arrived at a perception that a house exterior is worth thinking of, both for one's own pleasure and that of one's neighbours, and there is no department of architecture, on the whole, in which the recent development has been so marked and so satisfactory, as it has been in street architecture.

At the commencement of the half century on which we are looking back, the taste for a somewhat cold and correct style of columnar architecture for public buildings was still surviving; it has in fact in a measure survived ever since in a spasmodic way, for though we have seen a more chateau-like style adopted for recent public buildings, the picturesque superseding the Classical, yet from time to time a large town-hall or other such edifice is still built in which the architect has nothing more to offer us than the Greek or Roman columns and Italian details which were in the earlier part of the century considered *de rigueur* for public buildings and banks and other such institutions. At the time we refer to, Sir William Tite, that most typically respectable of respectable architects, had just completed the Royal Exchange; much admired at first, grumbled at soon afterwards by those who most used it, as witness our own columns in the following year, under the heading "The Royal Exchange and its defects." The defects were draughts and discomfort of various kinds, and a prayer was expressed that the central area might be covered in; a wish now realised, though not till forty years or more after the building was erected. Burlington House was still *in statu quo*, with its single story and its massive gateway and

colonnade, now going to spoil on the river bank at Battersea. Montague House was in process of being used and partially transformed as the British Museum, the heavy panelled screen-wall and gateway still flanked Great Russell-street, where the lofty gilt railings now are. It was not till five years into our half-century (1847) that Sir Robert Smirke carried out the columned front of the Museum as we now see it; a design which is so far apart from the architectural taste of the era to which it belongs that one is always tempted to imagine the British Museum older than it really is; it seems distant from us, architecturally, by a good deal more than half a century. It was, in fact, a survival from an earlier period, by an architect who retained the academical tastes of the old school. Useless as the colonnade is, however, it imparts a certain classic dignity to the building, and a well-known artist living opposite to it, who chiefly concerns himself with the painting of architecture, declares that those columns, seen under various lights, are a constant source of pleasure and interest to him. Indeed the fact that a Classic colonnade is an anachronism does by no means prevent it being a very agreeable object to the eye—if we have not too much of it.

But while respectable academical architects were still finding an innocent pleasure in colonnades, a great national building was being commenced in a very different style. The Houses of Parliament is rather an exception, however, in regard to its style, which was not due either to the work of the architect or to the general or popular taste of the day, but to a bureaucratic decree. The Gothic movement had commenced before the competition for the Houses of Parliament, and its early development showed a certain predilection for Perpendicular architecture, as in the gimcrack plaster sham Gothic churches of Rickman and others, but there would have been no public expectation that the Tudor style should have been adopted for the Houses of Parliament, and certainly Barry would never have adopted it if left to himself. But it was ruled that the style was to be Gothic or Elizabethan—Late Gothic being probably intended—from a tacit feeling, apparently, that these were styles essentially English and connected with a great period of English history. Barry's predilections were all Italian, and Bridgewater House and the Reform and Travellers' Clubs (the first-named commenced nearly at the beginning of our half-century), exhibit his natural predilections as an architect. We have had an unfortunate habit of officially fettering the taste of our architects in regard to more than one national building, and probably Barry would have done better with the Houses of Parliament had he been allowed to treat it in his own way and in his own style. But, making allowance for these disadvantages, and for the frittering of the surface of the building by repetitions of small detail, we must hold that it is a building in the main worthy of the nation and of its purpose.

At all events opportunities for the architectural treatment of great national buildings have produced nothing equal to it since. One or two great opportunities we have had, but they have either been thrown away through the mismanagement or false economy of the Government, or the architects employed have not succeeded in making the most of the occasion. The next great opportunity to the Houses of Parliament—viz., the Foreign Office competition, occurred in 1856-7. There was as much public interest excited by this as by the Houses of Parliament competition. The 218 designs sent in were exhibited in Westminster Hall in 1857, and we find it noted in our columns that it was estimated that 10,000 people visited them on the first day of the show; a curious contrast to the public apathy with which competitions are usually regarded now, but unfortunately there have been so many competition *fiascos* that people have ceased to expect much from a great architect:

tural competition now. Some fine designs were sent in, but the result was a curious kind of shuffling of the cards, whereby the first premiated design by Messrs. Coe & Holland was afterwards set aside in favour of an Italian Gothic design by Scott, and this again set aside because Lord Palmerston, then in office, chose to act as arbiter of aesthetics also, and ruled that a Gothic Foreign Office could not be allowed. The Classic design, which Scott produced (against his own principles) is poor enough, and an attempt was made to change the decision of the Government when the question was discussed in the House of Commons (July 8, 1861), when Mr. Cowper addressed the House in a speech which was more humorous than he was aware of, the substance of his argument being—"Why, all public buildings, in all respectable cities, are Classic or Italian; therefore, how can we have a Gothic Foreign Office?" And so ended this curious and unfortunate episode, leaving us a poor building designed by an architect working against his will and at the command of a Prime Minister who would meddle with things that he did not understand. A still greater opportunity was lost, however, in connection with the Foreign Office scheme, for Sir Charles Barry exhibited in Westminster Hall at the same time a splendid plan for the collection of all the Government offices in one vast group of buildings extending from Great George-street to the Horse Guards, and facing on Whitehall and on St. James's Park, with communication through, and open colonnaded courtyards. This would have been a scheme really worth carrying out—one of the greatest architectural opportunities any city ever had; now only one of the architectural "might-have-beens."

In 1863 came the next great chance for national architecture, in the Law Courts Competition, this time a limited competition, which also attracted great public interest. Here again there was a kind of shuffle of the cards, for E. M. Barry won the competition for plan and Street for design, and they were appointed to work together; the result being that Barry was pushed out. The Law Courts, as a Gothic public building, is a curious contrast, in its sturdy and rather grim style, to the Gothic of the Houses of Parliament; a contrast indicative of the path of the Gothic revival, which in the main has been still from the later towards the earlier styles, ending with a preference on the part of many for Transitional work. The persuasion seems, however, to have forced itself on the world at last that early Gothic is not the style for modern life, and the Law Courts is probably the last public building of any importance, which will be built in pure Gothic style. The same change of feeling may be noted in domestic architecture. Mr. Burges's early Gothic house, built for himself, with its curiously piquant furniture and decorations, is still an interesting relic of the period, but no one would do that kind of thing now.

The Law Courts competition is memorable for the amount of power, talent, and originality displayed in the drawings as a whole. The design of Burges will not be forgotten by those who studied it at the time, and others in the set showed a remarkable degree of talent and originality; it may be doubted whether any similar competition at the present moment would give us a collection of designs of equal power. Certainly the next Government competition did not, that for the War and Admiralty offices in 1884. On the contrary, with one or two exceptions, what struck one in general was the poverty and commonplace character of the designs. But both the public and architects had begun (from experience) to distrust these great competitions, and neither did the public come to see the drawings nor did the leading architects (for the most part) compete. This want of public interest was again shown in the case of the limited competition for the Imperial Institute, which excited little attention, and where the designs

were not a remarkable set; but the one selected was certainly the best, and is an appropriate culmination to the work of an architect who has made a style of his own. Here, as in the Law Courts, the executed design is a landmark of the progress or change of architectural taste: each of these buildings representing the architectural taste predominant at the time the competition was held.

Among the prominent public buildings of the municipal class considerable interest attaches to the one which resulted from the competition for the Manchester Assize Courts in 1858, gained by Mr. Waterhouse, and forming the first of a series of large buildings connected with his name, all marked by admirable planning and by a treatment of Gothic materials specially his own, and which may be said on the whole to be eminently municipal in character. The most typical Gothic municipal building of the period is perhaps the Manchester Town Hall, carried out by the same architect about ten years later. In 1854 St. George's Hall at Liverpool was approaching completion; one of the last of the great columnar buildings of the period, but distinguished from such examples as that of the British Museum by the element of originality in the treatment both of masses and details which characterises it, and by a really new treatment of portions of the exterior in the shape of a kind of translation of Egyptian architecture into Greek. Its architect, Elmes, was a man of true architectural genius, who had he lived would have no doubt vindicated a claim to be considered as the fourth really great architect of this country since the Renaissance—Inigo Jones, Wren, and Barry being the three others. In 1861 the Halifax town hall, designed by Barry, is notified as approaching completion under the direction of his son E. M. Barry; a Classic building of fine design and distinguished by a highly original and successful application of the feature of the spire to Classic architecture, far more successful certainly than Nash's well-meant attempt in All Soul's, Langham-place. In 1862 occurred the competition for the Birmingham Exchange Buildings, not a very important one, and about the same time was carried out Scott's town hall at Preston, of the second class in point of size, but one of the best and most original in design of the Gothic town halls. In 1871 we had the important competition for the Birmingham Municipal Buildings, in which a good deal of talent was displayed, and which is memorable for the splendid plan sent by the late Mr. Lynn of Belfast, a plan which, as evidence of architectural genius, was worth all the rest of the designs put together. Unfortunately the design sent in with it was quite unfinished, and though the corporation purchased the plan, no use was made of it, and in the result the selection fell on a very commonplace design, which is no credit to Birmingham. The Leeds Municipal Buildings competition, in 1876, was gained by Mr. Corson, who produced a well planned building of rather heavy and unattractive Classic architectural style. The Glasgow Municipal Buildings, won by Mr. Young in a competition in 1882, was an important work, and a good application of Classic features, though not a very interesting building in proportion to its scale and the liberal amount spent on it. The Birmingham Law Courts, won in a competition by Messrs. Aston Webb and Ingram Bell in 1886, and but recently finished, is one of the most original and picturesque buildings of this class in recent times, though the elaboration of terracotta ornamental detail has to our thinking been carried too far. The competition for the Edinburgh Municipal Buildings in 1887 promised to be of the greatest interest on account of the splendidly picturesque site, and was gained by Messrs. Leeming with a plan which was a model of its kind; the design, however, did not come up in interest to the plan. Unfortunately the whole scheme fell through, the Edinburgh authorities not having appa-

rently made up their minds before advertised the competition. The last of the large Municipal competitions has been that for the Sheffield Municipal Buildings, gained by Mr. Mountford, under whom the building is now in progress. It furnishes an example of the same kind of tendency in modern architecture as that displayed in the Imperial Institute, and which may be defined as the use of details mainly Renaissance in character, but with a grouping and feeling essentially Gothic.

The largest public building now in progress is the great scheme for the completion of the South Kensington Museum, long left an unhappy object with ugly temporary brick walls in front, but which is now to be completed, according to Mr. Aston Webb's design, in a manner which will produce a building worthy of the site and of the important object to which it is devoted.

A building which may claim notice is the Oxford Museum, of Messrs. Deane & Woodward, won by them in a competition in 1854, for it was typical of the then feeling of the Gothic revival. The artistic "Young England" of the day was vastly interested in it; it was to be a revival of true Mediaeval art; enthusiastic words were spoken concerning the carvings, which the impassioned artisan was to carve after his own fancy from the flowers of the fields, as in the middle ages (so we were told). Alas! where has all this gone now? The enthusiasm has flown. The work is no longer admirable to the hypercritical eye of the present day, and the impassioned artisan is chiefly enthusiastic about the eight hours day.

We have referred to the great church building work of the earlier part of this half century. Some of the most typical buildings in this class are not the largest. Many of us can remember the interest which was aroused at the time (1861) by Street's small church of St. James the Less in Garden-square, so new in style (in this country) at the time, and showing a practised hand in the treatment of the style. Four years earlier Burges's successful competition design for the memorial church at Constantinople was another landmark, and still more decisively, two or three years earlier, Mr. Butterfield's All Saints, Margaret-street, which may have had some factitious importance owing to its being one of the head quarters of the new movement in the church, but which, along with other churches by the same architect, has held its own amid the changes of fashion much better than most of the Gothic church work of its day, even than that of Scott, whose mere revival of Gothic detail, however well done, looks somewhat *passé* now, whereas the touches of originality in Mr. Butterfield's work preserve its interest. Street's churches have also left their mark very decidedly in modern Gothic architecture (we were about to say "church architecture," but in fact all church architecture, practically, is still Gothic with us), and are the most permanently valuable work which he has left. He had a remarkable faculty of imparting dignity and apparent spaciousness to a comparatively small church. His completion of Bristol Cathedral deserves note as the only example of the completion of one of our Mediaeval cathedrals in modern times. Of course, another great feature of the time has been the church and cathedral restoration movement; carried out amid universal enthusiasm at first, now only to be attempted amid the outcries of enraged archaeologists; so curiously does fashion in these things turn about. It may be said that the church restoration movement deserved neither all the enthusiasm with which it was started nor all the opprobrium cast upon it now. Scott undoubtedly robbed some of the cathedrals unnecessarily of the charm of antiquity, and turned them out practically new buildings; but he also discovered and elucidated many points in their history, while the renovation of their interiors was simply a work of necessity and order, if they were to be regarded as buildings for practical use as churches. The competi-

tion for the proposed Liverpool cathedral in 1886, was an important architectural event which excited much interest, but has so far ended in nothing.

A prominent characteristic of the architecture of the period in late years has been the increasingly frequent erection of very large hotels, in a constantly ascending scale of magnitude. The influence of this class of erections on architecture has been mostly very bad; they are generally built in a hurry, and aim at no architectural expression beyond that of a certain showiness of exterior. Even Scott's St. Pancras Hotel, about which much was thought at the time, as a new departure, the treatment of a hotel by the leading Gothic architect of the day, is no longer looked upon with admiration; it is better than some other large hotels, but its detail is now felt to be too florid and *pronounced*. The really fine and suitable treatment of a railway station façade is a thing yet to be done. The club architecture of the period has also been a somewhat important element. Little of it is previous to our half-century; several of the Pall Mall clubs come into our "half-century," others, as the Reform, only preceded it by two or three years. The more recent clubs, like hotels and houses in flats, have become in these days much more lofty, and are treated in a much more elaborate manner architecturally. Some of the club-houses of this type, such as the National Liberal and the Constitutional, are undoubtedly more calculated to assist the picturesque effect of street architecture than the old style of Italian *palazzo* buildings which line Pall Mall; but they have the architectural defect (which they share with the modern style of residential blocks) of being in many cases too lofty for the width of the streets they occupy (a great mistake in house architecture, of which Victoria-street is a flagrant example), and it may be questioned whether, apart from this, they are really such dignified buildings, or so suitable to the architectural expression of a club, as the buildings of the type shown in the Reform, the Carlton, or the Army and Navy Clubs.

There is no class of architecture which has made such unquestionable and satisfactory progress during the half-century as the street house. In fact, at the commencement of our period, it could hardly be said that anything worth calling street architecture existed in our modern cities. Now, in some of the new parts of London especially, it is the most satisfactory architecture of all. In place of bare cement or brick fronts, with a few oblong holes in them, we have now a large class of new houses which are picturesque and tasteful in their architectural treatment without being pretentious. Even in shops and business buildings we now often find a most decided effort to give picturesque effect to the street front; we publish one example in this number, of some shops at Chelsea by Mr. F. G. Knight, illustrated by one of his own drawings. In some instances buildings of this class rise to a very high quality of architectural picturesqueness, as in Mr. Norman Shaw's charming building at the foot of St. James's-street, which Mr. Brewer has sketched in the foreground of his panoramic view of some of the buildings of the half-century, issued with the present number.

In this panorama, to which we may now refer the reader, Mr. Brewer has arranged in a very masterly manner (as we think everyone will admit) more than seventy among the leading English buildings of the last fifty years, grouping them on either side of a river, which serves both to divide the composition and to afford the opportunity of introducing sketches of the three Thames bridges built during the period; Putney Bridge, by Sir J. Bazalgette; Westminster Bridge (Sir Thos. Page) and Blackfriars Bridge (Henry Cubitt and Joseph Carr). Of these three bridges we may observe that Putney is far the superior in an architectural sense; West-

minister was carried out in a kind of bastard Gothic (probably with the idea of harmonising with the Houses of Parliament), and Blackfriars is defaced by the enormous and absurd granite columns on its piers, which carry nothing at all. The Albert Hall is placed in the centre of the composition, not so much on account of its architectural importance as because it comes very well into the composition in that place. The Albert Memorial comes in its actual position in front of the Hall, and may very well claim that central position on other grounds, for, in spite of a certain degree of over-elaboration and incrustation of ornament, it deserves to rank as a remarkable work in decorative architecture, and was considered by Scott himself as his most important and central work. The other buildings, a few of which have been referred to in the course of this article, will be easily identified by means of the key-plate which Mr. Brewer has furnished, and which will be found, with the index of names, on page 12. To the architects of various buildings which might have had a good claim to be included and which are not to be found here we will only say that the difficulty of selection has been very great, and that we would gladly have included many more had it been in any way possible to find space for them. As it is, the group we believe forms a fairly representative collection of some of the most remarkable buildings which the architectural requirements of the last half-century have called into existence in this country.

NOTES.

A WORD may be said here as to the first establishment of this Journal, which has now entered upon its fifty-first year. The first number of the *Builder*, which, as we have already said, bore the date of December 31, 1842, consisted of sixteen pages, of which eleven were devoted to advertisements. It contained no illustrations except a few wood blocks, chiefly connected with advertisements. It was described as a "precursor number," issued to test the demand for such a journal. The Editor was Mr. J. A. Hansom, an architect born at York in 1803, and who was architect of the large church of St. Philip Neri at Arundel, built for the Duke of Norfolk, and of various other buildings, a list of which we gave in a memoir of him published at the time of his death in 1882.* He was also the inventor of the form of cab known by his name, which has thus at least a chance of being immortalised in history. The paper was at first issued at the price of 1½d., stamped 2½d.; and it is curious to note that although this journal has been through its whole career, after the first year or two, emphatically a paper for architects and those interested in architecture (builders of course included), it was actually started by Mr. Hansom as a builders' newspaper and magazine, under the impression, distinctly stated by him in the opening article, that there must be a field for a paper devoted to so large an industry as that of building. Mr. Hansom professed, indeed, from the first, that—

"In designing our paper, we use the word *Builder* in its most extended sense. Instancing a house or other edifice, we regard it from the procurement and preparation of the materials to the fixing upon its site, and to its full completion for the residence, use, and enjoyment of man, and which includes the making of the design or plan, 'breaking ground,' as it is termed; the erection, or building up; decorating, fitting, and furnishing; the supply of water and drainage; and even the laying-out of the garden, pleasure-grounds, and park. This is the whole art of building, or, in other words, of providing and perfecting human habitations. To all, therefore, who are engaged in the art so defined, we address ourselves without distinction, and without preference; the interests of all will, to the best of our power, be consulted, promoted, and advocated."

Thus the extended sense in which the title of the paper is to be read was in great

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measure anticipated in the first number, in spite of its nominal dedication to the builder and contractor; and the architectural element in it very soon got the upper hand; and the real scope of the paper was further indicated when Mr. Godwin became editor, by the addition to the title-page in 1846 of the two first of the quotations which still stand there, and in 1847 by the addition of the still more pointed quotation as to the real meaning of the Saxon word "build," which means "to confirm, to strengthen, to establish, and is applicable to many other things besides building." The first volume was described on the title-page as a paper "for the drawing-room, studio, office, workshop, and cottage;" afterwards altered to "for the architect, engineer, operative, and artist;" a comprehensive profession which we think we may say has been fairly kept up during the whole course of the paper. The second number, the reception of the trial number having been encouraging, appeared on February 18, 1843, and the weekly issue has not been interrupted since. Mr. Hansom only occupied the editorial chair for a few months, and was succeeded by Mr. Bartholomew, the author of the well-known treatise on Specifications, who retired from the editorship after a little more than a year, towards the end of 1843, when he was succeeded by Mr. George Godwin, who conducted the paper for nearly forty years, until his resignation in 1883.

AT the next exhibition of the Glasgow Institute of Fine Arts, a special effort is to be made to procure a good representation of Architecture. A room has been set apart by the Council of the Institute, which, through a small one, is one of the suite, and not a *cul-de-sac*, as at the Royal Academy. This measure was taken in consequence of a special petition to the Council of the Institute, and it is interesting to note that the petition to give up to architectural drawings some of the space hitherto allotted to paintings was signed by a larger number of painters than of architects—a fact highly creditable in every sense to the former. A circular signed by eight of the leading architects of Glasgow has been sent round to a number of members of the architectural profession in England and Scotland, drawing their attention to the new undertaking, and asking for their assistance and co-operation in securing a good exhibition of architectural drawings. We hope this will be largely complied with, and that the spirited action of the Glasgow Institute will be justified by a good collection of drawings being sent.

WITH the stir to benefit the agricultural population, and with the formation of an Agricultural Union, this journal is not concerned in a general sense. But we cannot but express a hope that the subject of the cottages of agricultural labourers will come in for some attention. It is desirable to prevent the indiscriminate migration of the rural population to the large towns, and there is nothing more likely to do this than that the village homes should be healthy and comfortable. The Legislature has of late done a great deal to make rural cottages more healthy if local authorities will carry out the law with attention and vigilance. It is impossible to take up an ordinary local newspaper without seeing instances of disease arising from insanitary conditions. These are discovered too often after they have produced sickness or ill-health, but a more careful inspection by the sanitary authorities ought to remedy these defects before they can do mischief. Again, though many landlords spend time and money in improving labourers' dwellings, there are yet all over the country a vast number of cottages in bad repair, badly constructed, and without proper accommodation. If Lord Winchelsea's union will endeavour to improve these dwellings it will make the labouring population more contented and less desirous

of moving into large cities. Many proprietors of cottages, more especially small tradesmen, rack-rent their tenants and yet keep their cottages in a miserable condition, and it is this class of proprietors also, rather than the great landlords, who are most supine in regard to sanitary improvements.

IN the issue of *Nature* for December 2 some account is given of the progress of the preparations for erecting an observatory on the summit of Mont Blanc. It is stated that it has been decided to use the snow itself as a foundation, this decision being in part the result of some experiments which were made at Meudon for the purpose of ascertaining the resistance of compact snow to the pressure of a building. A miniature mountain of snow was made, pressed artificially to the same density as that which is found on Mont Blanc at the depth of one or two metres below the surface. This having been levelled at the top, discs of lead 35 centimetres in diameter, and weighing each about 30 kilogrammes were placed on the snow, one above the other; after twelve had been piled they were removed, and the depth of the impression made was measured and proved to be only 7 or 8 millimetres (about $\frac{7}{16}$ of an inch). The information here given in the pages of our contemporary may possibly be of use to architects under some exceptional circumstances; at all events, it is of interest. We ought, however, to have been told for how long a time the snow surface was subjected to the weight before the depression was taken.

L'ARCHITECTURE for December 31 gives a description and pretty full illustrations of the new church, "Eglise du Rosaire," which it is proposed to build at Lourdes, the rendezvous of pilgrims. The design is rather a remarkable one; the church proper, which is in a somewhat Rhinish-looking Gothic, is mounted on an immense basement, and approached by two long sloping roads, carried on arches, and leading up to it from each side, the two roads or viaducts diverging from the church on plan, on somewhat the same lines as the colonnades in front of St. Peter's. The lower building, to which access is gained by a great arched portal of somewhat Byzantine character of detail, is intended, if we understand it aright, to be a place of access to the rocks whence the healing waters emerge; a kind of sacred "pump-room," in fact. The architect is M. Hardy.

IT is a very difficult matter to tell what the effect of the new railway rates will be upon different industries, as the reports at present available are rather conflicting. Last week's *Colliery Guardian*, for instance, remarks that "the new Act has been very indulgent to the coal trade as compared with other leading industries, the station-to-station rates being decidedly more favourable to the traders than those hitherto in operation." On the other hand, a Durham report of about the same date states that the new coal rates will not be well received in that district, and that they will have an adverse effect upon local traders. Similar reports come from Lancashire, but the Yorkshire coal-owners debated the question last week, and kept the result of the conference secret. This, taken with the admission of the *Colliery Guardian*, is rather suggestive of the prophetic utterance of the writer of the recent article in the *Times*, who speaks of the revision of the coal rates as involving a certain and heavy loss to the railway companies, "which will be accepted, possibly with gratitude, but certainly in silence; while each case of increase in rate will be cried from the house-tops." The effect of the change will be, of course, far from uniform, as the same traffic will be charged higher rates than before

* A kilogramme is 2'205 lbs.

between some stations, and less than hitherto in other cases. Traders whose traffic mainly passes between a limited number of places will be able to estimate the difference far more readily than those who are daily despatching goods in all directions. The agricultural engineers and others who have hitherto had the advantage of owners' risk rates will be hard hit if the new working classification is strictly adhered to, as no provision is yet made for owners' risk rates. It is probable, however, that details of this nature will be the subject of supplementary regulations, as the withdrawal of the old system would entail a number of claims for damage, besides seriously embarrassing the industries concerned. Traders will be enabled to ventilate their prospective grievances at the forthcoming meeting announced by the Mansion House Association on Railway and Canal Traffic, while the railway managers will anxiously watch the traffic returns for the new year. They will inevitably find decreases in certain descriptions of traffic, unless the new rates are modified, and experience will soon prove the necessity for giving way in order to avoid "killing" trade which has hitherto been a pretty constant quantity, and which they cannot afford to lose.

THE last number of the Athenian *Mittheilungen* (xvii., 3, 1892), has several important papers of general interest. Herr Julius Ziehen discusses the Asklepios reliefs, which are now at last, by the re-arrangement of the National Museum, made conveniently accessible to students. He gives woodcuts of several, which illustrate the interesting type where the god of healing himself visits the sick person. He also hazards the conjecture that the pigmy figure, usually known as Telesphoros, and regarded as the *demon* of convalescence, is really the impersonation of the *Tēlesthōra dōmipara*, (dreams bringing accomplishment,) which were so important a feature in ancient medical treatment. Dr. Dörpfeld has a paper on the dates, names, and topography of the various and much-disputed Odeions of Athens. He concludes that there were never more than three; the first was built by Pericles, and stood at the south-east foot of the Acropolis, near the theatre of Dionysos. It was a large covered building intended for musical competitions, but soon used for various other meetings. It was entirely destroyed in 86 B.C., and then lost its distinctive name, which passed over to a small covered theatre which Agrippa built a few years later near the old orchestra in the Agora. This is, according to Dr. Dörpfeld, the building that Pausanias called, without qualification, the Odeion. Soon after this, Herodes built the huge structure, of which we still have the ample remains. Then there were contemporaneously two Odeions at Athens; the one was called the Agrippæion, the other the Odeion of Herodes. Whether the old Odeion of Pericles, which was still standing, was used as such or for other purposes is not known. Other papers of interest are the "Muses of Praxiteles," by Dr. M. Mayer, who contends that the group called by Pliny *Thespiades* (Pliny, "Nat. Hist." xxiv., 69) were really Muses, and exercised a great influence, not only on such works as the recently-discovered Mantinea relief, but also on the minor art of Tanagra terra-cottas. Finally, there is an important paper on the "Dipylon" vases of later style, which goes far to prove that the whole disputed class are Attic work. While speaking of Athens we may note that the first volume of Dr. Kabbadias's catalogue to the National Museum has been reprinted, with corrections and additions that bring it up to date.

THE Athens correspondent of the *Standard* (December 31) states that Dr. Dörpfeld confidently asserts he has now at last found the Enneakrunos. The spot in question is in the road south of the Areopagos and

south-west of the Acropolis, facing the Propylæa and leading from it to the ancient Agora. No inscription has come to light, and Dr. Dörpfeld's conviction is based on certain objects, including pipes soldered with lead, fragments of marble, and other unspecified indications which he attributes to the age of Pisistratos. Further news will naturally be looked for with eagerness. Hope as to substantial evidence of the exact *locale* of the Enneakrunos was getting a little dim. So recently as December 24 the *Berliner Philologische Wochenschrift* reported it yet unfound. It will be interesting to see how nearly the spot coincides with that conjecturally marked in by Dr. Dörpfeld in the plan of the Agora in the "Mythology and Monuments of Ancient Athens." If the Enneakrunos is really found, perhaps the most satisfactory thing of all is that we shall have no more treatises on the "Enneakrunos Episode."

THE Council of the Society of Arts are this year offering a gold medal, under the "Stock Trust," or a prize of 20*l.*, for competition among the students of schools of art in the United Kingdom, for the best original design for an architectural decoration for the interior of a building, either for the side of a room or for a hall or ceiling. The material and method of decoration are left to the choice of competitors. They are also offering, under the Mulready Trust, a similar prize for drawings from the life.*

VIENNA will this year practically close its long period of architectural enterprise of the highest order, the new Royal Palace (which will not be ready until 1900) being the only piece of monumental work still in hand, and a proposed Royal Theatre the only one in view. After the coming Spring the civil engineer will be entrusted with Vienna's public works in lieu of the architect, and if we refer to a list of the proposed works published in our columns last summer we find that he will have as much scope as the architect had during the last two decades. An enormous amount of unskilled manual labour will fortunately be required this year in Vienna, so that much of the distress prevailing in the Austrian capital ought to be alleviated. In the Austrian provinces, in Buda Pest, and throughout Hungary, there is yet much work for the Vienna architect, whose sphere also extends well into the Balkan States.

WITH the New Year two important pieces of building legislation come into force in Prussia, the one dealing with the regulation of structures in the suburbs of Berlin, the other relating to the erection of Government buildings throughout the kingdom. Both codes have been framed by Government officials after careful investigation and with the usual Prussian clearness in wording. For all that, the Suburban Act will probably have but a short life in its present form, as the local press strongly opposes the deterioration in the value of property caused by some of its requirements. The regulations for Government buildings, on the other hand, are not likely to require revision for many years, as a better drawn-up code would be difficult to find. Both pieces of legislation show careful attention to the prevention of fire-risks. The Government buildings which stand outside local jurisdiction have of late years been the scene of several serious fires. It may be added that in these public buildings the fire-risk is to be guarded against by an able fire-expert, who is an admirer of the use of the simplest preventive means, and does not let his requirements interfere with the wants of the architectural artist. This example might be followed by our Office of Works, who last month received a slight warning at Somerset House.

* Particulars can be obtained from the Secretary of the Society of Arts.

THE quarry-owners of Guernsey are threatened with powerful rivals in the vicinity of Cherbourg. According to a recent diplomatic report, the exports of macadam from the French port to England are rapidly increasing, and the material, we learn, is finding a ready sale on this side of the Channel. The export of this road metal, which in 1890 increased tenfold over 1889, trebled itself from 1890 to 1891, and as far as can be ascertained, there has been no falling off in the past year. Much, however, yet remains to be done to give this trade its legitimate impulse, although the expense and delays hitherto occasioned by cartage from the quarries was expected to be considerably lessened in 1892 by the construction of tramways and a railway to the quays. The machinery at the quarries is absurdly inadequate, and good cranes are badly wanted on the quays to facilitate shipment, though several improvements have recently been made.

THE slate industry of Angers, France, is a thriving one, and good material abounds. The quarries are situate about three or four miles from the town, and the metamorphic rocks from which they are derived extend over an area of about a dozen square miles. The greater number of the quarries are worked by a syndicate, the remainder being exploited by private individuals. Six of the workings are in the open air, the others being underground. The open-air quarry of Pont Malembert produces about two millions of slates per month, and employs 180 workmen; whilst another at La Paperie produces about the same number, but is worked with a gallery 558 ft. below the surface of the ground. Les Grands Carreaux has a gallery 164 ft. long, 148 ft. wide, and 330 ft. below the surface, producing two-and-a-half millions of slates per month, and employing some 400 people. Les Petits Carreaux, with a gallery 476 ft. underground, employs 350 workmen, and Hermitage quarry, with 400 hands produces over three millions of slates per month. La Grande Maison and La Poueze quarries yield one-and-a-half million and half-a-million slates monthly, respectively. Altogether about 3,200 workmen are employed in the slate quarries in the district, and the annual production is, in round numbers, 160 millions of slates, with a value of 145,000*l.* The slates extracted are principally of two kinds (1) ordinary, of which the price varies from 2*s.* 5*d.* to 1*l.* 8*s.* per 1,000; and (2) the English slate, varying from 1*l.* 12*s.* to 8*l.* per 1,000, according to size. The average wages of the hands employed are 2*s.* 6*d.* per diem, and many of the men are of a superior class, being very expert at their work.

THE recent fatal accident to a man in the Strand, who was killed whilst crossing that street in the dark by Lord Rosebery's brougham,—which, it is clear, was being driven slowly and carefully,—again calls attention to the urgent need for passages under the most frequented streets, or bridges above them. The necessity of stopping the vehicular traffic in much-used thoroughfares to allow people to cross adds largely to the prevailing blocks, and sensible inconvenience and delay, not to say danger, is constantly caused to pedestrians. It is just as easy to construct a bridge across a street as it is across a railway. Bridges in themselves may be so made as to be no eye-sore; or the railway-bridges can be so formed and be of such materials as to be picturesque objects. Therefore there can be no reasonable objection to them on the ground that they are unpicturesque; but even if they were not beautiful, we have to put up with many things for the sake of public utility which do not add to the beauty of our cities. Holborn, the Strand, Piccadilly, and other important thoroughfares ought to be capable of being crossed by means of bridges, and there is no doubt that in time the large numbers of

pedestrians would make for the bridge crossings, and would thus relieve the crossing traffic at other places. Here is a useful and unsensational improvement for the County Council to inaugurate during the year which is now beginning.

THE *Athenæum* having removed a few months ago to new premises* in Bream's-buildings, Chancery-lane, upon the demolition of its time-honoured offices in Took's-court for the new Patent Office, wishes to know "who was Took, who survives in the court which bears his name." But it appears that the original name has been corrupted, for in Strype's "Stow" (1720, Book III., p. 282, we read:—

"A Duke's-court, a large and well-built place, much inhabited by lawyers, as seated amongst the Inns of Court and Chancery; and this hath an open passage

Castle-yard, since Castle-street, is now Farnival-street. Strype's description is repeated, word for word, in Seymour's edition of Stow's "Survey" (1733). Book III., p. 800, and in the second volume of Maitland's work (1756) Book II., p. 965. The court is shown, unnamed, in Hollar's map of 1675, and in many others published since the Great Fire. In certain maps the name is variously given; for instance, as Duck's-court in Ogilby and Morgan's (1677), said to be engraved by Hollar; Tuke's-court in Pine and Tinney's (1749), based upon Rocque's survey of 1741-5, and engraved by Seale and Basire; Duke's-court in Sayer's reprint (1773) of Rocque; and Took's-court in Horwood's (1795-9). Seymour, on another page, calls it Duck's-alley: "Duck's-court, Curator-street" is cited in Baldwin's "New Complete Guide," 1774-5, and by Hutton in his "New View of London," 1798. The greater part of the court stands in St. Andrews, Holborn; a gift of £2 per annum, in perpetuity, was made to the poor of that parish by one Thomas Tuck, whose benefaction was recorded in a table set up in the church (1673) during the rectorship of Stillingfleet, afterwards Bishop of Worcester: as Hutton tells us. A correspondent of our contemporary, last week, says that in "London and its Environs Described," 1761, he finds Bream's-buildings mentioned, and with a mark to indicate that it is named after the ground-lord or builder. He will find it also in Seymour, and in the Parish Clerks' "New Remarks," 1732, as situated within the Rolls Liberty, St. Dunstan's-in-the-West. The rebuilding of this thoroughfare, consisting mainly of miserable tenements, was begun eleven years ago, upon the purchase of the property from the Ecclesiastical Commissioners.

A REPORT by Mr. R. D. R. Sweeting to the Local Government Board upon an outbreak of enteric fever at Temple Cloud, in the parish of Cameley, in the Clutton Rural Sanitary District, shows that though the water supply is not as flagrantly bad as in some rural districts that have been reported on, it is in anything but an ideal condition. Water is obtained mostly from shallow wells and open dipping-places, but also from open spouts (piped from springs), and in one case from a deep well in the shaft of abandoned coal-workings over 300 feet deep. These several sources of supply are, as a rule, placed inconveniently, people having to go distances varying from 50 yards to a quarter of a mile for water. The shallow wells (of which there are at Temple Cloud 17 for the 90 houses) are liable to all sorts of animal contamination, being dry-stained, and generally uncovered. We find the usual defective and insanitary conditions reported in regard to drainage and privies, which still abound in our rural districts:—

"Drainage. Household soils in some cases are hand-thrown into rude catchpits situated near the

external walls of cottages. From these pits refuse often leaks away into the surrounding ground, leaving in them dark, foul smelling masses of filth. The only main drain in the place receives the house slops of a few houses and clusters of cottages at the southern end of Temple Cloud. It is constructed, for the first 50 yards of its course, of 6-in. 'sanitary' pipes, and then for 115 yards it is made up, partly of rubble and partly of 6-in. 'field pipes.' It discharges into a ditch along the roadside, which receives the contents of another ditch from the northern and central parts of Temple Cloud some 50 yards lower down. The ditch meanders for some distance before discharging into the Cam at Temple Bridge. It has been proposed by the Sanitary Authority to relay this drain entirely with sanitary pipes, and to provide a settling or subsidence tank at its termination, with discharge of the supernatant matter into a ditch. Correspondence with owners of property is still in active progress upon this subject; but nothing has been yet definitely settled.

Excrement Disposal.—This is effected by privy pits, of rude construction for the most part, often mere holes in the ground, quite uncovered or loosely covered by stone slabs, the contents of which are emptied at long intervals by the occupiers, and applied to the gardens. Usually, one small privy serves for two cottages, and is placed very close to one or other of them. But at better-class houses and outlying farms, excrement is conveyed to cess-pools well removed from houses, having an overflow to the land or to ditches; and I observed a movable pail at one cottage. At Temple Bridge, where some privies are situate directly on the banks of the Cam, the overflow from the pits finds its way to that stream; whilst at Chelwell many privies are situate directly over a stream tributary to the Cam. I saw at my visit masses of excrement on the surface of this stream, which passes close alongside and in front of cottages hereabouts.

THE recent decision in the Circuit Court of New Jersey, under the New American Copyright Act, in favour of Messrs. Eyre & Spottiswoode, shows that under the Act English publishers will be able to bring piratical American publishers to book when the Act applies. Messrs. Eyre & Spottiswoode registered the copyright of a mezzotint engraving under this Act; it was a reproduction of Mr. Sant's painting which he called "Little Lord Fautleroy." The New York Recorder Company pirated this engraving under the title of "A Noble Friend," in the form of an art supplement to the Recorder paper of February 28, 1892. It is worthy of notice that the fraudulent character of this performance was clearly understood by the American publishing company, as they reproduced the engraving under a different title. But whilst this decision shows that when this Act applies the law will be enforced, it is clear that it can only be done with a good deal of trouble and expense. Moreover, it cannot restrain American publishers from the practice of making use of illustrations which are published in journals in this country, such, for instance, as appear in the pages of the *Builder*, which are frequently reproduced in America without permission and without payment.

THE LOAN EXHIBITION AT BURLINGTON HOUSE.

ALTHOUGH we cannot echo the opinion which we expressed in some of the daily papers that this year's Loan Exhibition is equal to any of its predecessors (a statement which is, in fact, regularly repeated every year, some critics having, apparently, imperfect memories), it is certainly a finer one than those of the last year or two, and includes some works of exceptional interest and power. Among these may be mentioned the two remarkable Rembrandts, the portrait of the painter's son (50), one of those half-lighted heads, in which Rembrandt delighted, and in which the mere mechanism of portrait-painting seems entirely concealed; and the half-length "A Man in Armour" (111); which, in some respects, one would hardly take for Rembrandt; in the rich and ornate treatment of the armour and the style and cast of the features the painting reminds one of some of Leonardo da Vinci's heads of armed men. The portrait of his son, on the other hand, is one of the most thoroughly Rembrandtish pictures that one could well see. Among the larger works of the year Vandyck is represented by the noble portrait group lent by the Earl of Strarford, of Thomas Wentworth, earl of Cleveland, and his wife, son,

and daughter. The two men are standing, the father on the left hand, the son in the centre of the picture, the lady seated on the right, with her daughter standing behind her. The young man, with his light hair and handsome face, clad in complete armour, makes a charming centre to the group, and the figure of the Earl is full of dignity; the female figures are less attractive, and have a somewhat *bourgeoise* look very unusual in a Vandyck group. At the opposite end of the long gallery hangs Rubens's brilliant, powerful, and bustling picture of the "Daughter of Herodias" (128), a feast of sense among the Flemish aristocracy, with a Scriptural title appended to it. The same painter's "Holy Family" (74), in Gallery II., has more the appearance of having been intended as a religious picture, and is both finely composed and fine in colour; yet it does not impress one as a work of the highest class, perhaps because the trick of composition is too obvious, and gives the picture we know not what of an academical appearance. On the north wall of the large gallery hangs the Earl of Strarford's "Holy Family," by Titian (117), one of the painter's open-air representations of this time-honoured subject; it is very cracked and gone in parts, and probably generally faded more or less in tone; but the flesh of the Virgin and the child, so much of it as is seen, has a remarkable richness and warmth of tone; it seems really to radiate a mild, warm glow from the canvas. The same painter's "Diana and Actæon" (120) is either much damaged and repainted, or is a poor and mediocre specimen of Titian. On the same wall hangs Giorgione's strange painting of "The Adulteress brought before Christ" (119), in which there is a kind of attempt to give a dramatic expression of the situation by means of figures wholly of the costume and style of the painter's own day; the man in armour on the left, with his back to the spectator, is a peculiarly Giorgionesque figure. On the opposite (south) wall of the long gallery the centre place is filled by Turner's "Festival upon the opening of the Vintage of Macon" (137), one of the largest but not one of the finest of Turner's pictures, at any rate not in its present condition. These are the large works of the year, to which we may add also Landseer's painting (37) of the man who has been let down into a crevice after a stag and two dogs which have fallen over the precipice, of which one dog is still living, and is caressed by the man as he shouts to his comrades: that is to say, he is said in the catalogue to be shouting, but he is not really, he is only going through a pantomime which does not strain his facial muscles the least; nor are the rocks real rocks, they are only picture rocks; but the painting and drawing of the dead stag, foreshortened, are splendid.

Among other things in Gallery I is Lewis's splendid and sumptuous painting, "The Doubtful Coin" (38), with the woman's yellow dress making a kind of brilliant flash in the room, and with the bit of architecture shining in strong sunlight at the back of the composition. His picture of the "Bezestein Bazaar, Cairo" (45) is also here. Both make one regret rather than such splendid powers should not have been expended on subjects which possess some dramatic, as well as picturesque, incident. The brilliancy with which Lewis puts on canvas this gorgeous effect of Oriental colour in dresses, jewels, silks, and strong sunlight through occasional apertures, is wonderful; but his whole mental energy goes to producing the effect, there is no interest in the scene or the people, other than that picturesque interest which the scene itself would have; there is nothing behind that: they are pictures addressed to the senses rather than to our reason or our feelings. There is more of human interest in John Phillip's "Chat round the Braseron" (36), for the figures have considerable individuality of character, and are not merely figures to produce an *ensemble*; in every sense this is a very good specimen of Phillip's somewhat restricted powers.

Among the portraits in the collection one is glad to see three examples of that fine and too much forgotten English painter, Sir William Boax, of which the finest is the portrait of the late Frederick Huth (42), a most dignified and refined work in pose, feeling, and execution. Other noticeable portraits in the first room (devoted as usual to deceased English architects) are Romney's "Mrs. Dawson" (7), and Reynolds's "Lady Elizabeth Keppel" (21), which latter has indeed suffered much from time, but is a work marked by strong individuality of style and (as far as it remains) colour. Gallery II. contains a powerful Rembrandt portrait of an old lady (75), and in Gallery III. Murillo's full-length portrait (107) of a man of common-place appearance but in a very picturesque dress, is notable as a piece of strong,

* For an illustrated description, see the *Builder* of April 9 last.

solid, brilliant workmanship. At the opposite end of the room are some fine Vandyck portraits, and in the same gallery is a lovely portrait of "Miss Close" by Romney (100), a young lady of great beauty in the white dress which Romney seems to have had such a preference for, seated in an attitude in which dignity is combined with natural grace and ease.

Landscape is not very strongly represented; in the first room is a work by Constable which he can hardly have considered as more than a study for a landscape, but which forms an instructive contrast with J. B. Pyne's pretty but over-finished and artificial view of Eton College (33), a picture which attracts at the first glance by its exquisite art, but in which art is so over-refined that we lose sight of nature. Callcott's large seascape, "The Mouth of the Tyne" (12), with a delightful old round-bowed ship with bulky timber catheads coming up with the breeze, is a curious survival of a manner of painting the sea which was considered, we presume, to be satisfactory in Callcott's day; long shallow troughs of waves, each of the same curve and each with the same little break and cresting at the apex. Did sea-painters ever look at the sea then? One would almost think not. We have made advances in this respect at any rate; painters who profess to paint sea nowadays at all events look at it and try to see how it really does move, and what colour it is under different atmospheric and other conditions. It is noticeable, too, in this picture, although it is evidently intended to be a bright breezy day, what a dull brown hue there is over it all, as if the painter was afraid of sunlight, and wished to tone down the brilliancy of nature to a decorous Academy standard. One of the finest landscapes in the room, in regard to force and poetic effect, is Rembrandt's small picture "Tobias and the Angel" (86), a dark scene of piled up rocks which seems almost threatening in expression. The three or four small and delicate landscapes of Van der Neer are an attraction of the exhibition, especially the landscape "Early Morning" (94), with the distant ship scene against the eastern sky.

The Dutch Room (Gallery II.), besides the works we have already alluded to, contains the usual average of works by Teniers, Metsu, and Ostade, in which we seem to meet each year the same figures engaged in nearly the same indifferent and uninteresting occupations, and painted with the same care and attention to details. Mrs. Baillie Hamilton's Teniers, with an old man wheeling a barrow of most religiously studied cabbages (49) is one of the best and one of the most typical. Far be it from us to deny that each one of these pictures is a possession in itself, for certain qualities; but the contemplation of a number of them together leaves a sense of monotony and of a very low intellectual standard of painting. It must be admitted that there are no works of this school, in this year's exhibition, so pre-eminently brilliant after their kind as some that have been seen in former years. Nor are the majority of the early Italian pictures in Gallery IV. of very much interest except from the historical point of view. The finest thing in this room, and one of the finest portraits in the collection, is that of Sir Thomas Gresham (177) by Antonio More, which, with two or three others of similar type, has been placed in the gallery otherwise devoted to early Italian work.

The special feature of the exhibition is the collection of drawings and water-colours by Calvert, Palmer, and Blake, all friends, and all with somewhat similar tendencies to the mystical. Calvert is just being resuscitated, perhaps partly owing to the attention which some specimens of his work recently exhibited in the British Museum Print-room have excited. He is well worth resuscitating. With some of Blake's mysticism and imaginative faculty, he drew much better than Blake usually took the trouble to draw; for from some of his work it is obvious that Blake could draw the figure much better, when he chose, than he generally did choose. He seems to have been so much occupied with the idea to be expressed that he neglected the drawing. The collection of his large coarsely executed sketches for illustrations to Dante, in the small room beyond the water-colour room, will we fear send many devout Blackists away feeling a painful doubt about their idol. It is possible that had Blake engraved these on a small scale, in his peculiar fashion, he might have made them as interesting and powerful a series as the illustrations to the book of Job; but as they stand they are certainly very feeble productions.

The works by Calvert which are exhibited are partly a series of very interesting studies in oil, in very low tones and in a kind of half-

light effect, of ideal subjects illustrated by nude figures; the scenes being given in a faint light making them look like dreams of pictures. But superior to these, and perfectly exquisite in their way, are Calvert's small engravings, apparently for book illustrations, of which a few are framed together (105, 106, 117). There is a certain naïveté about these, as in Blake's similar works, but they are much better engraved than Blake's; and the poetic feeling and fancy of these little works, and the manner in which luminous effect is got in sky and water by the powerful treatment of the shadowed portions of the landscape, can hardly be over-estimated. The little figures introduced, too, are full of poetic charm. Besides these, there is to be seen again in this room Palmer's series of grandly conceived if somewhat exaggerated landscapes, partly in illustration of Milton's *A Allegro* and *Il Penseroso*, and which have something Miltonic in their stateliness of composition and their bold masses of colour. These have been exhibited in London not long ago, and we have commented on them recently; every one will be glad to see them again; they do indeed suggest questions as to the relation of landscape-painting to actual nature, and they are exaggerated in effect in some cases and do not present a perfect balance of execution; but at least they carry the mind higher than the boozing boors of Ostade and his brethren.

The large collection of water-colour sketches by a former Marchioness of Waterford, in the same room, we cannot find space to speak of particularly, but they are well worth attention and show the true feeling and power of an artist; and in some senses the water-colour gallery may perhaps be considered the most interesting room in the Loan Exhibition of 1893.

LETTER FROM PARIS.

WITH the approach of the New Year the minor exhibitions began to open in various galleries.

At the "Théâtre d'Application," in the Rue St. Lazare, there have been for some days exhibited a collection of the landscapes of M. Havet, flower paintings of very decorative type by M. Schuller, animal paintings by M. J. J. Rousseau, and portraits by M. Dagnaux, one of the best pupils of M. Roll. At the George Petit Gallery there is an interesting collection of fancies by M. Lachenal, an artist who has worked energetically to revive that ancient art in France. This year his exhibition, which consists of works in stone-ware and in enamel, shows some interesting novelties of effect. There are a good many decorative pieces treated with animal subjects, very well modelled. We may mention also, at the gallery in the Rue de Sèze, the watercolours of MM. Ogier and Jacquin, interesting recollections of a tour in Biscaye.

We also find at the George Petit Gallery the best of the painters who every year unite their works under the title of "Exposition Internationale." Among these artists, the majority of whom are landscape painters, M. Cazin holds the most important place, several of his works reminding one very much, in their quiet harmony of colour and a certain calm that pervades them, of some of the best of the Dutch school of landscape painters. M. René Billotte, who loves half-lights and evening effects, paints scenes in the Parisian suburbs and in the dunes of Gascony; M. Dumoulin paints St. Petersburg and Paris; while M. Dauphin forms a contrast with his warmly-coloured scenes from the South of France, among which especially is a remarkable study of Cap Martin, Monte Carlo. The landscapes of M. Montenard and M. Cagliardini, the views in England by Mr. Walter Gay, the portraits by M. Jacques Blanche and the pastels of M. Prins, are also worth attention.

The next Champ de Mars Salon will probably include an important ceiling painting by M. Duvis de Chavannes, the first work he has painted for a ceiling. It is intended for the grand staircase of the Hôtel de Ville, and the sketch has been accepted. The design is perhaps not sufficiently "plafonnante" in style, but it was felt to be undesirable to try to impose on so eminent a painter any conditions contrary to those to which his own taste and habits in painting would naturally lead him; and if the work is rather a "picture" than a ceiling painting, it will at any rate be in harmony in other respects with architectural conditions, and will not appear, like some decorative paintings, to dig a hole in the surface on which it is painted. The subject is "La Ville de Paris, couronnée par les Lettres, les Sciences, et les Arts, agréée l'hommage du Chantre immortel qui l'a célébrée." Victor Hugo,

clothed in a long floating garment, and crowned with laurels, presents his lyre to Paris. A trio of flying figures symbolise lyrical, legendary, and dramatic poetry. Under a portico, which seems rather wanting in substance, a group of youths, attendants on Paris, wave palms. Fifteen compartments, in the form of tympana and arches, are treated in relation to this central work, the tympana being occupied with figures representing "l'Esprit," "l'Elegance," "l'Urbanité," &c. On the arches are other allegorical figures, including "Paris au moyen âge" and "Paris moderne."

The question of the Expiatory Chapel in memory of the death of Louis XVI. and Marie Antoinette is again coming up, and this time the Municipal Council has abandoned its claim for the destruction of the Chapel, which is not, in fact, under its control, having been built on ground belonging to the State. It has confined itself to demanding the erection, on the neighbouring square, of a monument to Lepeletier and Saint Fargueau, who, having voted for the death of the king, were afterwards stabbed by a garde-du-corps named Paris. This is to be a simple bust with some symbolical ornaments, and M. Dalou is to be asked to execute the bust. It is hoped that this proposal will satisfy all parties and put an end to the long wrangle about the Chapel in the Boulevard Haussmann. The Government, however, does not look with much favour on the idea.

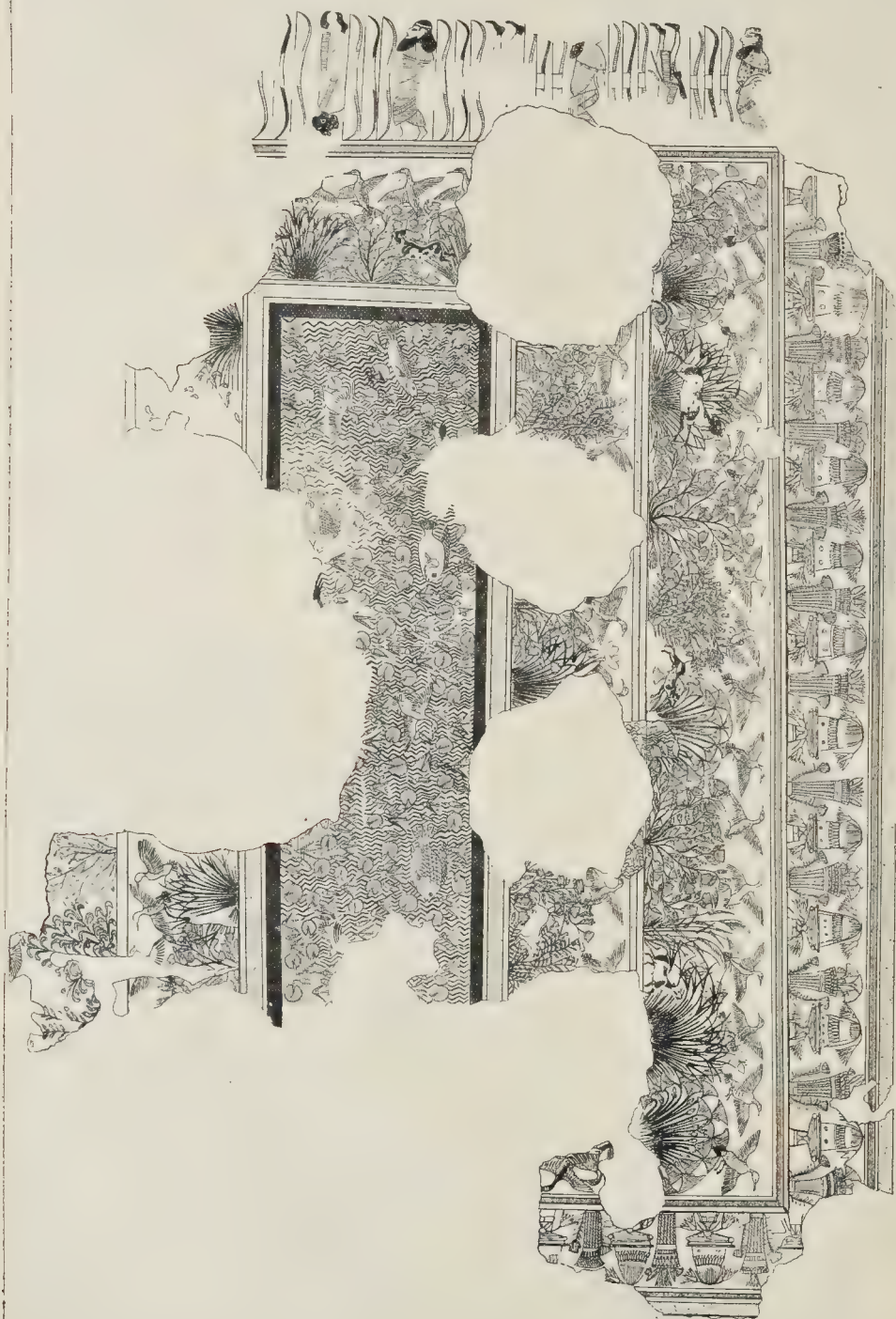
The Department of National Museums has received some interesting donations: Assyrian bas-reliefs, bronzes from Cyprus, early vases from Crete, &c. We may mention also, among modern works presented to the Louvre, the original plaster model of the monument to Watteau at Valenciennes. This monument, placed in the centre of a fountain, the vases of which are ornamented with bronze swans, is decorated with the figures of the leading personages in Italian comedy. Above is the statue of Watteau, one of the most graceful works of Cayreux.

There is talk of a new coinage, with new effigies, which will shortly be seriously studied. The Republic of 1870 made no new coinage (contrary to the previous habit of doing so at every change of government); it merely made use of the existing dies which were in the State collections. The existing head of "La République," which is very commonplace, was the work of the sculptor Oudiné. It is desired now to substitute for this something really new and original, and if the project is seriously taken up, there will be a competition opened among artists, on the same lines as that which the Municipality of Paris organised in 1879 for the municipal medal, which was designed by M. Daniel Dupuis.

There have been disagreeable occurrences again at the École des Beaux-Arts, similar to those which a few years ago led to the closing of M. Bonnat's atelier. This time it is the pupils of M. Gustave Moreau's atelier, who inflicted on a new comer the cruel and stupid persecutions known as "Brimades." The affair was brought to a climax by a resolution that the new student should be painted Prussian blue. The Minister of Fine Arts has intervened for the establishment of order in the studios, and the authorities of the École are to keep a strict watch from this time and take severe measures in case of any outrages of this kind being repeated. One moral from the story is that the behaviour of our young artist students affords a proof that any idea of opening the schools to young women, so much talked of a little while ago, is entirely out of the question for a long time to come.

While referring to the "École des Beaux-Arts," we may mention that the jury commissioned to judge the competition for "Enseignement simultané des trois Arts" has awarded second medals to MM. Daubé and Bliant, pupils of the second class in architecture, and medals to MM. Dufour and Guadet. M. Mayeux has obtained a medal for the competition in decorative composition, the subject being "Un foyer de Théâtre Lyrique."

The unexpected death of the painter Victor Galland has caused much regret in the artistic world. Galland, who had achieved an important position by dint of energy and hard work, was the son of a goldsmith at Geneva, where he was born in 1822. He came to Paris at the age of seventeen, and having worked for two years under the architect Labrousse, he entered the atelier of the painter Drolling, dividing his studies between painting and architecture, and doing various decorative work to gain a living. Thus, he collaborated with Ciceri in the decoration of the Palace Theatre at St. Cloud. In 1858 he began to distinguish himself in work for the decorations or public fêtes. He then went to Constantinople to decorate the palace of an Armenian prince. Thence he betook himself to Italy, where he



Reliefs at Thebes, Egypt. (See next page.)

studied the pictures of the old masters for several years. On his return to France he was commissioned to decorate several private houses as well as some public buildings, and subsequently carried out important works of this kind at Stuttgart, London, Madrid, St. Petersburg, and New York. As a good example of his style we may mention the figures of angels in the Church of St. Eustache, the "Prédication de St. Denis" in the Pantheon, and a number of designs for tapestry intended for the Palais d'Elysée. He also designed the diploma for the Exhibition of 1889, which was the subject of a public competition. For the last twenty years Galland had been professor of decorative art at the Ecole des Beaux-Arts, and was also director of works of art at the Gobelins.

Galland's last important work was the decoration of the grand gallery of the Hôtel de Ville, parallel with the three *salons à arcades*, representing the Parisian trades and corporations in the sixteenth century. It has been much criticised, perhaps with reason in some respects; but it must be admitted that it is at all events a very learned work, to which much study must have gone. One praise that must be given to Galland is in regard to his absolute respect for the architectural lines in decorating a building, the result, no doubt, of his early architectural studies. He was most difficult to satisfy with his own work, keeping it on hand and touching and retouching it, often expending on this perfecting process more time and labour than the price he received for his work could at all compensate him for. Naturally, with this self-abnegation in the interests of his art, he died poor. He leaves a wife and three children—two sons who continue worthily the artistic traditions of the family, and a daughter who married M. Jean Gounod the painter, son of the celebrated composer.

M. Georges Brégnier, whose decease, as well as that of Galland, has already been mentioned in our columns, was a pupil of Gerôme and Meissonier, and exhibited for the first time in the Salon of 1881, a portrait; and in the Salon of 1887 had a large historical picture, "Henry II. at the tomb of Thomas à Becket." In 1889 he became one of the original members of the *Champ de Mars Salon*, where he exhibited "L'Atelier de Meissonier." He had two important pictures in the last Salon. In his death, at the age of thirty, cuts short a career full of promise.

We have also to record the deaths of the sculptor Alfred Gauvin, an able artist, and of the landscape-painter Dalgé de Fontenay, a pupil of Hersent and Watelet, who has died at Paris at the age of eighty.

PAVEMENT AT TEL-EL-AMARNA, EGYPT.

By the courtesy of Dr. Flinders Petrie, we are now enabled to reproduce his own drawing, which shows the design of the remarkable pavement found by him during the recent excavations at Tel-el-Amarna.*

The pavement is that of one of the largest of the halls, that of the Harem; of the Palace of Amenhotep IV., the founder of the city, the site of which has now been excavated. One half of the pattern only is shown, the dimensions of the hall being 60 ft. long by 20 ft. wide. Another apartment adjoining has a pavement of similar construction. Dr. Petrie concludes from the difference of the patterns that the two sides were executed by different artists. They are certainly of different years, and there are signs of reconstruction. "The weaker artist did the first groups; he endeavoured to balance his inferiority by attempting more than his rival; he introduced convolvulus and insects in the first group, dragon-fly, locust, and butterflies; in the second group he attempted foreshortening the heads of the calves, the first such trial that we know of. The superior artist is the earliest free and naturalistic painter that we know of; the first man to draw from memory animals in rapid action, and to seize the waving and graceful spread of plants; and the first man who cast aside mere symmetry for artistic balance. We know of no rival to the ability shown in this sudden birth of art until the animal figures of later Assyria and Greece, and the plants painted in modern ages. The young bull bounding in the air is a most vigorous sketch, admirably conceived, but only failing in the details which the memory could not easily grasp in rapid motion." Elsewhere, Dr. Petrie has pointed out reason for the belief that these paintings were the work of native artists, and not foreigners, for while

several of the objects are drawn with great freedom of design and execution, yet the groups of the lotus, done by the same hands, are arranged in the conventional mannerism of older times.

The breaks in the design, where the pavement is wanting, show where the bases of the columns formerly stood. Some shattered fragments of the columns were discovered, from which a restoration was possible. They have already been described. The walls were also decorated in colour, and the broken remains were abundant enough to show that the large hall must have been a blaze of harmonious decoration.

The borders of the pavement are broad bands of black and yellow, the latter colour under the plants being to represent yellow sand. The scrap of water and birds has formed part of an earlier pavement,—perhaps ten or twenty years earlier,—which was broken up when worn, and a new one laid down and painted, the earlier one being of a different style, of smaller pattern, with a grey outline. The colours of the pavement are natural, the bulls being reddish-brown or white, the thistles purple blue, and the foliage of various tints of green.

The floor is of brickwork, formed of sun-dried bricks of Nile mud, the ground surface having been previously levelled, and laid flat in a single course. Over them was spread a layer of hard mortar, which, filling up inequalities, averages from $\frac{1}{2}$ in. to 1 in. in thickness. Above this was a finishing coat of fine plaster $\frac{1}{4}$ in. in thickness, with a good deal of hair. The main lines were marked out when this coat was soft, by stretching strings which were pressed into the plaster. In some cases, portions of the colouring were done when the plaster was still wet, for marks of the brush can be detected. The surface was afterwards completely water-proofed and polished, so as to enable it to bear walking upon.

The patterns, excellent for wall decoration, are hardly such as would be chosen by a modern designer for a flooring surface; nor are they quite what we should expect to find on an ancient pavement. Yet, here, they are, revealed to us after being buried for so many ages, with all their curious details of construction. We have already spoken of the remote antiquity of these remains, and of the certainty of the correctness of the date assigned to them. In examining all the relics from this site, we may remember with advantage that they reveal to us the state of the arts at a period of 3,000 years ago,—a date anterior to the Exodus, according to some of the best Egyptologists; nearly 500 years before the building of Solomon's Temple; and more than 900 years before the age of Phœnicians.

The interest attaching to the discovery of this remarkable work has caused the Egyptian Government to have it roofed over, and as a further protection, it has a guard of custodians.

RAILWAY VIEWS OF BUILDINGS.

WE are not ashamed to confess that when in a train we like to look out of the window. We know not why it is, but we nearly always find our travelling companions ashamed of being caught in this act, and they always pretend to be deeply absorbed in the perusal of some newspaper or magazine. As, however, they seem only too ready to lend this periodical to some one else and appear disappointed if it is declined, we believe that at heart they are quite as fond of looking out of window as we are, and that their literary enthusiasm is little better than a sham. The wide-awake advertiser has found them out and knows their weaknesses: he is not to be deterred by any such pretences; hence we find his soaps, pickles, mustard, and ballet girls, represented in gorgeous colours on every coign of vantage that is visible from the rail.

Now, why should not the architect and builder be as wide-awake as the advertiser? That they are not so is evident, because we notice that new buildings invariably turn their backs to the railways, and very ugly backs they generally are. It is by no means an uncommon thing to find a church, chapel, or public building, which has a most elaborate front covered with carving and decoration facing some little back street down which not a hundred people pass in the course of the twenty-four hours, turning towards the railway a blank brick wall round which not even cornices or string-courses are continued, though thousands of people see the building alone from this point of view.

The sketch (Fig. 1, next page) represents the kind of view which one gets of many modern buildings from the railway.

We are not here complaining of private houses

backing towards the rail; there is generally something interesting to be seen about the backs of private houses; it is like "looking in unawares," and finding the family unprepared for visitors. (Fig. 2.) We are able to see that one "does the washing at home," that another keeps fowls and does not care about gardening; whereas the next has a trim, pretty garden, with a nice grass plat. Another is completely overrun with children—broken toys, mud castles, and puddles, occupying the whole space, and it's many a long day since the gardener had a look in. The next, perhaps, has a flagstaff on the lawn, and a summer-house made of old ship's timbers. Another has a vast bottle-rack, but—one must not judge too hastily.

Now all these have a character about them, and offer suggestions to the mind, and, consequently, they are a relief to the weariness of a long journey. Whereas the blank walls which form the backs of churches and public buildings, not only offend the sight, but are apt to make one jump at the conclusion that modern architecture is a sham, entirely calculated for show!

It is a very singular thing that when a railway runs through an old town the view obtained is almost invariably picturesque, although, of course, it is merely an accident that it is so. Canterbury, Ely, and Rochester are cases in point; but, where the line passes the portion of a town built since the coming of a railway the effect is almost invariably unpicturesque, if not hideous: Cambridge, Derby, and Bristol, for instance.

The tricks which railways have played with old towns are very peculiar, and many of these places have suffered in appearance in consequence. Those, for instance, who remember visiting Oxford by coach, and the magnificent effect of the city, driving over Magdalen Bridge and up the High, cannot help contrasting it with the present approach through St. Thomas's. An old Oxford man, a distinguished member of the University, once declared to the writer that he believed that an important portion of a man's University career had been sacrificed by this change, for it was never possible now for a man coming up to Oxford for the first time to receive the extraordinary impression which used to be made by the old approach. At Leigh, near Southend, the railway has done exactly the reverse, as it has appropriated the high street of the town, so that the place presents its best aspect to the railway.

We believe people often take it for granted that there is far less to be seen from a railway than is actually the case. Many people will tell you that "you see nothing of a country when passing through it by rail;" that a railway journey is so uninteresting that they prefer travelling by night and sleeping through it. Now this is a great mistake; and the whole of our experience proves exactly the reverse to be the case. Some of the most interesting places that we have ever visited attracted our attention from the view they presented from the railway. Würzburg in Bavaria, Schwäbisch-Gmünd in Württemberg, Bamberg and Maestricht (Fig. 3), Ingolstadt, and many other most interesting towns in Germany and Holland, we should never have seen had we not first spied them out from the train. Würzburg is a remarkable example of this. We only intended to stop there for refreshments and then go on to Nuremberg, but the view of the place, and of several little towns which we had passed in the neighbourhood, determined the writer to stop there and thoroughly explore the neighbourhood, with the result that for ten successive years he made it his headquarters for sketching expeditions, part of the results of which appeared in the form of illustrations and articles upon ancient German architecture in the *Builder*. Unfortunately, since we first visited it, the approach to Würzburg by rail has been slightly changed, and the station shifted to another end of the town, and although the view is still fine, it is less striking than our first glimpse of the town, of which a sketch is given (see Fig. 4, page 11).

In conclusion, we beg to offer the following advice to all architectural and art students who are bound on sketching expeditions. In the first place, *never travel by night*, except when absolutely necessary, or on a return journey home. Secondly, never make a hard-and-fast programme before you start, but leave your route undecided. Thirdly, never hesitate to sacrifice your railway-ticket, or portion of it, if you see anything that attracts you by the way; the few extra shillings which you lose weigh so little in the balance when compared with the advantage of exploring some interesting old town and sketching some original and characteristic work. And fourthly, do not worry yourself about getting any particular distance—if good material falls in

* See last volume of the *Builder*, p. 253.



Fig. 1.



Fig. 2.

way near it, why go to the field? Places that are the farthest away do not always offer the most valuable material, or even the greatest contrasts to what you are accustomed to see. There are many little Dutch towns, which are passed in a hurry to get to the Rhine or Switzerland, that are quite as interesting in their way as anything that will be discovered on the "grand tour." As Talleyrand said, "It is the unexpected which always happens." And this is as much the case in a sketching tour as in anything else. There is more pleasure, and often more profit, in the discoveries you make in a place which you did not know of before seeing it, than in the inspection of some place which you have carefully read up beforehand.

So we say to students, always look out of window when you are travelling by rail, and when you become a practising architect, remember that others may often see your building from a "railway view." H. W. B.

Illustrations.

SOME ENGLISH ARCHITECTURE OF THE LAST FIFTY YEARS.

THE large plate which forms the first of our illustrations this week is, as will be seen, a panoramic grouping, by Mr. H. W. Brewer, of some of the principal buildings erected in England during the last half-century. We give also a key to the plate. A general review of the progress of architecture in this country during the last fifty years forms the subject of our first article this week.

YORK MINSTER.*

THE view of York Minster, which forms No. 26 of the illustrations of the Cathedrals of England and Wales, is, as in some previous cases, taken from a supposed position which, owing to intervening houses, is not really accessible. The view shown here can really be seen from the road which runs round the north-east of the cathedral (except the upper part of the western towers and of the north transept gable), but no picture could be made from this point of view, as the angle included would be too large to take in the building in a drawing. The reason for selecting this view is that it presents one of the most picturesque aspects of the building, and one which is less known, drawn, and photographed than most others, and also because we must confess that we have never been able greatly to admire the west and south façades of the building. The west front, in spite of its exuberance of detail, is somewhat coarse and commonplace in design, and the same may be said of the south transept, and therefore we have preferred to take the north side in spite of the disadvantage of having to take the shadowed side of the building. There are other fine points on the north side; the bold and massive treatment of the nave, for instance, and of course the celebrated "Five

Sister" windows, but the latter have been so much illustrated that it was of less importance to include them here. On the other hand, we get in the foreground the Chapter-House, which is one of the most characteristic and picturesque features of the building. In fact, York, like Canterbury, is so large and multifarious a building that one can no more give a single general view of it from any close quarters, than one can give a general view of a town.

York was the site of a church from as early as 627 A.D., when a small chapel or oratory is related to have been built at the baptism in that year of King Edwin, who subsequently commenced a permanent stone church on the site, and one or two other churches succeeded each other and fell to decay; in fact, York Cathedral seems to have been specially marked out as the prey of fire, down to the comparatively recent conflagration in the present century.

The present cathedral in the main may be said to have had its rise after the fire in 1137, when Bishop Roger commenced the rebuilding of the choir in 1171. In 1260 the north transept of the church was built by John le Romaine, the treasurer of the church, and was completed in 1260. He also erected a central tower. His son, the archbishop of the same name, laid the foundations of the nave in 1291, and this and the two western towers were finished in about forty years from that time, by Archbishop

Romaine and his successor, William de Melton. Archbishop Roger's choir, however, was destined to disappear, owing to the usual Mediaeval feeling of a desire to improve on the architecture of a former period, and to rebuild it in the style of the day; and accordingly Archbishop Thoresby in 1352, deliberately pulled down half of Archbishop Roger's choir, and built the eastern extension of presbytery and Lady Chapel. The western portion of the old choir very soon followed, at a slightly later date. There appears to be no record that the former choir was dilapidated, or that it was destroyed for any other reason than the desire to put something better in its place. Shortly after this the present tower was erected, and with the exception of the Chapter-House, the cathedral may then be said to have assumed in the main its present architectural aspect, the other additions and alterations having been of minor importance.

In the process of measuring for the plan of the cathedral given in the present number, some irregularities have been detected in the laying out which afford interesting evidence of the difficulties experienced in fitting some of the portions together, in the process of altering and rebuilding piece by piece.

At first sight few of our Cathedral plans look more simple and regular than that of the Minster at York. There are, however, several points throwing light on the



Fig. 3.

* This series of illustrations of the Cathedrals of England and Wales was begun in our issue of January 3, 1892. A list of those already illustrated, with particulars of future arrangements, will be found on page 22.



Fig. 2.



York Minster.

Sketch of Ironwork on lids of 'Cope chest' in North Choir Aisle.

Scale

history of the building some of which are shown clearly on the plan given in the present number, others smaller in scale, which would probably be passed over if attention were not drawn to them, and which have been noted during the process of measuring and plotting.

The tower piers still retain their Norman core, which is the only Norman work above the floor level. The other important fragment of the early church is the crypt under the choir. The tower piers have been added to at various times. The western sides of the western piers are Decorated, forming the responds of the nave arcade. The north and south sides of the north-west and south-west piers respectively are likewise Decorated—part of the reconstruction in Decorated times. The western arch does not stand at right angles with the north and south arches of the tower, as the width of the easternmost bay of the nave arcade is wider on the north than on the south by a foot.

The axis of the Chapter-House is not parallel with that of any other portion of the building—not even with that of its vestibule. The Chapter-House was, as is shown by its mouldings continuing on the exterior, built before the vestibule; and the latter,

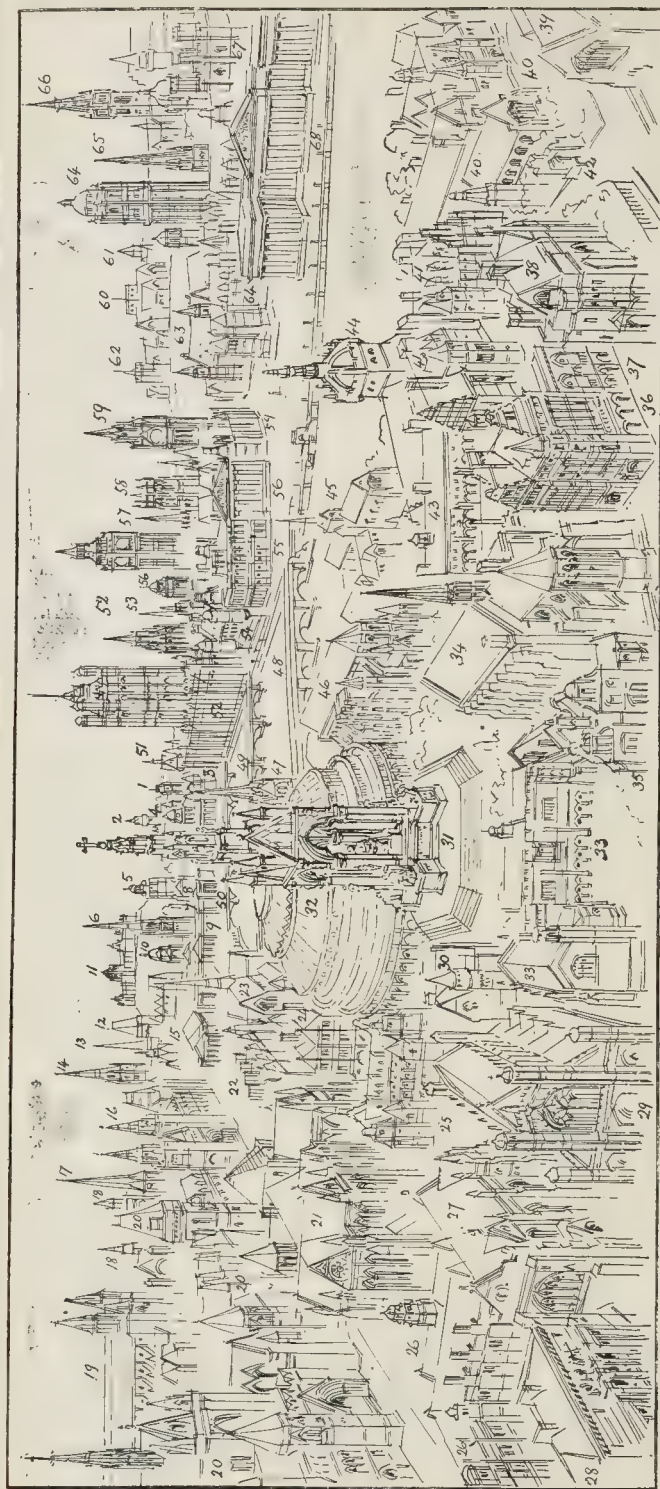
when erected, being made parallel with the north transept out of which it leads, was joined on to the Chapter-House proper without regard to its being parallel with it. The whole of the eastern arm of the church—the choir, presbytery, and Lady Chapel—presents some curious instances of irregularity. When Thoresby's Lady Chapel and presbytery (the four eastern bays of the present church) were built, the early English choir was standing, causing some difficulty, no doubt, in the setting-out of the new work. The centre of the east front was, however, made to agree with the centre line of the nave and central tower. But beyond this the lines of the new work do not seem to have been laid down with very accurate measurement. In the first place, the main axis of the centre of the presbytery bends to the north (going westward), and at the eastern face of the lantern is, as near as possible, 2 ft. 6 in. north of the centre line of the lantern and nave. In addition to this, the sides of the presbytery (the four east bays of the eastern arm) erected by Thoresby are not parallel, but are closer together at the bay west of the present reredos than at the east end. This is still more marked in the side aisles, the result being that the east walls of the

aisles are not parallel with the east wall of the centre alley, and the buttresses at their angles are turned outwards. The western portion of the presbytery (including the choir proper) built by Thoresby's successors, has its walls practically parallel, but the main axis or centre line of Thoresby's work was kept, causing the divergence before noted at the central tower. This in its turn has affected the later rood-screen, its doorway having had to be made central with the choir and not with the tower. There are consequently eight divisions containing canopied arches and statues on the south side, and only seven on the north.

This brings us back to the central lantern and the transepts, in connexion with which is another point to which we will refer. The erection of the lantern in late Perpendicular times caused a considerable thrust on the transept arcades, and pushed them out of the perpendicular. So serious was this that portions of the transept arcade were rebuilt nearest the lantern, although the upper portion seems to have been uninjured, and, consequently, was retained. This reconstruction seems to have included the Decorated piers of the arch north and south of the lantern on the west side of the transept, the filling in of the space between it and the Early English pier, and the rebuilding of the column which carries the two arches on the west side of the north transept nearest to the "Five Sisters." It is desirable to lay some stress on this point, as hitherto the rebuilt pier in the north transept and those next the Early English retained piers have been considered as belonging to the Decorated period. They will be found, however, to be of very different section to any of the Decorated work in the Minster, and although perhaps largely old stone re-worked, date undoubtedly from the period of the construction of the lantern, and are not part of the Decorated scheme. Professor Willis, in his exhaustive paper published in the York Volume of the *Archæological Journal*, makes the pier in the north transept Perpendicular on his plan, but, owing to what is evidently an error, refers to it in the text as "Decorated."

Amongst lesser points of interest in the plan is the west aisle of the north transept being wider than its corresponding aisle in the south, and the clever way in which the sacristies on the south of the choir have been worked with their lockers in between the eastern buttresses of the south transept. These sacristies were additions to the Early English choir, to which afterwards the Zouche Chapel (founded by Archbishop Zouche in 1351) was added. This group of smaller buildings was, consequently, in existence when Thoresby commenced his great work of rebuilding the presbytery, and the gradual diminution in the width of Thoresby's work may partly have been caused by a wish to retain the inner walls of these buildings as much as possible. As it was, the two sacristies were somewhat curtailed, and the Zouche Chapel had its north wall considerably interfered with, even if it was not, with its vaulting, entirely rebuilt.

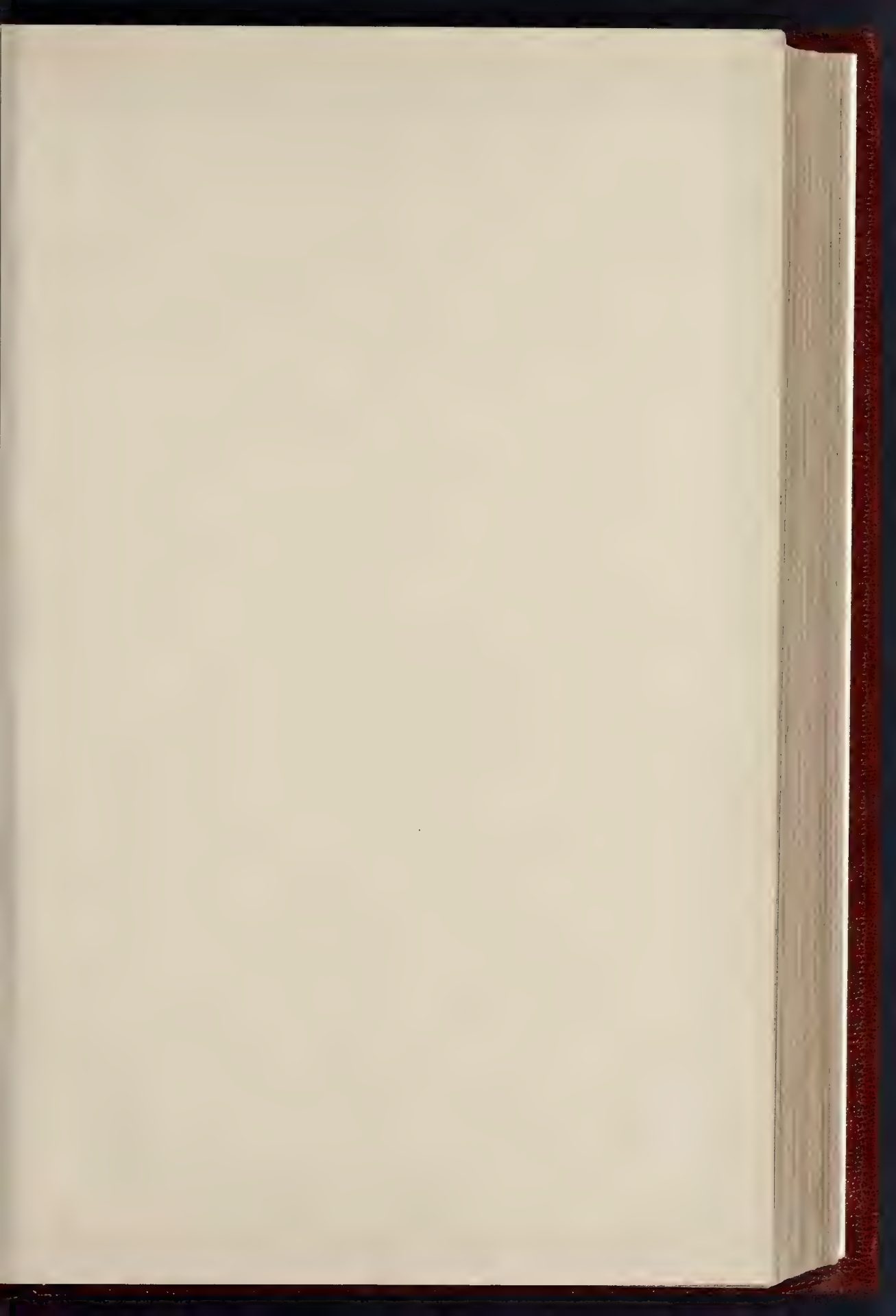
Externally, as we have observed, the west front of York is not a very admirable composition; the ranges of niches in the lower portion of the buttresses have a fine and rich effect, but the treatment of the upper portions of the towers is very commonplace, and the break in the line made by the strongly-marked cornice with the pinnacles above it oversailing the wall line, and



Key to Plate. "Some English Architecture of the Last Fifty Years."—References (beginning in extreme distance).

1. All Saints Church, Paddington. W. Wilke, E.S.A.
2. St. Thomas's Hospital. H. Curry.
3. Leeds Town Hall. Cuthbert Brodribb.
4. St. Martin's Church, Coventry. W. Young.
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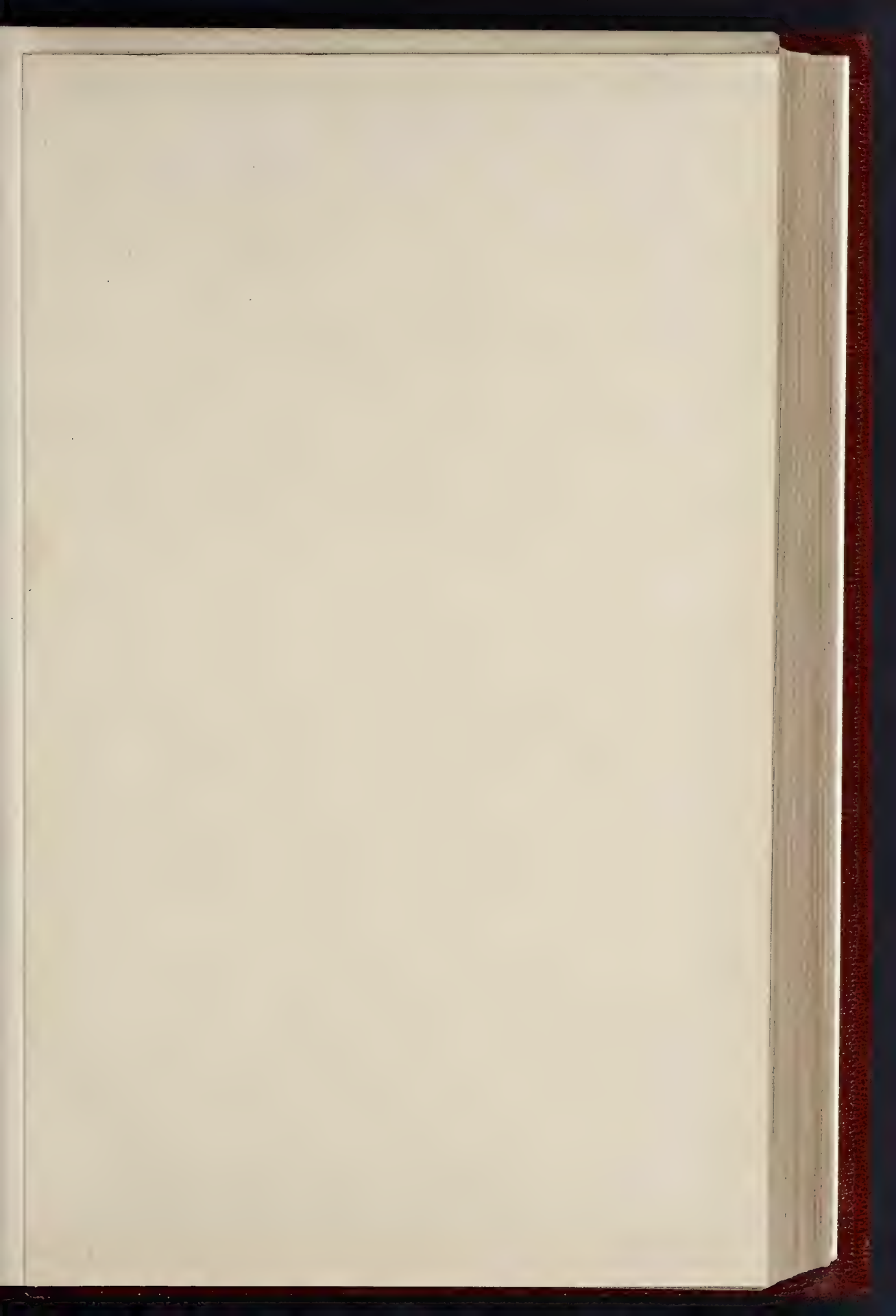
32. Junior Boys' Quad and Chapel. Elton, Sir A. Blomfield & Son.
33. Marlborough College Chapel. Elton, Sir A. Blomfield & Son.
34. St. John's Church, Coventry. W. Young.
35. St. John's Church, Coventry. W. Young.
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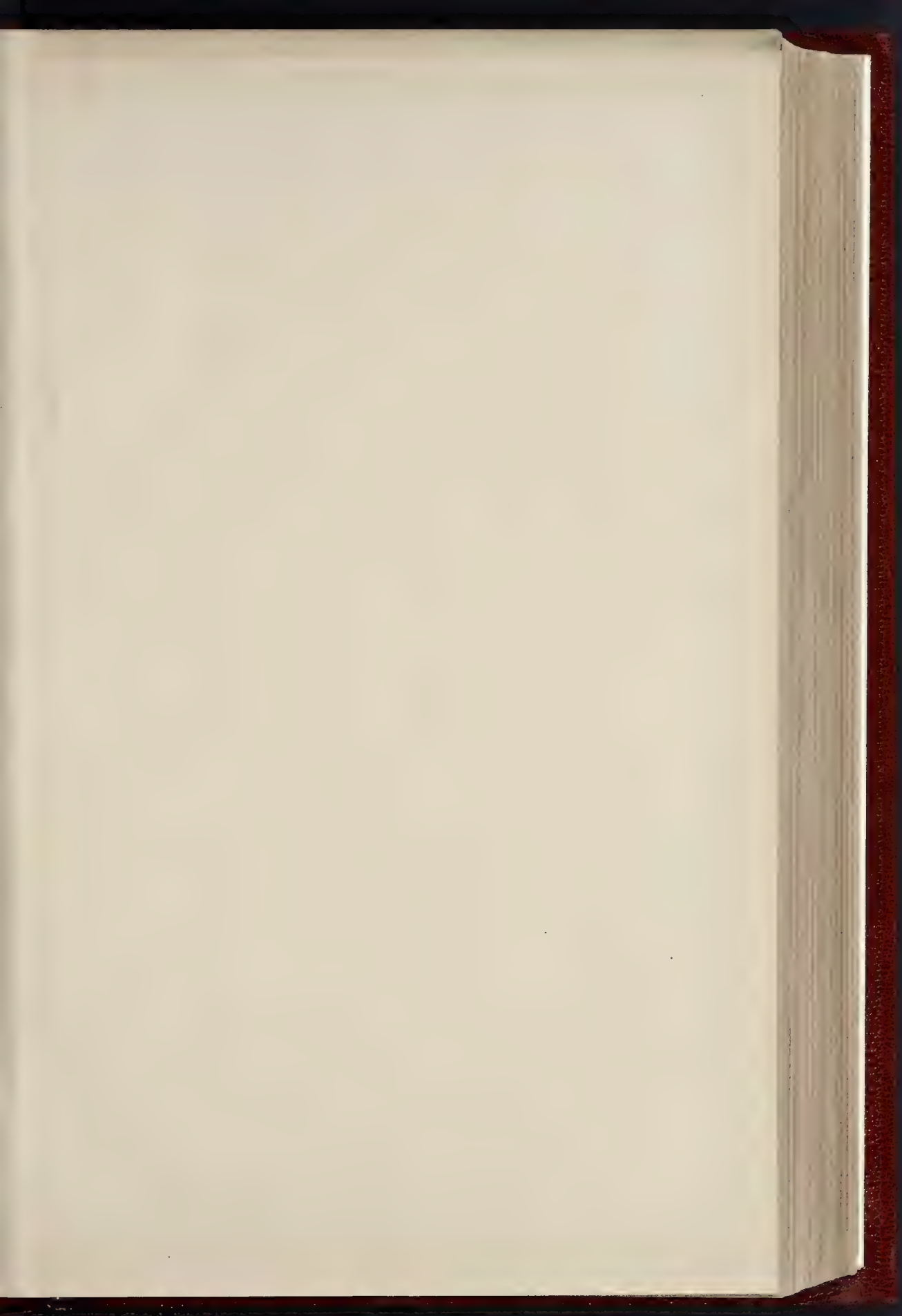






St. Peter's
Rome





THE BUILDER, JANUARY 7, 1893

New Premises,
Sloane Square, S.W.
Fred. G. Knight, Architect.





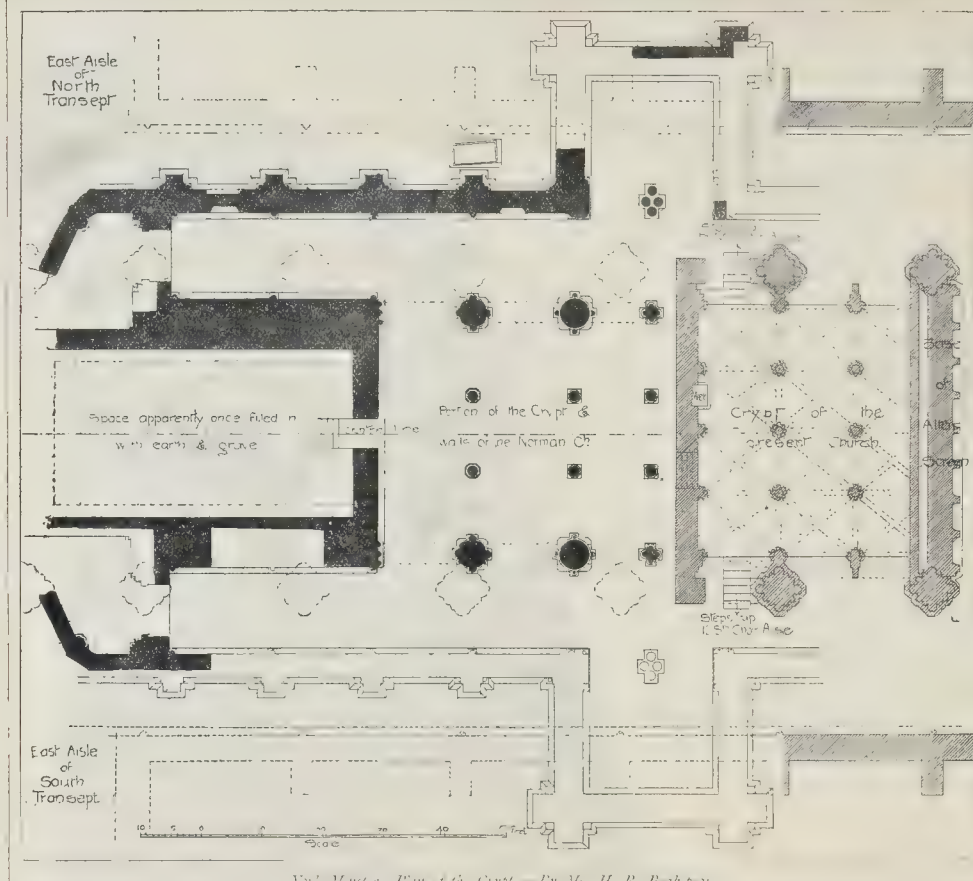
LONDON STREET ARCHITECTURE. NEW PREMISES AT CHELSEA.—MR F. G. KNIGHT, A.R.I.B.A., ARCHITECT.

DESIGNED BY THE ARCHITECT. DRAWN BY J. H. ST. JOHN. PRINTED BY J. H. ST. JOHN. 1851.

*Reproduction from original Working Drawing for the Design of the Inside of the Lid
of Grand Pianoforte.—By Mr. T. G. Jackson, A.R.A.*

See page 15.





the vertical line of the buttresses entirely cut off from it, has a very bad effect. The doorways were restored by Smirke in 1845. On the south side of the cathedral the exceedingly tall pinnacles of the nave have an effect by no means monumental, the building seems to want solidity and simplicity and to be too much cut up and frittered in line. The south transept has not these defects, but it is not interesting nor refined in design, it seems to be spread out in its various portions in a rather mechanical manner, and the details and mouldings are in a large and coarse style. Eastward of the transept the south and north sides of the main building are nearly identical in design, and it is one of the characteristics of York, a cathedral in which architectural play of fancy seems to have been curiously limited, that the window tracery all round the choir is of the same design, and as far as the ground story is concerned a poor design, which however is continued all round mechanically, and repeated in the smaller windows of the east front. The clearstory windows are indeed not of very interesting tracery design either, and the tracery-bars are thin and starved-looking, as was frequently the case in late Gothic; but an interest is given to them by the singular and very unusual treatment of the design here, by which a mullioned screen is interposed in front of the window, of entirely separate design, the piers between these screens also standing out quite separately from the main wall, with a considerable space between. Effective shadows are of course produced by this arrangement, and a degree of effect given to the clearstory which the rather tamely designed windows in themselves would certainly not have given. The introduction of the lofty narrow eastern transepts, breaking the line of the choir on each side, is a very fine and happy

architectural feature, though the long window with its meagre mullions and poor tracery, does not make the more of the situation. The same may be said of the large east window, effective from its size but not from its design. On the other hand, the manner in which that is connected with the wall design by the wall mullions is a very good feature. Some of the carving in this portion of the building is very spirited and bold in execution, particularly the seventeen heads which are carved each in a square panel under the sill of the east window, and which form an interesting series of studies of Medieval sculpture. The treatment of the buttresses and pinnacles at the east end is very picturesque and in some respects rather curious; the bases of the pinnacles are crowded with such a complicated mass of gables and crockets and finials that until one gets close to them on the roof it is almost impossible to distinguish how they are set out; but the effect is rich, and furnishes a good base to the tall slender crocketed spirelets. The series of wall niches carried over the east front and round into the angle buttresses is a very telling feature, and the designing of the corbel tables and parapets to both upper and lower roofs is well worth attention; the main feature of the corbel table to the upper roof is a convex string of boldly carved conventional foliage, that to the lower roofs a series of heads or masks; the whole of the work here has been very well carried out and with an evident intention to produce a sumptuous piece of work.

The chapter house is one of the most characteristic features of the exterior. It may be a question whether the peculiar treatment of the upper portion of the buttresses is not an afterthought, arising from a desire to put more weight on them than was at first thought necessary; it is difficult to believe that they were really

designed in this form; but the result, though looks like a makeshift, is remarkably effective and picturesque. The adjoining bit of the vestibule also shows some interesting treatment of buttresses, in a very different manner from the chapter house, but very pretty in its way.

The solid and grand design of the north transept is known to everyone, and is one of the most famous features in our English cathedrals, and there is something very satisfactory and monumental-looking in the plain and severe treatment of the nave buttresses on the north side, which in our opinion is far superior in an architectural sense to the be-pinnacled busyness of the south side. The tower produces effect mainly by its mass and by the bold and simple treatment of the angles, which gives it a great look of power. The window treatment here, as elsewhere, is poor. The tower was probably intended to have angle pinnacles; there is little doubt that it gains an architectural effect by not having them, its square mass being far more dignified and impressive without them.

Internally York produces an effect by its remarkably spacious and lofty character, but it is a somewhat bare-looking interior, especially so far as the nave is concerned, and as Fergusson remarks, the open spacing of its wide arch prevents any sense of mystery, one sees through the building in every direction. It is not enriched with many monuments, nor are the existing ones of the highest order of interest in point of design. One of the most notable of the minor details to be found in the interior is the admirable wrought iron work on the ancient cope chest, of which we are enabled to give an illustration from a drawing by Mr. B. Walker.

We also add a plan of the crypt, all the remains of the Norman structure, for which we are indebted to Mr. H. R. Brakspear.

CHARTRES.

The view, from a drawing by Mr. Joseph Pennell, we have called simply "Chartres," as it includes both the town and the cathedral, though the latter is of course the main object of the drawing.

Chartres Cathedral, as every one knows, is one of the most remarkable of the ecclesiastical monuments of France, and stands on the summit of a hill occupied by the chief town of the Département of Eure and Loire, the old streets of which have so curiously preserved their Middle Age appearance.

The cathedral, which dates back to a foundation in the third century, has gone through numerous vicissitudes. The actual building has been erected on the site of a primitive Roman church. It was consecrated to "Notre Dame" in the middle of the thirteenth century.

Chartres is the largest of the metropolitan cathedrals of France. It is 138 metres long and 33½ metres wide, and the nave is 34 metres in height. The capitals of the nave arcade offer a great variety of fine and interesting carving, and above the arcade is a fine triforium gallery surmounted by a lofty clerestory.

The west front is decorated with about 700 statues or statuettes, and is flanked by the towers, with their two entirely different spires which give to the building the well-known and peculiar character of its west front. The more modern one, the "Clocher Neuf," of very elaborate design, is 122 metres and a half in height; the *Ficche*, the highest in France, was partly built by Jehan de Beauce in 1507-14, and finished by Claude Angé, a carver, of Lyons. The "Clocher Vieux," about 112 metres high, is of simple and severe architecture, dating from the twelfth century. The side portals, which are of the thirteenth century (except some slight alterations in the fourteenth), are well known for their rich treatment in architectural detail and sculpture. M. Didron, in an interesting monograph on the cathedral, compares the sculptures to a poem in four cantos of a conception, he says, more vast than that of the *Iliad* or the *Æneid*. He describes the first division as representing the cosmogony, the creation of organised beings; the second is an encyclopædia of the sciences and their commercial and industrial application; the third a moral treatise on virtues and vices; the fourth a manual of religious history, from the creation to the end of the world. On the left or north side are sculptured the personages of the Old Testament, on the south side those of the New.

The ambulatory surrounding the choir is a well-known and fine piece of work, commenced in 1310 by Jehan de Beauce. The bas-reliefs which decorate it illustrate the life of Christ and of the Virgin. In the middle of the choir is the high altar, which is decorated with a sculpture of the Assumption in marble, by Bidaud. Behind the apse is a building, separate from the church, which contains a chapel of the fourteenth century with some very rich stained glass.

Beneath the church is a large crypt, the largest to be found in France. It is 110 metres long, and is decorated with some remarkable frescoes. The crypt is reached by five staircases, and contains fourteen chapels, as well as the well of the "Saints Forts," which is shown as the place into which Christian martyrs were thrown at the time of Diocletian—a story which may of course be believed by those who like to think that they are looking on the real scene of some ancient history, even without much evidence.

Mr. Pennell's drawing, though it can hardly be said to show the architecture of Chartres, or to be an architectural drawing in the sense in which the word is usually understood in our pages, gives a full idea of the way the cathedral sits on the top of the hill, and gives some idea of the character of the picturesque old city, besides being in other respects an admirable picture.

RESTORATION OF HADRIAN'S VILLA.

This restoration of the north-west face of Hadrian's Villa, by one of the ablest of the younger French architects of the day, formed one of the finest architectural drawings in a recent Salon Exhibition at Paris, and we give it not only as a fine drawing and an interesting archaeological study, but also as giving our readers an idea of the kind of work which is done by French architects who go to pursue their studies at the Villa Medici at Rome, for this was a Prix de Rome drawing.

The Villa of Hadrian at Tivoli, of which the ruins occupy an immense space of ground, constitutes one of the most remarkable remains of

Roman civilisation. It was the original conception of a man who was one of the most notable personalities of his time. Having travelled much to examine into the state of his empire, Hadrian wished to preserve a *souvenir* of the various countries he had seen. Hence this agglomeration of buildings of different styles and destinations. Along with habitations necessary for an Emperor and his suite are theatres, baths, and more or less faithful reproductions of the most remarkable edifices of other countries; a *suite* of buildings of all kinds, connected by splendid peristyles and porticoes, with domes, pediments, towers, terraces, and gardens all united in one sumptuous whole.

The north-west façade shows, above the terraces, the collection of habitations preceded by the Greek and Latin libraries connected by a portico sheltering the nine Muses, the statues of which were found among the ruins and are preserved in the Vatican Museum. Next to this comes the Nymphaeum, then the Basilica and the *Pocile*, preceded by a triumphal arch. At the rear is the auditorium. From the time of Hadrian to that of Heliogabalus, this splendid villa was successfully inhabited by Roman emperors, who, while making various modifications in it, added to its splendour and luxury.

Antoninus Pius, and after him Caracalla, began to despoil it of its art treasures to ornament their own palaces, but the actual ruin of the place probably happened at the invasion of Totila and his Goths in the Sixth Century; but in the Fifteenth Century there were still very considerable remains. Pope Pius II. who visited them, spoke of them with admiration. At the Renaissance period the site became the prey of a Italian commercialism, and a great many excavations were made in the hope of discovering statues or objects of art, and the whole ground was broken up, and these operations were unfortunately more injurious to the remains of Hadrian's Villa than the work of time or of barbarian conquest.

M. Esquié, the author of the drawing (one of a complete set for the restoration of the villa) was a pupil of M. Daumet; he obtained the Prix de Rome in 1882, a second medal in 1887; and a first medal in 1889, for this restoration.

"THE TREE OF LIFE." DESIGN FOR MOSAIC.

This illustration, taken from a painting by Mr. Burne-Jones which was exhibited in the New Gallery a short time since, is the design for a Mosaic to be executed in the church built by Sireet for the American community in Rome.

We consider it one of the most beautiful designs Mr. Burne-Jones has ever produced. The figure in the centre seems to represent the cross, the tree of death, turned into the tree of life; the branching tree instead of the dead wood, the figure with outstretched arms no longer nailed to the cross, but extended in welcome. There is a beautiful feeling too about the subsidiary figures, which seem to stand as the representation of the human family; the man with his labour at breadwinning (indicated by the sheaf), the woman with her children and her flowers. Architects will not fail to notice the admirable adaptation of the lines of the design to those of the architecture, which is carried out in a true decorative spirit. But it is the spiritual feeling in the design which is its chief beauty.

"SUMMER": DECORATIVE PAINTING.

This is a reproduction from one of M. Puvis de Chavannes' large decorative painting, in the Hôtel de Ville, Paris; a painting occupying the end wall of a room, the door architrave cutting rather unpleasantly, it must be admitted, into the picture. A companion picture of Winter has been executed by the artist for another position in the same building.

In its general treatment, the picture is a notable example of skill in treating landscape in a decorative sense; it will be observed how all the lines of the landscape are kept nearly level, yet in an unforced manner; and the long sombre mass of trees in the background has a fine effect and gives a kind of monumental aspect to the landscape. The foreground bathers on the left are somewhat too realistic in spirit to harmonise either with the main design or with the graceful group on the left; but as a whole the picture is a very fine example of decorative painting.

DESIGN FOR A GRAND PIANO.

We give two illustrations, from photographs, of the remarkable piano recently made by Messrs.

Broadwood from the designs of Mr. T. G. Jackson, and we have also asked Mr. Jackson to allow us to give a reproduction from his full size working drawing for the inside of the lid of the piano; which will be found on another page (not among the lithographs). This, of course, is simply a working drawing, not a finished up illustration, and must be taken as such.

We already gave a brief note on this piano when it was exhibited at the makers; we add the following details with regard to the execution of the decoration, taken from a pamphlet issued by Messrs. Broadwood:—

"The outside of the piano itself is veneered with purple wood, stained an exceedingly dark green (not black), and the effect of the natural dye in the wood, combined with the chemical used, produces the appearance of a very fine old ebony. The surface is dull polished.

Elaborate *intarsiatura*, representing a profusion of lily stems, leaves, and blossoms in satin wood and pear tree, dissipate the sombreness of the dead black in a striking manner.

To heighten the effect, the blooms are made to scintillate with the iridescent tints of mother-of-pearl, each lily being literally 'painted,' its centre being overlaid with transparent and variegated tortoise shell, through which a rich red enamel effectively gleams.

The top is fastened to the body of the piano by means of long and elaborately chased brass hinges of vine-leaf pattern."

The underside of the lid, of which we give the working drawing, is enamelled and lacquered in vermilion as a ground, on which the design of laurel leaves is executed in gesso. The centre ornament has been altered to a cypher since the working drawing was made, as may be seen on the photograph.

The instrument forms an object which there is little doubt will eventually find its way to some future museum of art, as an example of design in furniture. There are only two details we do not quite like in it; one is the shading of the escutcheons carrying the music inscriptions, so as to give them an appearance of relief. We cannot understand why that was done; it seems so much at variance with the whole principle of remainder of the design.

The other point we do not like is the introduction of the two scroll pieces underneath. We imagined they were necessary to the construction, and merely treated decoratively, but Messrs. Broadwood tell us they are no part of the construction. Why then introduce them? But these are minor matters, and the whole is a splendid piece of work; more especially the design of the supports, which ought to make a revolution in piano-legs.

COUNCIL CHAMBER, INSTITUTE OF CHARTERED ACCOUNTANTS.

This illustration shows a section through the Council Chamber of the new Institute of Chartered Accountants, of which building Mr. John Belcher is the architect.

The decorative treatment is admirably drawn by Mr. J. A. Slater. A cartoon for the large fresco on the centre wall is being prepared by Mr. Loudan, who is making a special study of this work; the architect thus hopes that not only will sculpture be represented in the building, but the sister art of painting also.

The external sculpture, by Mr. Thornycroft, R.A., and Mr. H. Bates, A.R.A., is nearing completion.

We may add that we gave a general view, with sections and plans of this building, in our issue for January 12, 1889; and a view to a larger scale of part of the façade, and plans, in our number for August 27 last.

NEW PREMISES, CHELSEA.

This illustration shows some new business premises, with residential apartments for assistants above. The buildings are now in course of erection in Sloane-square for Mr. D. H. Davies. The materials used for the front are light red bricks from the Laverstock and Acorn Company, and terra-cotta dressings and enrichments by Mr. J. C. Edwards of Ruabon, with Westmoreland green slates on the roofs. A considerable amount of iron and steel is being used in the construction, which is being supplied and executed by Messrs. Dorman, Long & Co. The work is being carried out by Mr. B. E. Nightingale, under the superintendence of Mr. F. G. Knight.

CHANGE OF A DISTRICT SURVEYOR'S OFFICE.—Mr. C. McDonell, District Surveyor of South-West Islington, St. Luke's, Old-street, &c., has removed his office to 12, City-road, Finsbury-square.

Books.

Electric Lighting, and Power Distribution.
Part I. By W. PERREN MAYCOCK, M.I.E.E.
London: Whittaker & Co. 1892.

NEITHER the size nor the scope of this little volume would of themselves entitle it to any detailed criticism, or single it out from the innumerable elementary treatises on the same subject that are continually pouring from the press. But the importance of a text-book is, in part at least, to be estimated by the number of students who are likely to use it; and the author's position as a teacher in the City and Guilds of London Institute, and elsewhere, makes it probable that a considerable number of students will acquire from this book their earliest ideas on its subject.

Mr. Maycock wisely begins with a chapter explaining the meaning of, and the distinction between, certain physical terms which occur in this as in all branches of Physics, the correct use of which is essential to all real progress in the subject. It is not, indeed, too much to say that the main distinction between the scientific and the pseudo-scientific is, that the former do, and the latter do not, know what they mean by force, work, and power.

Perhaps owing to the exigencies of space, Mr. Maycock is not so clear in this chapter as would be desirable. It is not enough to say that "force is that which produces motion or change of motion of matter;" the student should also be told that it is measured by the rate at which it changes the motion of matter, and motion, or momentum, should be defined. This, of itself, would put the student on his guard against the common error—suggested by an unfortunate name—that *electro-motive-force* is force. This error, indeed, Mr. Maycock seems rather to emphasise than to guard against. "*Electro-motive-force*," he says, "is a force producing or tending to produce a flow of electricity." No doubt Mr. Maycock only intended to point out the analogy between electro-motive-force and mechanical force, an analogy which (on the fluid theory of electricity) is partly true; but even so, it would be well to indicate where this analogy breaks down. He might even go further and suggest to his more advanced students that the true analogue to electro-motive-force is mechanical difference of potential.

"Power is the rate of doing work," and has nothing to do with the amount of work done." This statement is illustrated by two examples, of which the first is all that could be desired; but the last is a most unfortunate illustration, as the following extract from it will show:—"When the train was drawn to its destination, it (*sic*) would represent the same amount of work done, no matter whether it had travelled at the rate of a mile a minute or a mile an hour. This, of course, leaving friction and air resistance out of account." On most railway lines nearly the whole work is done against friction and air resistance, but perhaps Mr. Maycock is thinking of a mountain railway; if so, for the sake of the beginners, he should say so. As it stands, there seems to be some confusion between the rate of working and velocity, which are only proportional in the case of the force being constant. Space would be better used in making such matters clear, than in giving the figures 39371 six or seven times, with variation only in the position of the decimal point, as the value in inches of the various multiples or sub-multiples of the metre, or similarly superfluous tables for the gramme, or in tediously ringing the changes on the different ways of delivering a Board of Trade Unit.

In Chapters III. and IV., in addition to a good deal of information common to all electrical text books, we meet with some six or seven rules connecting the direction of a current with its magnetic field. Of these it may be said that any one of them is better than Ampère's somewhat fanciful rule, but that Ampère's rule is better than all of them. Let the student choose his rule and stick to it, but not cumber his memory with "right hand rule," "clock face rule," "screw rule," &c., all repeated over again when a coil takes the place of a straight conductor.

Chapter V. deals with instruments of measurement, and is perhaps the best in the book. The instruments chosen for description are well selected, the descriptions are for the most part clear, and the illustrations are excellent. It is to be regretted that the mathematical limitations of the beginner preclude the proof of the formulae for the Wheatstone Bridge, except in the case of equal arms; and it might have been an advantage to postpone any account of motor meters till the student should have read something

about motors. The explanation of the modifications of Mr. Evershed's instruments for alternate current working must needs be unintelligible to the student who knows nothing of the laws of self-induction, nor what a transformer is. The difficulty, and the mode of meeting it, will be alike beyond his comprehension.

The last chapter deals with the dynamo, and can hardly be fairly judged apart from the second part of the book, which is promised shortly. We shall look with interest to it for an explanation of Mr. Maycock's method of classification of armatures; at present we prefer to regard the Brush armature as a modified ring armature, rather than, with Mr. Maycock, as belonging to the disc armature class.

Mr. Maycock is on the side of those who wish to extend and change our scientific vocabulary. "Inductance" is, no doubt, more convenient than "co-efficient of self-induction," but we can see no justification for "resistivity" and "conductance." The ugly word "mho," originating in an unhappy piece of scientific humour, has, we fear, "come to stay," but it is surely an abuse of language to say that "2 ohms = 3 or 0.5 mho." The symbol ω is not usually used for "is the reciprocal of." Such errors as the misprint in the figure on p. 26, and zero for infinity on p. 87, will, doubtless, disappear in a subsequent edition.

While we cannot agree with Mr. Maycock's somewhat strangely expressed opinion that before the appearance of this book there was no elementary treatise on the subject which could be recommended to beginners, we have no doubt that students will find the present work useful as an introduction to the study of the electrical distribution of "power," whether for lighting or for other purposes.

A Study in Municipal Government (The Corporation of Berlin). By JAMES POLLARD, C.A., Chairman of the Edinburgh Public Health Committee, Edinburgh and London: William Blackwood & Sons.

THIS popularly-written sketch gives a good description of the municipal Government of Berlin, and deserves the attention of all persons interested in local affairs and general philanthropy. As the author says, we can indeed learn much from Berlin, especially where logical and systematic organisation is concerned; but we may point out that some of the best qualities of the administration he describes are counterbalanced by the effects of party antagonism, red-tape, and above all, by the over-bearing manners of the petty officials. We must congratulate Mr. Pollard on the general correctness and lucidity of his "study," although he has missed the *raison d'être* of some of the Berlin institutions, and has omitted speaking of such important ones as the Ambulance Service, or the *Städtische Feuer Societät*, with its compulsory mutual fire insurance. Although the author does not wish to express opinions, there is little doubt that he considers the Berlin arrangements models of their kind. A peep behind the scenes, and, especially, not had, would, however, show him that the good results of splendid organisation are brought about by means and practices which we, in this country, would utterly reject. Mr. Pollard's little sketch may, however, be the means of suggesting some great improvements in our municipal affairs.

The Arbitrator's Manual. By J. S. SALAMAN, Solicitor. London: W. Heinemann. 1893. This is a neat and well-produced little book, dealing clearly and shortly with arbitrations, and it is almost as satisfactory a manual on the subject as could be produced. The establishing of the London Chamber of Arbitration seems to be the primary cause of its production, but it would be quite as usual in arbitrations outside the Chamber of Arbitration as in those conducted by that tribunal. In regard to one practical point of importance, we are unable to agree with Mr. Salaman. He writes (p. 101) "In ordinary cases, unless there appears to be reason to throw the costs upon one side or the other, it is better to say that each party shall bear his own cost of the reference." The proper general rule is that the successful party shall obtain his costs from the other side, and this rule should not be departed from without the very strongest reason. It is one of the unsatisfactory fruits of lay arbitrations that costs are too often divided, whereby the successful party is deprived of some of the fruits of his victory.

THE INSTITUTION OF ELECTRICAL ENGINEERS.—In consequence of the unavoidable absence abroad of the new President, Mr. W. H. Preece, F.R.S., on the 14th inst., he will deliver his inaugural address on the 26th inst.

TRADE CATALOGUES.

MESSRS. STANLEY BROS., of Nuneaton, recently sent us a useful and very complete illustrated catalogue of moulded and diapered bricks, encaustic and roof tiles, and terra-cotta goods, including ridges, finials, hip-knobs, string-courses, cornices, copings, gutters, chimney-pots, fire-bricks and fireclay goods, glazed sanitary stoneware, and enamelled bricks and tiles.

From Messrs. John Eede Butt & Sons, of Brighton and Littlehampton, we have received their new "Book of Moulding Designs," which are clearly shown and priced, so that the cost of any moulding can be at once seen. In addition to the usual stock patterns, the book contains some ten pages of "registered designs" for mouldings.

A catalogue of "patent specialities" in granite concrete and other materials has been issued by Messrs. B. Ward & Co., of Great George-street, Westminster. The material first named is shown in its application to stable and cow-house paving, stable-yards, &c. The catalogue also shows the application of what is termed "patent limestone concrete" to the construction of staircases and landings. It contains, too, particulars of artificial stone dressings, "in red, buff, grey, or green," stated to be "impervious to the action of the atmosphere."

Messrs. J. M. Bennett & Sons, of Ardwick Station, Manchester, send us their half-yearly catalogue, with priced details, of dry walnut, birch, oak, and ash logs. It is a very useful little book, and its arrangement is such that purchasers can see at a glance what will be the cost to them of any particular scantling.

Messrs. J. & G. Odhams, of Upper Thames-street, send us the fourth edition of their illustrated catalogue of electric bells, batteries, indicators, fire-alarms, &c.

Mr. W. H. Harling, of Finsbury-pavement, sends us illustrated catalogues of mathematical, drawing, and surveying instruments of all kinds, including his patent cone-fitting drawing instruments and Harrison's patent "clinograph."

Messrs. James Allan, sen. & Son, of Elmhurst Foundry, Glasgow, send us two illustrated catalogues, one devoted to stable and cow-house fittings, and the other to baths and their fittings. They are both well worth attention. The first is prefaced by some useful notes on the erection of stables, the recommendations made being, we fear, "counsels of perfection" rather than, in the great majority of cases, attainable realities. The horse, we are told, being a more delicate animal than man, requires a great amount of care and attention to be kept in good health and in good working order. To attain this, particular attention ought to be given to site, size of stable, light, ventilation, and drainage. Too little attention has been devoted to this subject, and some useful hints may be derived from a perusal of Messrs. Allan's catalogue.

Correspondence.

To the Editor of THE BUILDER.

THE ORIENTATION OF CHURCHES.

SIR.—Your correspondent, Mr. J. H. Spencer (see *Builder* for December 24 last, p. 504), has done service in ascertaining how nearly the axes of the churches which he names agree in pointing to sunrise on the days of the Saints to whom they are dedicated. This is a task which, to the best of my knowledge, has never yet been undertaken with anything like system, which is matter for some surprise in these days, when critical tests are being applied so generally to elucidate what were merely conjectures in former years.

We have all heard in a vague way that the various differences of axis of one church in relation to another—two neighbouring churches, it may be, are found to differ greatly in this respect,—are all to be accounted for by the position of sunrise on the day of the Saint to whom they may happen to be dedicated. It is extremely desirable that the subject should at last be examined and determined by the results of actual observation. But many more than three examples that are fairly right out of forty that, apparently, do not appear to be so to your correspondent, will be required before any reliable data can be obtained. It is likely also to follow that the three agreements that he has obtained by adopting three days of various events in the life of St. John-the-Baptist will not be found to exist with respect to other churches of similar dedication. There is an easy mode of testing. If your correspondent's researches have resulted in obtaining a rule, it will follow that other churches so dedicated will be found to agree with either one or the other of the axes of his three examples. In fact, all churches of this dedication would do so but for some of the contingent changes alluded to.

Your correspondent's conjecture with respect to St. Mary's, Truro, having been previously dedicated to St. Michael, on the evidence of the orientation alone, may be easily tested to a certain degree by his observing if many other churches dedicated to St. Michael have an axis pointed 5 deg. south of east. The test will be the easier since it will be assisted by the peculiarities of position not unusual to churches with this dedication,—peculiarities, which, by the way, do not exist at the example named. I doubt the results of the test, but it is worth applying on an extended scale.

Your correspondent will perform a much-needed service if he will prepare a list of what the angles of sunrise should be, say of a dozen or so of the days of the most popular of Saints. Were this in existence, the most busy even of your readers would be able to tell readily how any church of the dedications named agreed or differed. This list, to be of service, would have to be calculated for about a thousand years backward, and to allow for the precession of the Equinoxes. The date named would be a convenient one, since it would meet the fact that the greater proportion of our parish churches own their foundations from before the Conquest, while the largest proportion of the remainder were founded soon afterwards, there being but comparatively few of much later date until recent times. But it would not account for foundations of very early date.

With respect to the church at Llanton, stated to be dedicated to St. David, it has to be remembered that, so far as Wales is concerned, evidence points strongly in favour of the ancient churches having been founded by various princes and other religious men, and simply called after the names of their founders, without, it may be, any further dedication. They are, as a rule, well oriented, and whatever agencies may have produced this arrangement, the church referred to would most probably have followed them. These Welsh churches, and others in the West of England and elsewhere, require attention by students of orientation, for they indicate its use at a time anterior, it may be, of any rules of Saints' days of the Roman Church. This is of easy proof; for the dates assigned for their foundations are rendered by many of the Welsh chronicles. There was, at least, no official communication between the Church of Wales and the Roman Church in England. And the latter church in Italy has always been, and still is, more or less indifferent as to orientation. Its missionaries in England are, therefore, not likely to have proposed it; and since it is found practised here so universally and at so early a period, it is a reasonable hypothesis that the Saxons learned it from their neighbours, as they did much of their art work, their polemical divisions notwithstanding; and they found it on the spot in some of the ruined ancient churches of an earlier time.

It would be well that your correspondent, and others, should continue to trace any similarity of orientation in churches of the same dedication, even if only negative results be obtained, as I believe will be the case.

I do not think that any better hypothesis will be found than the belief that the axes of our ancient churches were obtained by the shadow cast from a pole at sunrise, set up when the builders were about to begin. This is sufficient to account for almost all the differences of position that are found to exist, and it will also account for the few remarkable examples which are met with in our own land and abroad, where the angles face the cardinal points. Of this arrangement the diagonals of circular Stonehenge are an example. Of orientation of orientation are relics of customs of remote antiquity, far earlier than the advent of Christianity, and all researches in this most interesting subject, so prolific of results, will lead to an early period of time.

E. P. LOFTUS BROCK.

SOME ANCIENT WALL-PAINTINGS.

SIR,—Owing to absence I regret having omitted to notice a letter in the *Builder* of November 19, page 109, from Mr. P. H. Newman. Mr. Newman, in speaking of the wall-paintings of Eastbridge Hospital, Canterbury, says they "have suffered greatly from exposure to the air and moisture since their structural restoration by Mr. Neale." I fear Mr. Newman has not been careful as to his facts. I in no way "restored" these paintings, and should be strongly opposed to the "restoration" of them or any other ancient wall-paintings. Some time since, the central portion of the hall existed a vesica enclosing a life-size picture of our Saviour seated upon a throne; the emblems of the Four Evangelists surround the vesica, each enclosed in a circle. A great part of St. Luke had been cut away to allow the fume of the modern fireplace to pass through the wall. Immediately beneath the vesica was another painting about 4 ft. high—our Saviour and the Apostles at the Supper; Jesus

giving the sop to Judas. There are fragments of a painting of the murder of Becket on the eastern side of the central subject, but this is of a later date than the fine work it adjoins, and inferior to it in execution. On the western side was a painting—much destroyed—apparently showing Henry II. doing penance at the shrine of Becket.

The method pursued for the preservation of the paintings was somewhat hazardous, but extremely successful, as far as can yet be seen. The wall is of chalk, roughly plastered over. Upon this rough plaster is a thin coating, about $\frac{1}{4}$ in. thick, of fine plaster, and upon this the subjects are painted. What was once rough plaster next to the chalk wall was, when examined, found to be loose sand, only held in its place by the hard skin of plaster under the painting, and not held in everywhere by that, for holes had been made in the surface, and the sand ran out through them. Boards were placed against the painting, and the sand encouraged to run out by gentle tapping. Copper and slate dowels were then let into the wall in a number of positions under the larger cavities. The chalk of the wall was saturated with water, driven in from a large garden syringe. Then the cavities were packed with old Portland cement, and cleansed flint road drift, nearly in a semi-liquid state, applied in very small quantities at a time. This solidified round the dowels, making thus the most thorough attachment to the wall in all positions. The incrustations of smoke and dirt were then attacked, spirits of wine and water, applied with a fine syringe moistened the whole, and the coatings were taken off in small flakes. A somewhat similar process was employed by me in repairing the paintings in St. Gabriel's Chapel in the crypt of Canterbury Cathedral.

I saw the Eastbridge paintings recently, and so far as I remember they showed no signs of fading since I uncovered them in 1879. I gather Mr. Newman intimates having treated these paintings with a preservative solution. I trust his solution will not act in the manner of many other solutions, and end in the destruction of the paintings. Mr. St. John Hope asks Mr. Newman in yours of December 3 as to the nature and properties of the preservative solution which he applied to these and other paintings. Perhaps Mr. Newman will kindly satisfy your readers on this point. I agree with Mr. Hope as to the sad fate of many wall paintings, owing to the use of "preservative solutions."

When I uncovered the paintings I made careful copies of the size of the originals, so it is easy to see if any of the painting has disappeared.

An excellent description of the paintings and method of "preservation" was given in the *Builder* of July 26, 1879, and a portion of this letter is extracted from your description.

IAN D. NEALE, F.S.A.
10, Bloomsbury-square, London,
December 31, 1892.

LOW SIDE WINDOWS.

SIR,—In the article on this subject in your last issue, modern antiquaries are said to ignore the medieval tradition of the term "Leper Window," and its historical associations. But, in fact, the term is only some forty years old, having been invented by Mr. Street on the discovery of a distemper painting behind the stalls in the chapel (I think) at Windsor, supposed to represent a leper being communicated at one of these windows.

Whether this conjecture were correct or not in the particular instance, it is much more likely that these windows, being in connexion with the site of the stalls, would be for confessing than for communicating, for which the arrangement would be most inconvenient, and in very many cases impossible.

I intend that these windows were for a very different purpose, connected with the burial of the dead. I think it will be found that in nearly all cases they overlook that portion of the churchyard which was used for burying. And prior to the period when the body was brought into the church, it was the custom to open this window for the priest to say the greater part of the office. In several notable instances there is on the jamb of the window a projecting book-ledge, which would indicate some sort of office being said within connected with an outside ceremony, the window being in all cases shuttered and not glazed.

WILLIAM WHITE, F.S.A.

*** We may call Mr. White's attention to the fact that initials were appended to the article, to indicate that while considering the article of interest, we did not make ourselves responsible for all the opinions expressed in it.

SIR,—The writer of the interesting communication on low side windows in your last issue is apparently unaware of the existence of a very instructive example at Ely. Prior to Cranmer's Chapel, or oratory, a little gem of fourteenth century work, though thoroughly lighted by six large windows, has a low window of charming design in each of its north and south walls. The chapel is built upon a crypt, or under-croft, of considerable height. Hence the external cills of these windows are at a level of some 10 ft. or 12 ft. above that of the ground, and there could be no peeping in from the outside

by lepers or any other persons unless ladders were reared up for the purpose.

The tinkling of a hand-bell from either of these windows seems improbable, when it is remembered that the chapel was the private oratory of the Prior, and had no concern with citizens dwelling outside the precincts of the abbey; such a tinkling would have been audible only to the members of his household. Moreover, the chapel has a bell-cot, in which the sanctus-bell was probably hung. This bell-cot forms the termination of a newel staircase at the north-west angle of the building, and as I can discover no trace of friction or grooving by a bell-rope, I fancy the bell was struck at the proper moment by a person posted at the head of the stairs, where there is a niche or recess in which he possibly stood. Standing there, he would be within 6 ft. of the northern low window, and would supersede the necessity for opening it and ringing a hand-bell.

Are we bound to assume that these windows had any practical utility? May they not represent a mere freak or fancy of the wealthy and powerful churchman who built the chapel, and who had at his elbow a true artist, Alan of Walsingham—for *operatorem* in his generation—to carry out his wishes?

W. E. DICKSON
(Sacrist of Ely).

The Student's Column.

CHEMISTRY.—I. INTRODUCTION.

SOME knowledge of Chemistry is so essential to those who would fully understand the principles of sanitation, the composition of building materials, the "setting" of cements, the "weathering" of building stones, and many other matters connected with building, that it is now recognised by architectural societies as a useful and almost necessary study for those in the profession.

It is proposed in the following papers to treat the subject as simply as possible, assuming no previous knowledge of the science on the part of the intending student, omitting all mention of the rarer elements and their compounds, but describing in fuller detail than is usual all subjects directly connected with building or sanitation.

It must not be supposed, however, that it is possible to master any *experimental* science, such as Chemistry, by reading alone. It is necessary for the student to manufacture and examine the various elements and their compounds for himself; but as nearly all the apparatus and reagents required for the experiments to be described can be obtained for very small sums, there is no reason why, by combining theoretical with practical study, he should not obtain a sufficient grasp of Chemistry and its principles to enable him to turn that knowledge to useful account in his professional work.

Elementary Principles of Chemistry.—All bodies, whether gaseous, liquid, or solid, are said to be composed of *matter*, and it is the object of chemistry, by the combined aid of experiment, observation, and inference, to investigate the composition and character of every form of matter and to discover the laws which regulate the behaviour of these bodies under various conditions. This investigation has led to the division of all kinds of matter into two classes, viz., (1) ELEMENTS, or substances that cannot be split up into simpler forms, and (2) COMPOUNDS, which are substances formed by the combination of two or any greater number of elements. Copper, for example, is called an *element*, as it cannot be decomposed into two or more different substances; but "blue vitriol," which is so largely used in the manufacture of Scheele's green and other copper pigments, is a *compound*, as it can be split up into the elements copper, hydrogen, sulphur, and oxygen.

About sixty-seven elements have been discovered up to the present time, but as new elements are occasionally discovered, and as some of those substances at present believed to be elements may be found to be compounds, it is impossible to state exactly the number of elements existing in our earth. It will be readily understood, however, that with such a large number of substances, some classification is needed, for the sake of convenience. The elements are therefore divided into metals and non-metals, and the difference between most of these is so well-known as to need no description here. There is, however, no hard-and-fast division between them, for two or three of the elements combine some metallic properties with some non-metallic properties.

The following list of the most commonly occurring elements is not intended to be learnt by heart, but is merely given for reference when

necessary. The metals are p. in small capitals, the non-metals in the smaller letters:—

<i>Na.</i>	<i>Symbol.</i>	<i>Atomic Weight.</i>
ALUMINUM	Al	27
ANTIMONY	Sb	126
ARSENIC	As	75
BARIUM	Ba	137
BISMUTH	Bi	208
BORON	B	11
BROMINE	Br	80
CALCIUM	Ca	40
CARBON	C	12
CHLORINE	Cl	35.5
CHROMIUM	Cr	52
COBALT	Co	59
COPPER	Cu	63.5
GOLD	Au	197
HYDROGEN	H	1
IODINE	I	127
IRON	Fe	56
LEAD	Pb	207
MAGNESIUM	Mg	24
MANGANESE	Mn	55
MERCURY	Hg	200
NICKEL	Ni	58.6
SILICA	Si	28
OSMIIUM	Os	193
PLATINUM	Pt	195
POTASSIUM	K	39
SILVER	Ag	108
SODIUM	Na	23
SODIUM (Natrium)	Na	23
SULPHUR	S	32
TIN	Sn	118
ZINC	Zn	65

Atoms.—In order to explain the property which each element possesses of always combining with other elements or compounds in a certain definite proportion, or some multiple of that definite proportion, Dr. Dalton proposed his Atomic Theory, in which it is assumed that—

1. All matter is made up of atoms.
2. These atoms are *indivisible* particles.
3. All atoms of one element possess the same weight.
4. All atoms of different elements possess different weights, and
5. Chemical combination consists in the approximation of the individual atoms to one another.

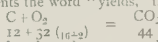
The absolute weights of the atoms are unknown, but their relative weights, as compared with hydrogen, the lightest substance known, are represented by what are called the atomic weights of the elements, which are shown in the third column in the list of elements just given.

Definition of Atom and Molecule.—An atom is the smallest quantity of any element which can enter into or be expelled from a chemical compound. A molecule is the smallest quantity of any element or compound capable of existence in a free state. It usually consists of a group of two atoms, and is supposed to be indivisible by mechanical means. There are, however, exceptional cases in which the molecule consists of only one atom, while the molecules of arsenic and phosphorus contain four atoms.

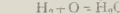
Chemical Equations.—The writing of equations representing the chemical reactions which take place when two or more substances act upon one another is of considerable importance to the chemist, forming, as it does, a convenient and very simple method of shorthand, and should be thoroughly mastered. Each element has a symbol attached to it which is either the first letter of its English or its Latin name, or the first joined with another of its constituent letters. Thus H represents hydrogen, Fe (Latin name, ferrum) iron, Cu (cuprum) copper, while Ca is taken to represent calcium, as C by itself represents carbon.

A symbol, however, not only represents a certain element, but also such weight of that element, (taking hydrogen as unit) as is indicated by its atomic weight. Thus, C represents 12 parts by weight of the element carbon; O, 16 parts by weight of oxygen; N, 14 parts by weight of nitrogen.

In writing an equation the sign + is placed between the substances used to produce the chemical reaction, and also between the different substances produced after the reaction. The sign = represents the word "yields," thus



expresses the fact that when 12 parts by weight of carbon are brought into chemical contact with 32 parts by weight of oxygen, 44 parts by weight of CO₂ or carbon dioxide are produced. Similarly,



expresses the fact that 2 parts by weight of hydrogen will combine with 16 parts by weight of

oxygen to yield 18 parts by weight of H₂O, i.e., water.

It will be well to remember that no chemical reaction can be correctly expressed if the sum of the quantities by weight on the left hand side does not exactly equal the sum of the quantities by weight on the opposite side, for it is one of the rudiments of Chemistry that nothing can be destroyed, nothing created.

Chemical equations also indicate the quantities by volume which take part in a chemical reaction, thus the equation—



indicates that one volume of carbon will combine with two volumes of oxygen to produce one molecule, i.e., two volumes, of CO₂ or carbon dioxide. With a few exceptions, all molecules may be considered as consisting of two volumes.

Now in this volume equation it will be noticed that three volumes of the elementary gases only form two volumes of the compound gas, and therefore the sum of the quantities by volume are not equal on both sides of the equation. If, however, the three volumes, and the resultant two volumes were weighed at the same temperature and pressure, they would be found to have exactly the same weight. Nothing, therefore, has been lost, and the elements, carbon and oxygen, may be regarded as having condensed somewhat while chemically combining to form the compound CO₂, which is entirely different in its properties to either carbon or oxygen.



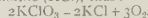
shows that two volumes of hydrogen when chemically combined with one volume of oxygen only yield two volumes of water vapour, yet the sum of the quantities by weight upon each side of the equation are equal.

Symbol O.—*Oxygen.* Atomic weight 16.

Oxygen is a colourless and odourless gas. It exists in a free state in the atmosphere, of which it forms about one-fifth part by volume. In a state of combination with hydrogen, oxygen constitutes eight-ninths of the total weight of water. As all attempts to split up the gas into simpler form have failed, oxygen is considered as an element. It combines with all the elements, except fluorine, to form oxides, and is a constituent of most of the substances forming the earth's crust. It enters into the composition of all building stones, marbles, clays, and most paints, and is, in fact, by far the most abundant element known. Many oils, such as linseed oil, combine with the oxygen of the air, which causes them to thicken, and finally become solid or dry if in sufficiently thin layers. One of the chief objects in adding "driers" to paint is to accelerate this action by supplying the oil with a good oxygen-carrier, and it is found that those substances which contain the most oxygen in their composition make the best driers.

When a substance combines chemically with oxygen, it is said to undergo *oxidation*, and as the act of oxidation *always produces heat*, it will readily be understood why a collection of oily rags or "waste" left in a room or workshop for many hours will sometimes become spontaneously ignited, and thus set fire to a building. If cotton-waste was a good conductor of heat there would be no danger of spontaneous combustion taking place, but as it is a very bad conductor, it prevents the heat produced by the oxidation of the oil from escaping, and consequently through the gradual accumulation of heat a sufficiently high temperature is at last reached to cause the material to burst into flame.

Preparation of Oxygen.—Oxygen can be prepared from a great number of substances. Its extraction from the atmosphere is attended by many difficulties, and is not therefore resorted to for the preparation of the gas on a small scale. Experimentally it is best obtained from potassium chlorate (KClO₃). This substance, when heated, is decomposed into oxygen gas and potassium chloride (KCl), thus—



The reaction really occurs in two stages, thus—
 $2KClO_3 = KCl + KClO_4 + O_2$
 and then at a higher temperature,
 $KClO_4 = KCl + 2O_2$

If the KClO₃ is mixed with about one-fifth of its weight of black dioxide of manganese, the oxygen is evolved more readily and at a lower temperature, but is not so pure. The oxide of manganese itself undergoes no permanent change, its action being merely a catalytic or contact one. Many other chemical reactions are effected by the contact action of a substance, which itself undergoes no chemical change, but the cause of this action is by no means fully understood.

SURVEYORSHIPS.

BIRKENHEAD. The Road and Improvement Committee of the Birkenhead Town Council has received to recommend Mr. Charles Brownridge, J.M. Inst. C.E., F.G.S., the assistant and Deputy Engineer of London, for the post of Engineer and Surveyor to the Borough, tendered vacant by the retirement of Mr. T. C. Thorburn. The salary is £500 a year. The recommendation was adopted by the Birkenhead Town Council on Wednesday and Mr. Brownridge was elected.

BRIDGES AND (GLAMORGANSHIRE).—The Bridgend Local Board have just appointed a new surveyor. There were about 120 applicants, and the following three appeared before the board:—Mr. F. R. E. Willoughby, Cardiff; Mr. E. C. Jones, B.S.C. Neath; and Mr. Morgan Williams, Bournemouth. Mr. Williams was elected. The salary is £500.

GENERAL BUILDING NEWS.

BUILDING IN ABERDEEN DURING 1892.—During the past year there has been abundance of work for masons and others engaged in the house-building trade in the "Granite City." In the course of the twelvemonth a great many buildings have been finished, the most notable of a public character being the Jubilee extension of Aberdeen Royal Infirmary (charitable, general medical, and surgical hospital), and the new Free Library buildings and the new Free South Church, which two stand side by side on the Rosemount Viaduct, near the Wallace Statue. Among extensive buildings just approaching completion may be mentioned the Grand Hotel in Union-terrace, the new offices for the G. N. & S. Railway Company in Guild-street, and the addition to the Girls' High School in Albyn-place. At the end of 1891 the municipal boundary was considerably extended, so as to include the burghs of Woodside and Old Aberdeen, and also the village and new suburb of Torry, in Kincardineshire—an area of about ten square miles. The jurisdiction of Aberdeen Town Council extended over all this area during the whole of the year 1892; and the plans of buildings approved of by the Council's Plans Committee from January to December may be classified as follows:—Dwelling-houses, 60; alterations and additions at various premises, 75; manufactories, workshops, warehouses, and mills, 22; cottages, 16; shops, 6; halls, 2; hotels, 2; hospital, 1; church, 1; and miscellaneous (including stores, sheds, stables, greenhouses, washing rooms, outhouses and small business offices), 33. It may be explained that the expression "dwelling-houses" generally refers to large tenements to accommodate eight, ten, or twelve families, frequently with shops on the street floor, and that under the phrase "alterations and additions" a goodly number of varied and extensive operations are included. Among the largest of projected structures are the extension of the University Buildings (at a cost of about £100,000); the extension and remodelling of the Aberdeen Royal Lunatic Asylum (to cost £50,000); the enlargement of the Town Council's City Hospital (for zymotic diseases); and a "citadel" (including meeting halls, shops, offices, and dwelling apartments) for the Salvation Army. The Town Council has executed large improvements at the gardens and streets at Union-terrace, and in the widened thoroughfare a bronze statue of the poet Burns has been placed. At the east end, Justice-street, as widened and improved, and shabby-looking buildings replaced by substantial modern edifices. Extensions at a cost of £90,000 are to be made on the Corporation gasworks. The operations of the Aberdeen Harbour Board do not call for particular mention, beyond stating that £12,418 odd has been spent for new dredging plant and that the work of securing the foundations of the North Pier, building parapet, and paving roadway, has now been completed at a cost of nearly £10,000, as well as the extension of cattle lairage for foreign animals at the expense of £3,670.

GYMNASIUM, MORMOUTH.—The Monmouth Gymnasium which has been presented to the town by Lord Langstock in commemoration of the coming of age of the Hon. J. M. Rolls, in April, 1891, was opened by his lordship on the 29th of December. It is a new and fully-equipped building of the mixed Tudor and Elizabethan style, faced with rock rubble local stone, with dressings of Box-Gravel Bath Stone. The roof is covered with Phillips' patent tiles. The accommodation on the ground floor consists of a ticket office, a convenient hall, spacious reading and smoking room, dressing room, bath room fitted with hot and cold water, and large lavatory; the whole of this floor is laid with Wilkinson's granolithic cement. All the walls are lined with match-boarding stained and varnished. The floor over is constructed of fireproof materials executed by Messrs. Homan & Rodgers, of London. From the hall a staircase leads to the gymnasium, a room 53 ft. long, 32 ft. 6 in. wide, 17 ft. high at sides, and 16 ft. high in the middle, with large bay at end. An open timbered roof covers this room, and a spacious gallery extends across one end for visitors. The whole of the interior is lined with match-boarding, including the roof, and the window openings are filled with leaded quarry glazing with iron washes and frames, with provision for ventilation. The building

will be warmed with hot water pipes, and will be lighted by gas. The fittings of the gymnasium have been supplied and fixed by Herr Adolph A. Stempel, of London, and comprise apparatus for nearly all kinds of exercises. Mr. Henry Page of Winchester Hill, London, was the architect; Mr. James Monan, Rockfield, Monmouth, being the builder, and the works were carried out under the direction of Mr. Thomas Pembroke, Monmouth. The cost of the building—a little over £2,000—has been wholly defrayed by Lord Llangoat, who has also promised £50 a year towards its support.

PARISH ROOM, WOLVERTON ST. MARY, DUCKS.—A new parish room 40 ft. by 18 ft., with porch, class-room, and the usual offices has been opened at Wolverton St. Mary. The dedication stone was laid in August last by the Right Hon. A. W. Peel, Speaker of the House of Commons. It was built at the cost of the Rev. W. P. Trevelyan, the father of the present vicar. The materials used are local limestone, red brick, and flints, and Monk's Park Bath stone has been used sparingly in dressings. The roofs are open-timbered, "left from the tool," and covered with selected old tiles and capped with Cooper's ridges. The builder is Mr. H. Walker, of Wolverton St. Mary, and Mr. E. Swinfen Harris, F.R.I.B.A., of London, is the architect.

THE JUNIOR CONSTITUTIONAL CLUB, PICCADILLY.—Respecting this building, which was described in our issue for December 10, p. 466, the Bostwick Gate and Shutter Company write to say that they made and fixed the whole of the wrought-iron lift-screens and Bostwick gates to the elevators.

SANITARY AND ENGINEERING NEWS.

THE WATER OF LEITH SEWERAGE AND PURIFICATION SCHEME.—An important stage in this great work was reached on the 26th ult., when (as we learn) the Blandfield Tunnel, Bonnington. The pipe is now completed from Balerno to the sea. The sewer begins at Balerno with an 18 in. pipe, and increases in size to 4 ft. 6 in., and eventually to a tunnel 7 ft. 6 in. by 8 ft. 6 in. Thence the sewage is taken by 5 ft. iron pipes to the sea at the Black Rocks. It was expected that the sewer would have been joined up three months ago, but great difficulties were experienced in building the Blandfield Tunnel, and operations were retarded on that account. The tanks, settling ponds, and drains in connexion with the mills and works in the Water of Leith Valley are now well advanced, so that it is expected that the whole scheme will be in operation in the course of the next six months. In the mean time the effect of the work accomplished last week will be that the sewage can now be taken direct to the sea. That will relieve the old drain made in 1864, which on account of its limited carrying capacity has of late overflowed into the river in time of rain. The two pipes will now be sufficient to drain the whole Water of Leith district from Balerno to the sea for many years to come, even supposing the drainage area were fully built over. The Parliamentary Estimates for this work amounted to £40,000, but these have been greatly exceeded, chiefly on account of the unexpected increase on compensation claims. The borrowing powers of £200,000, which the Commissioners had under their original Act are now all but exhausted, and a Bill is being promoted asking for additional borrowing powers to the extent of 75,000.

STAINED GLASS AND DECORATION.

NEW WEST WINDOW, CANTERBURY CATHEDRAL.—A new west window has just been placed in St. Anselm's Chapel in Canterbury Cathedral. It is the gift of Mrs. Rutson, a niece of Canon Holland, and is the work of Messrs. Clayton & Bell, the subjects of the window are as follows:—The two Archbishops, Simon of Mepham, and Thomas Bradwardine, both of whom are buried in St. Anselm's Chapel, occupy the main portion of the window. The four medallions are filled with scenes from the lives of the archbishops named. The work now in progress in the Crypt, under the care of Sir Arthur Blomfield as architect, consists in excavating to the original floor level, and paving with stone.

WINDOW, ST. GEORGE'S CHURCH, STALYBRIDGE.—The east window of St. George's Church, Stalybridge, has been filled with stained glass to commemorate the jubilee of the consecration of the church. The window consists of four lights and tracery. The principal subjects are the Nativity, Crucifixion, Resurrection, and Ascension of our Lord. The design has been executed by Mr. W. Page, Leeds, Messrs. Eaton & Sons, of Ashton-under-Lyne, being the architects.

WINDOW, MURKES PARISH CHURCH, FORFARSHIRE.—A stained glass window, the gift of Mr. Robert M'Gavin, of Ballumbie, has just been placed in the church of the parish. The window is the work of Messrs. Ballantine & Gardiner, Edinburgh.

WINDOW, LARGS U.P. CHURCH, ABERDEEN.—Messrs. J. & W. Guthrie, Glasgow, have just completed a stained glass window to be erected in Largs U.P. Church. This is the fifth of a series of windows for this church which have been executed by the same firm, the others being now placed.

FOREIGN AND COLONIAL.

FRANCE.—Paris will shortly witness the erection, in the garden in front of the south pavilion of the colonnade of the Louvre, of the equestrian statue of Velasquez, by M. Frémiet. This work, which was exhibited in the Salon of 1890 (and of which we gave an illustration in the *Builder* for July 5 of that year) will commence the series of nineteen statues which, with the monuments to Meissonier and Raffet, will eventually adorn the gardens which surround the Louvre. In the Spring there will be placed in the gardens of the Luxembourg a number of vases and decorative objects which remain unutilised at the national manufactory at Sèvres, and which the Architect to the Senate, M. Scellier, of Gisors, has asked of the State for the ornamentation of the flower-beds. The Conseil Général de la Seine has at last decided on the suppression of the prison for juvenile offenders known as the "Petite Roquette," which stands opposite the Place de la Roquette, where the executions for capital offences are carried out. This prison, as barbarous as demoralising in its treatment of offenders, will be replaced by an educational house of correction, to be erected at Montesson (Seine-et-Oise) from the plans of M. Poussin, architect. The same body has refused to sanction the construction of a very useful bridge which the administration wished to construct over the Seine between Neuilly and Puteaux. The Committee of the Société Nationale des Beaux-Arts has unanimously elected M. Auguste Rodin to be President of the Section of Sculpture, in the place of M. Dalou, resigned. The association of pupils of the School of Fine Arts at Lyons have inaugurated their new premises, which have been built in the Rue de la Platrière. A fine-art exhibition was opened on the 1st inst. at Carcassonne (Aude).—M. Gustave Germain, the sculptor, has finished the monument which will shortly be erected to the memory of Captain Meyer, of the Artillery, who was last year killed in a duel with the Marquis de Moris, after a controversy on the Jewish question. The monument, to be erected in the Mont Parnasse Cemetery, consists of a pyramid, on which is sculptured a palm wreath surrounding a portrait medallion of the deceased; below is a sword and a laurel wreath. The work of prolonging the Sceaux railway as far as the Luxembourg is being pushed on with great activity, and a commencement is being made with the construction of the long tunnel which will extend from the existing terminus of the line, Place Denfert Rochereau, to the Rue Gay-Lussac, where will be located the future terminal station. A landowner at Hallé, near Auch (Gers) has brought to light a very fine Roman wall constructed of small stones, with an external facing decorated with rich mosaics. The French Government is about to construct a strategic railway, of narrow gauge, between Chuses and Chamonix, *vis-à-vis* Le Fayet (Haute Savoie).—With the advent of the New Year, MM. Valdon and Franck Lamy, painters, and M. Gaudex, sculptor, received the decoration of the Legion of Honour.

MISCELLANEOUS.

THE JUBILEE OF "THE BUILDER."—It may be interesting to note, in connexion with our Jubilee, that the *Builder* has been printed in the same printing-office from the commencement, and that there is still employed weekly in printing the paper a machine-minder who assisted in printing the first number of it.

THE ABERDEEN GRANITE TRADE.—There are sixty firms in the city engaged in the monumental and ornamental branch of the granite trade, employing in all about 2,500 hands. During the year these have been busy executing orders in monumental and architectural work for all parts of the globe. Employers, however, again complain of the smallness of profits, owing to over-competition. The local granite quarries have been unable to supply the demand for stones; and the grey granite quarry at Rogart, Sutherlandshire, has been further opened out by Messrs. A. Macdonald & Co., Limited, of The Aberdeen Granite Works, and a considerable quantity of this granite has been used for monumental and polished building work, house building, railway and bridge work, and girder blocks. Not only so, but during the Harbour Commissioners' financial year (ended 30th September) no fewer than forty-one cargoes of granite stones were imported from the continent—from Sweden, Norway, and Germany—weighing altogether 7,680 tons, 7 cwt., 1 qr. These foreign stones include some colours not obtained in Aberdeenshire granites, and they also polish beautifully; but the experience so far gained has shown that in point of durability of colour they will not compare with home granite, a marked difference being seen in polished tombstones exposed to the sunshine for five or six years. There has been no trade dispute worthy of notice during the year, and the prospects of brisk trade continuing in the stone-polishing and fine stone cutting and dressing departments are encouraging, though the smaller and newer firms, to whose hands the monumental trade for the United States falls, may find orders kept back for a time in the expectation of a modification of the M'Kinley tariff. It may be mentioned that at the Aberdeen Granite Works (Macdonald, Limited), during the year there has been constructed a large and effective polished red granite front, 60 ft.

wide by about 30 ft. high, for new buildings in Castle-street, Liverpool, for Messrs. McCorquodale, the well-known railway printers.

STONEWORKING MACHINERY FOR SOUTH AFRICA.—We are informed that Messrs. M. Povis Bale & Co. have secured a considerable contract for stoneworking machinery for South Africa, which is believed to be the first of its kind erected there.

A MANCHESTER BUSINESS.—We have received from Mr. John Heywood, the well-known wholesale newsagent, bookseller, and stationer, of Manchester and London, a *brochure* commemorating the jubilee of the establishment of the house. It gives some interesting details of the growth and progress of one of the largest businesses of the kind in the country, and among the illustrations are portraits of the founder of the business, John Heywood I., of his son, John Heywood II., and of his grandson, John Heywood III., the present head of the business.

THE PLUMBERS' COMPANY.—The Lord Mayor presided at the Quarterly Court of the Plumbers' Company at the Guildhall on the 29th ult. A communication from the sub-committee of the Hornsey Divisional Committee of the Middlesex County Council on Technical Instruction was reported, stating that the County Council proposed to arrange for the holding of a class on Plumbers' Work at the Museum of Sanitary Appliances established by the Hornsey Local Board at Highgate, and requesting the Plumbers' Company to nominate a teacher. The Court nominated Mr. Geo. Taylor, R.P.C., foreman to Messrs. Dent & Hellyer, as teacher. The Court also considered a communication from Professor W. R. Smith (director of the Laboratories of State Medicine), on behalf of the Governors of King's College, offering the use of workshops lighted by electricity and the physical and chemical laboratories of the College for advanced technical instruction for plumbers in connexion with the Company's educational scheme. On the motion of Sir Philip Magnus, a committee was appointed to prepare a scheme by which selected students from the Metropolitan Plumbing Schools may have the opportunity of attending a course of advanced instruction at King's College. The Court also considered and approved a syllabus of technical lectures on "Sanitary Plumbing," "Hot and Cold Water Supply," and "House Drainage," to be delivered in connexion with the Victoria University College, Liverpool, where classes for plumbers' apprentices are carried on under the direction of members of the United Operative Plumbers' Association of Great Britain and Ireland.

A. RANSOME & CO., LIMITED.—It is announced that for purposes of simplifying management, Messrs. A. Ransome and Co. and Messrs. Ransome, Josselyn, and Woods have amalgamated their Battersea foundry with their Chelsea engineering works, and converted these two concerns into a private limited company under one name. For many years the two businesses have been owned by the same partners, although their managements have been individual. The new company has been constituted under the Joint Stock Companies' Acts, and has been registered in the name of "A. Ransome & Co., Limited." The late partners, Allen Ransome, Frederic Josselyn, and Vincent Sydney Woods will be the Managing Directors of "A. Ransome & Co., Limited." These gentlemen, we are informed, hold practically the entire share capital of the new company, and the business will be conducted as heretofore.

PARTNERSHIPS.—Messrs. Warner, Walduck & Co., of Gresham House, Old Broad-street, announce that they have admitted into partnership Mr. William Bell and Mr. Frederick George Barrett, both of whom have, for many years, taken an active part in the business. We are asked to say that the partnership formally existing between Messrs. Keen & Drake, architects, has been dissolved. Mr. Keen retains the offices at 41, Bedford-row. Mr. William Eve, F.S.I., announces that he has taken into partnership his son, Mr. William Harold Eve, who has been in the office nine years, and that the style or title of the firm will now be "William Eve & Son."

REMOVAL OF OFFICES.—Messrs. Hobbs, Hart, & Co., Limited, as will be seen by announcement in our advertising pages, announce that they have removed their offices to Arlington-street, Islington, N., but that they will continue their show-rooms, &c. at Cheapside.

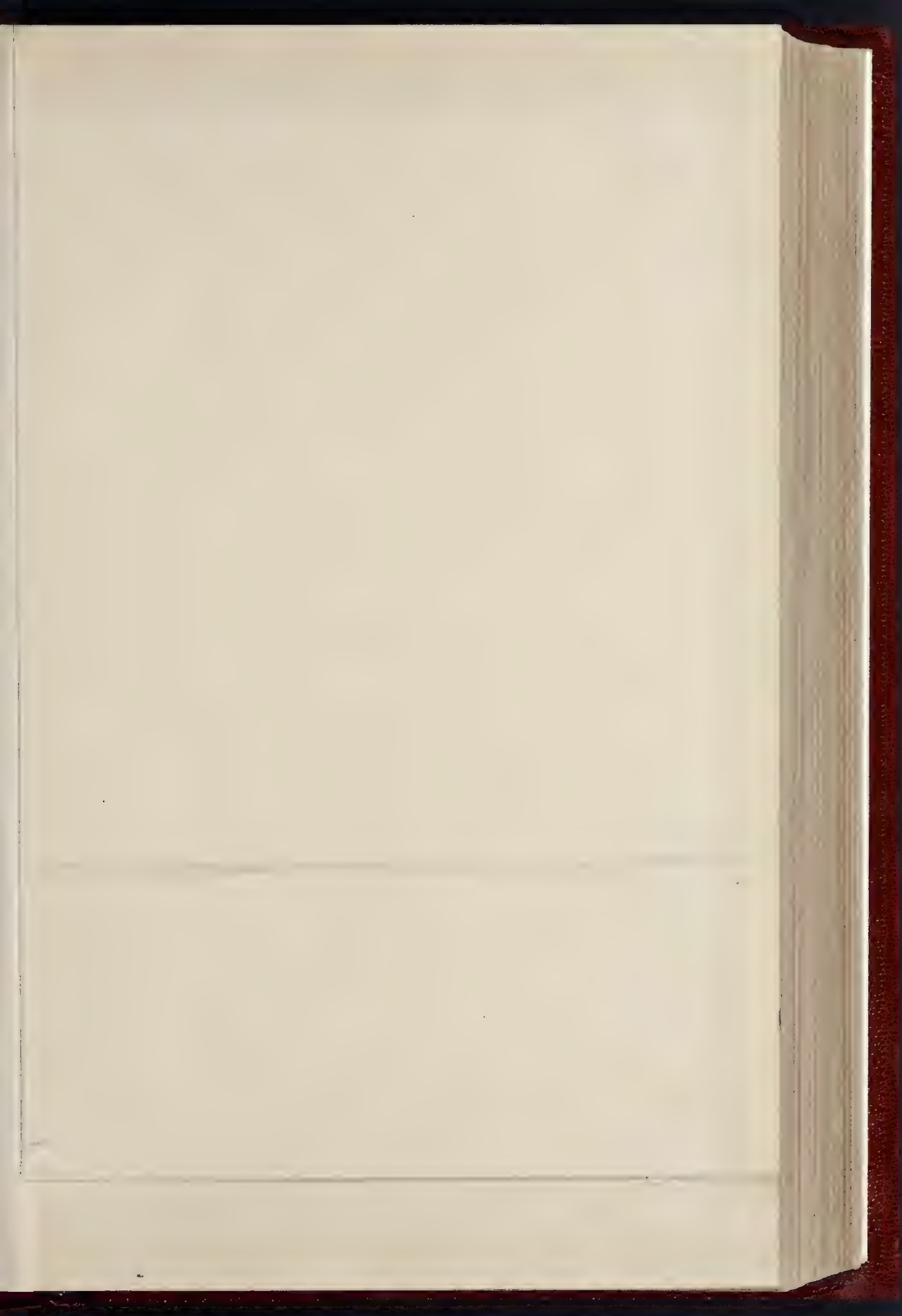
CHRISTMAS FESTIVITIES AT EXETER.—On Boxing Day Mr. Harry Hems gave his twenty-fourth annual Christmas treat to a number of old and decayed citizens, their wives and widows.

LEGAL.

DISPUTE AS TO A SCOTCH BUILDING "CUSTOM."

At Paisley, a few days ago, Sheriff Cowan gave decision in an action at the instance of the Building Committee of the Lawn-street Mission Hall against Mr. James Barclay, builder, Christie-street, Paisley, in which (we quote from the *North British Daily Mail*) the pursuers sought that defender be ordered to take down the mason work erected by him at the front buildings of the Lawn-street Hall, at present being altered and added to, and to re-erect the same and complete the mason and brick work in

827—GIRDERS: *W. Orr*.—This invention relates to metallic girders, and has for its object to provide a girder of light in structure, easily erected, and whose component parts can be packed together into small compass for transport. The girder is composed of two iron or steel tubes round, oval, rectangular or other cross section, one of which constitutes the top, and the other the bottom member. The tubes may be close or butt-jointed, or welded, and between them a web, or midrib, extends, the said web being composed of a number of sections, each having a jaw or recess at its upper and lower part, shaped to the contour

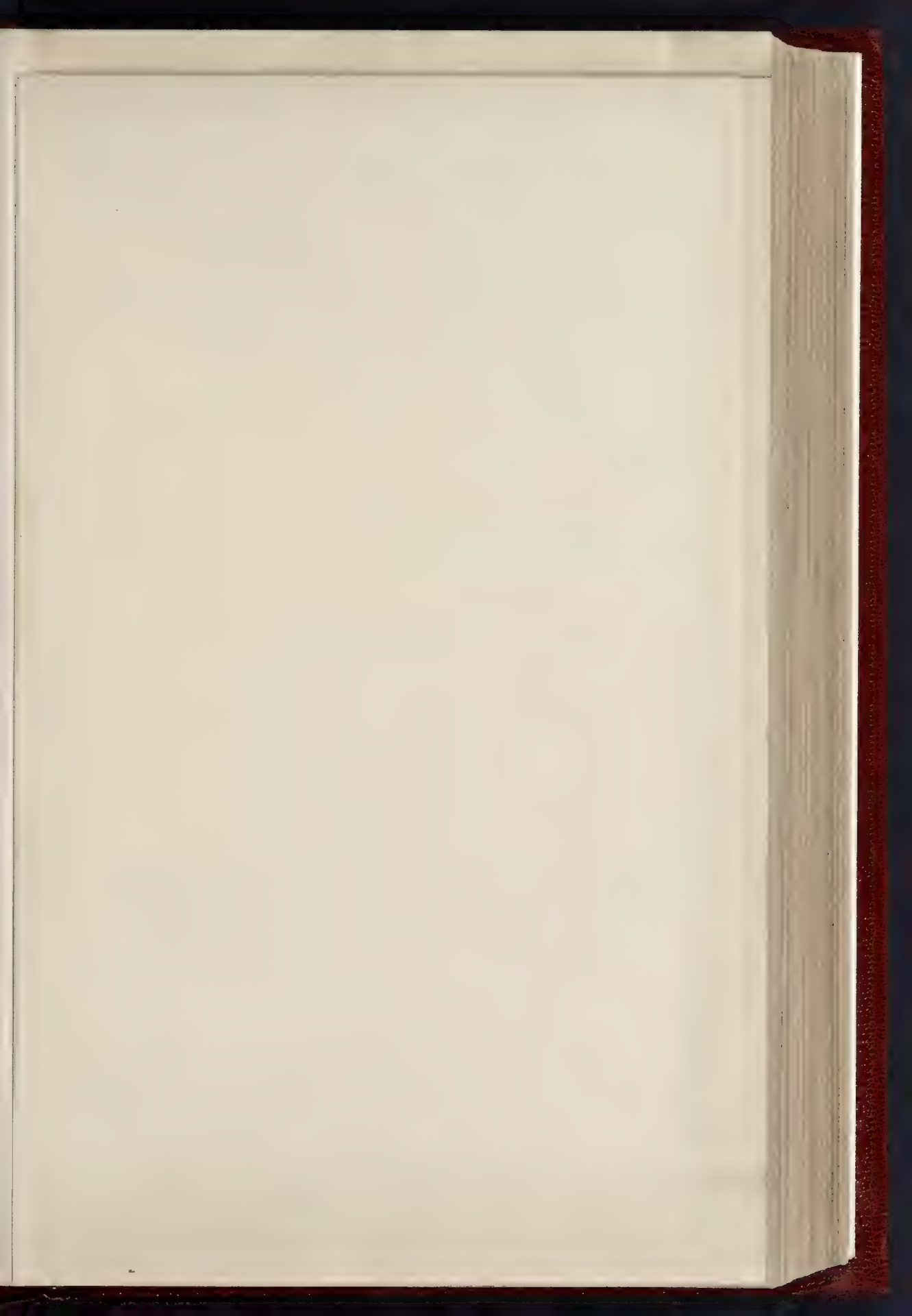






Cathedrals of England and Wales.
No. 26. YORK: FROM THE NORTH-EAST - DRAWN BY THE EDITOR

PHOTO-LITHOGRAPHY.

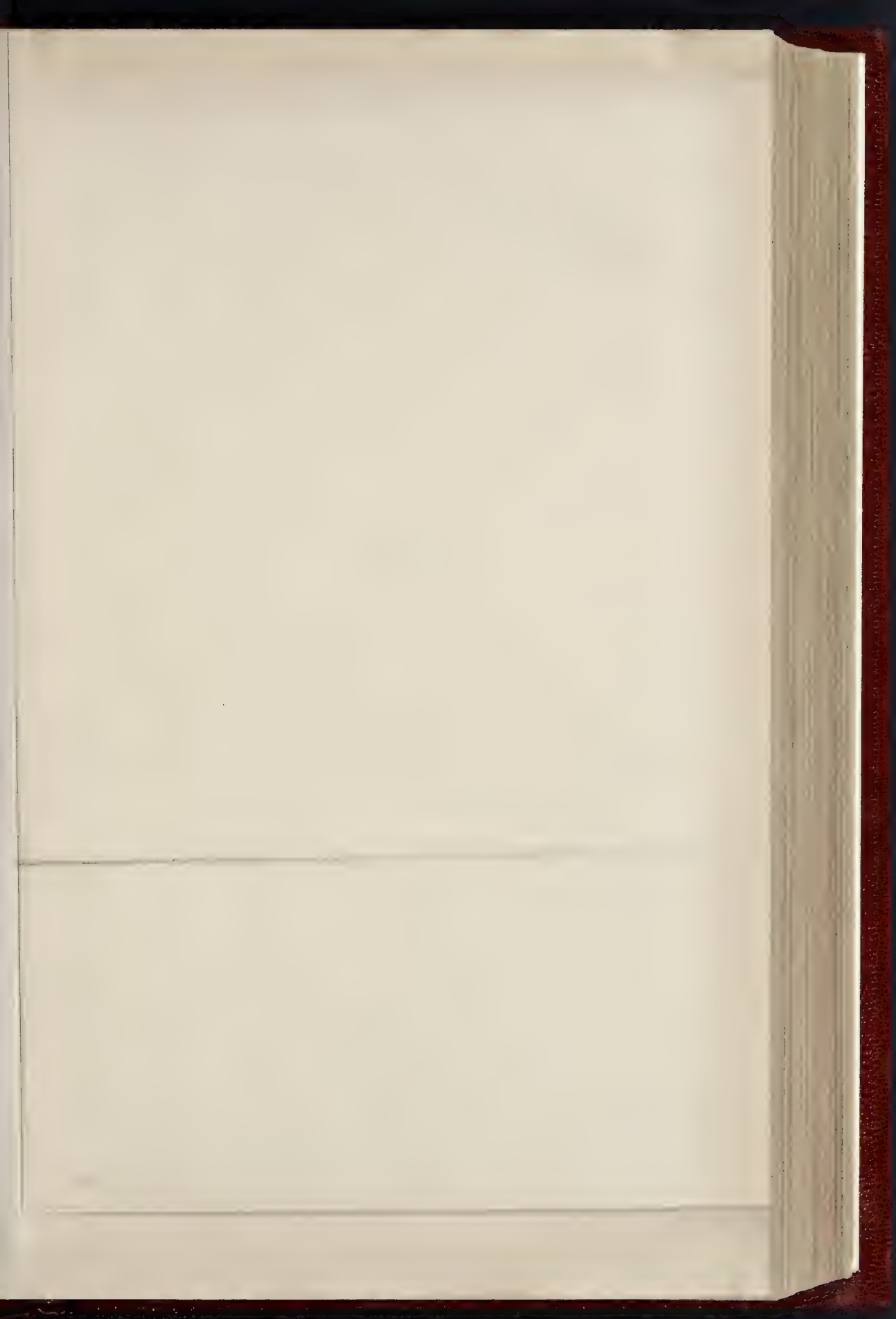




SOME ENGLISH ARCHITECTURE OF THE LAST CENTURY

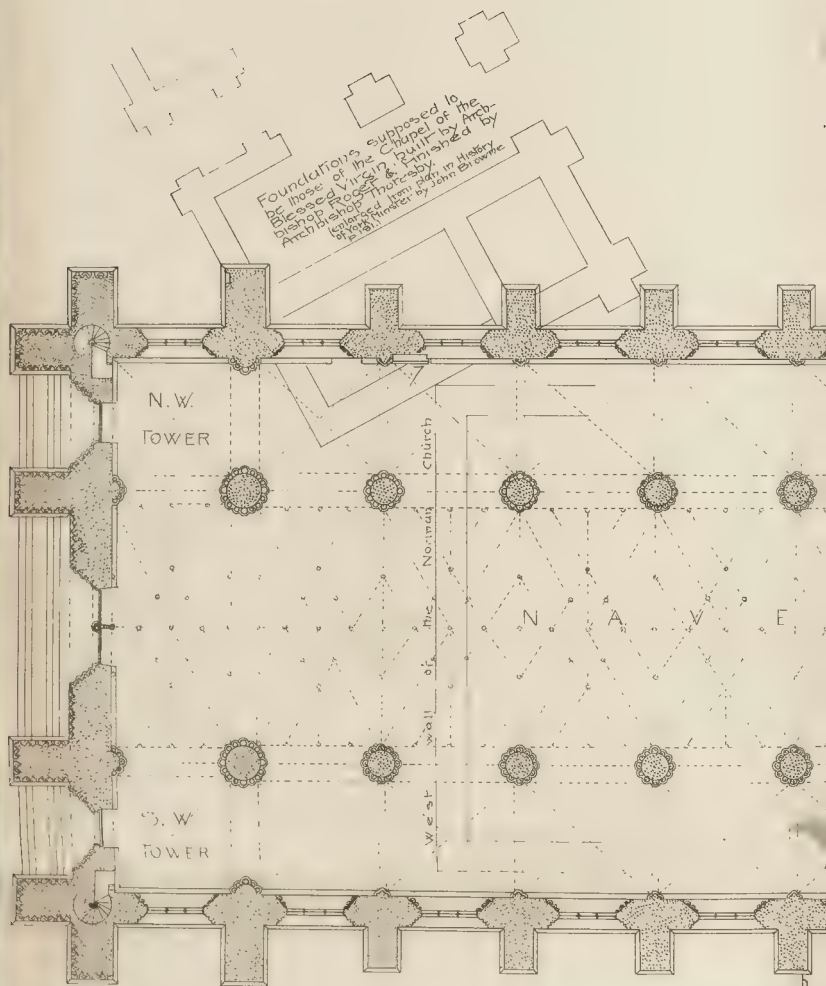
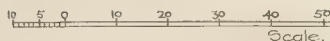


RS' A PANORAMA. «COMIN...» Mr. H. W. BREWER.



YORK MINSTER

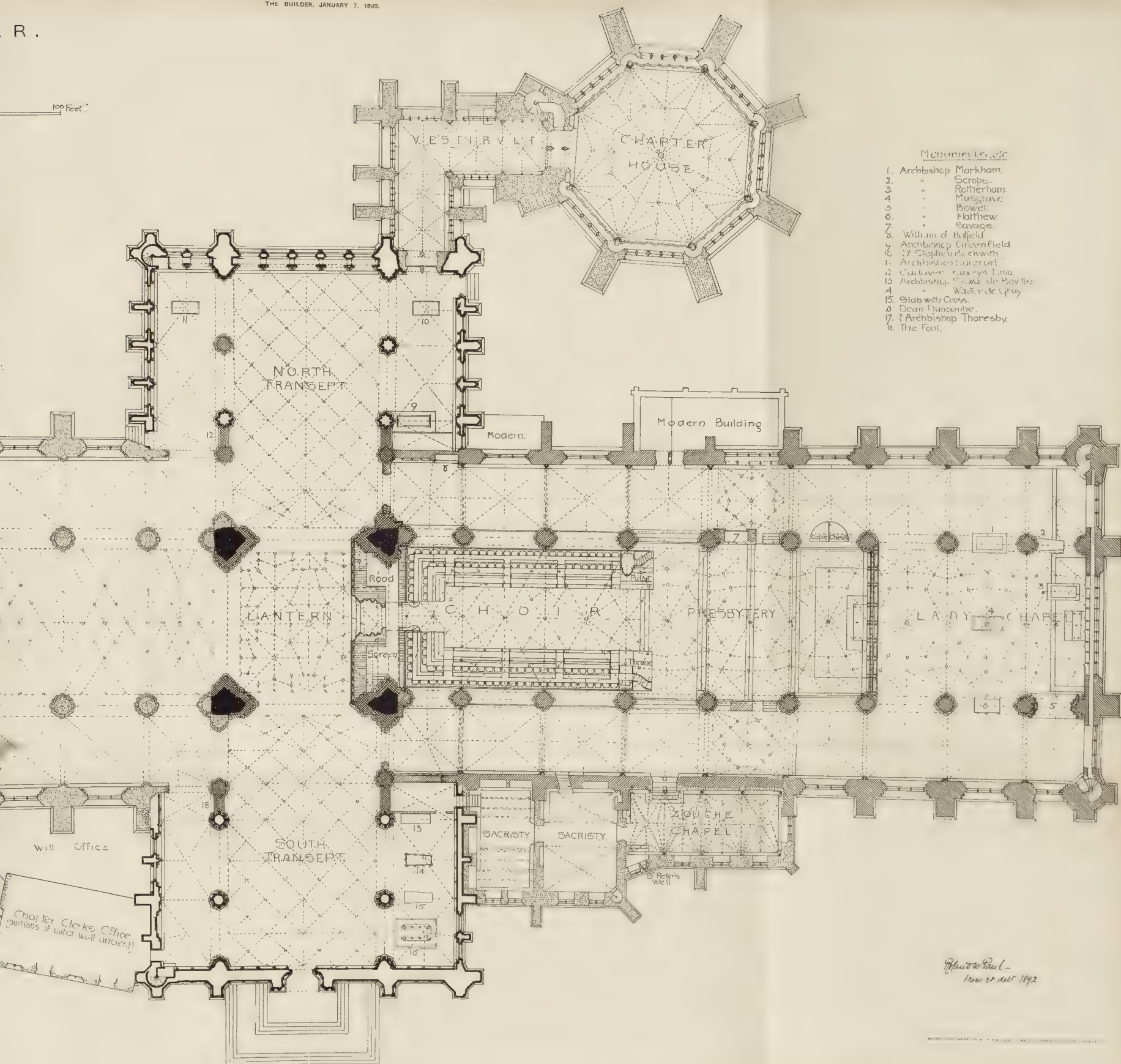
GROUND PLAN



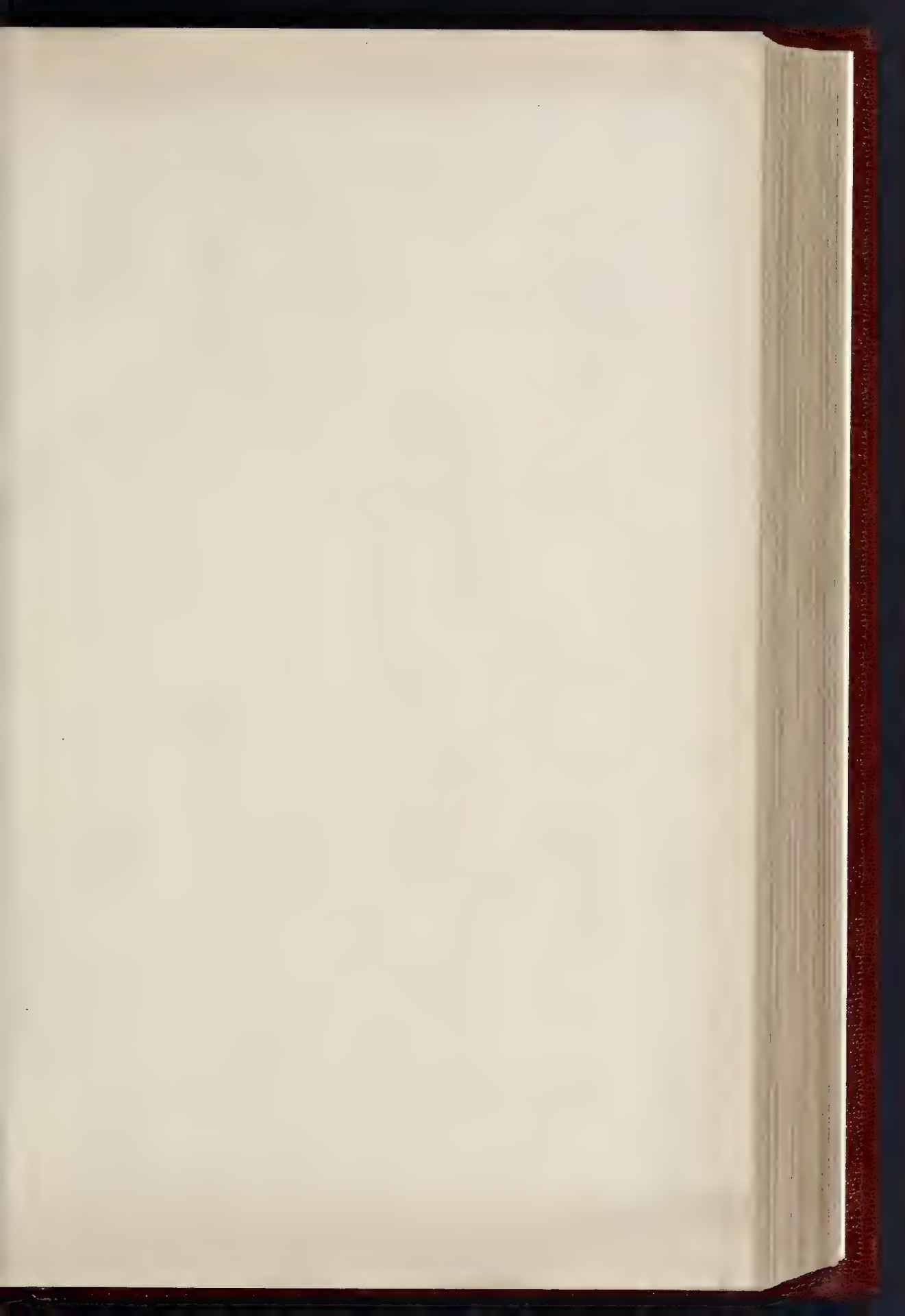
Reference.

- Norman
- Early English
- Decorated
- 1st Perpendicular
- 2nd do
- 3rd do
- 4th do
- Modern

R.



Alfred to Paul
from 22nd Dec 1892





"SUMMER" DECORATIVE PAINTING IN 2



DE VILLE, PARIS.—By M. PUVIS DE CHAVANNES.

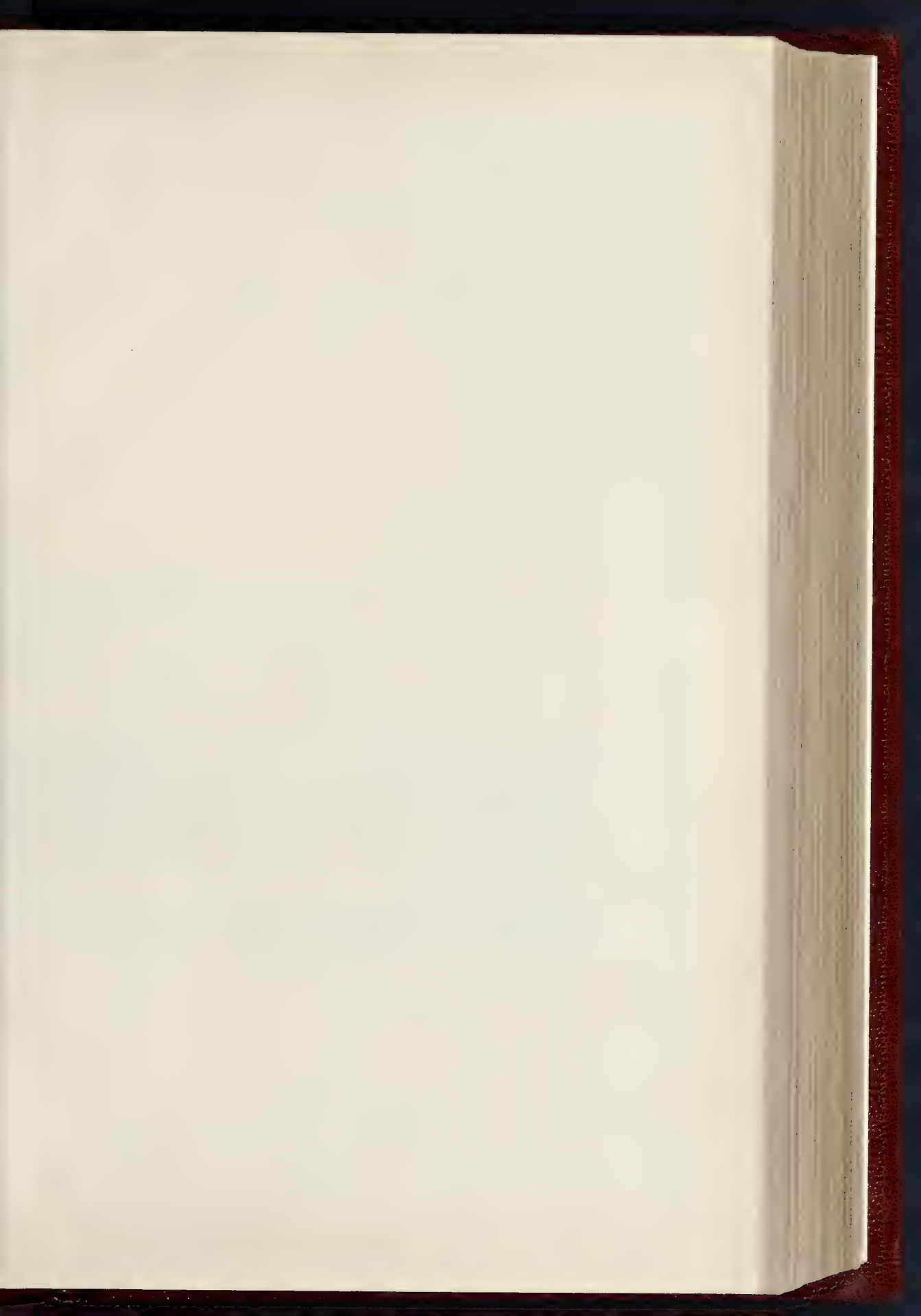




THE TREE OF LIFE. DESIGN FOR MOSAIC FOR THE



SCULPTURE OF ST. PAUL ROME BY MR E BURNI JONES ARA



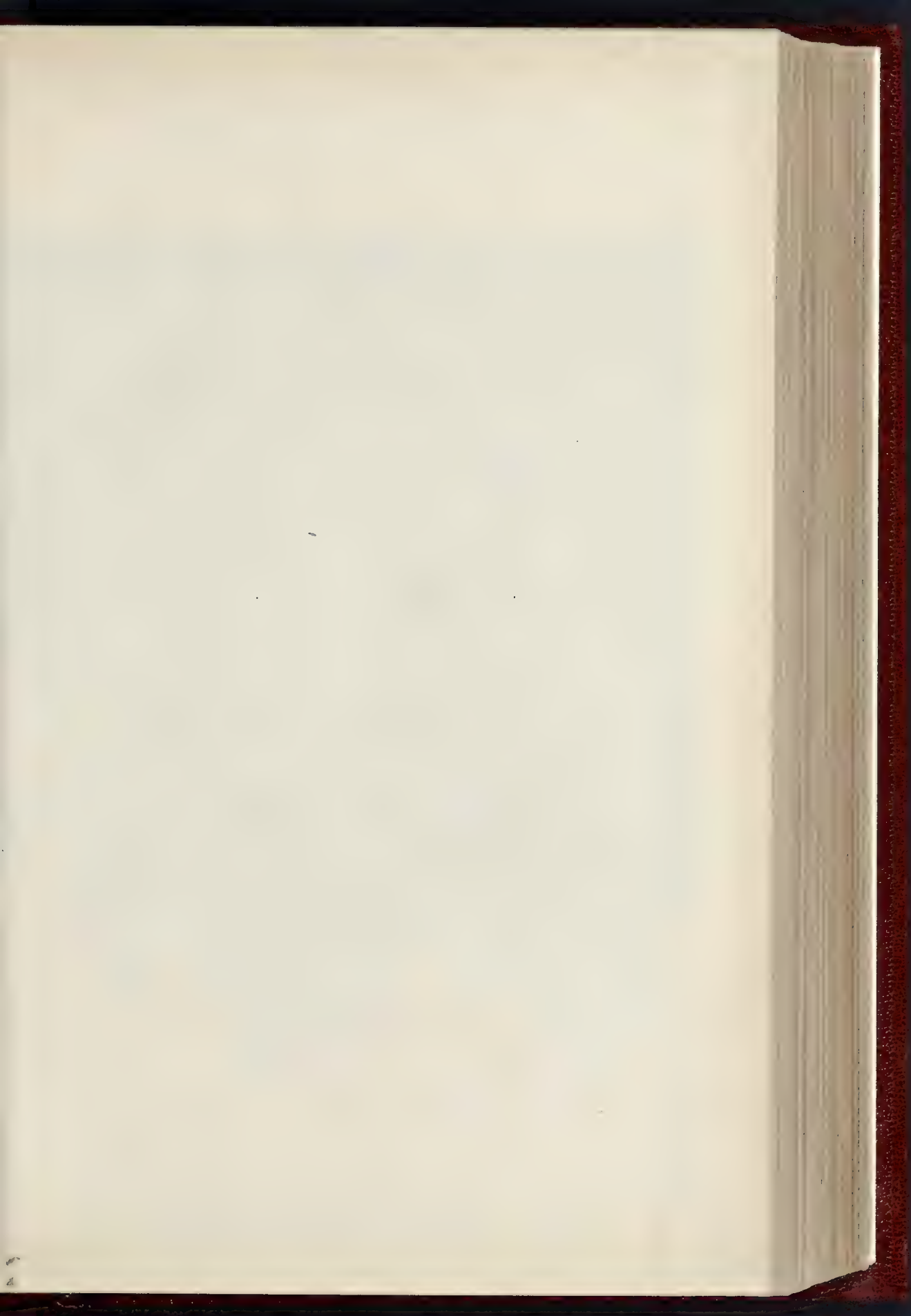


THE BUILDER, JANUARY 7, 1893.



RESTAURATION DE LA FACADE NORD-OUEST DE LA VILLA DE L'EMPEREUR HADRIEN

RESTORATION OF THE VILLA OF HADRIAN AT TIVOLI. THE NORTH-WEST FACE. BY M. PIERRE JOSEPH ESQUIÉ, ARCHITECT.



ILLUSTRATIONS.

Musée des Beaux-Arts, Lille.—MM. Berard and Fernand Delmas, Architects	Double-Page Ink-Photo.
Cartoon for Draped Figure: "Mary Magdalene at the Sepulchre."—By Mr. Lawrence E. Koe	Double-Page Ink-Photo.
A Studio-House.—Mr. M. M. Smith, Architect	Double-Page Ink-Photo.
Mission Hospital, Jerusalem.—Mr. Beresford Pite, Architect	Double-Page Photo-Litho.
Accepted Design for Technical and Art School, Accrington.—Mr. W. J. Morley, Architect	

Blocks in Text.

Musée Pavilion.—Designed by Mr. G. R. Rice	Page 27	Plan of the Fine Arts Museum, Lille	Page 31
Hotel.—Designed by Mr. J. J. Huddart	27	Proposed Church at Lourdes, France.—M. Hardy, Architect	37
Residence.—Messrs. Vanan & Sterner, Architects	27	Diagrams Illustrating Article on Chemistry ("The Student's Column")	31

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Mr. Burne-Jones's Pictures at the New Gallery.



HE collection of the works of Mr. Burne-Jones at the New Gallery forms a remarkable record of a life of conscientious devotion to a chosen ideal. Not a single picture is here which can be regarded as painted

for the market, not a single one which does not testify to a devotion, with all his powers, to the aim set before himself by the artist. That aim, as far as we can judge from the works themselves—for the artist has made no definite profession of his faith in any literary form—may be defined to be the expression of a romantic ideal of life, combined with the aim at decorative effect in line and colour. Nearly all, if not all the works here must be regarded in that twofold aspect. Each of the groups or figures is the expression of an idea to be conveyed through the medium of the figures portrayed, but with the condition that such portrayal shall always be decorative in its effect of line and colour; and inasmuch as decorative effect must always imply a certain conventionalism of treatment, it is inevitable that we should, in such a type of art, find that we must give up something from the lifelike portrayal of the variety and expressiveness of nature. Thus it is that we are conscious of a certain monotony in the types employed. Nature is always various, always strongly marked by individuality in each separate form of life. Just as the ornamentist, in dealing with natural types of foliage, has to give up something of the detail which makes their natural variety, in order to reduce them to forms suitable for decorative treatment; so the decorative painter, in making use of human types, must give up something of their lifelike variety and individuality of expression and character, in order to bring them within the boundaries of the form of art which he has adopted.

Perhaps this selection of a type of figure

conformable to the painter's aim may have been carried further than was absolutely necessary. Still, our judgment of such paintings must be made with the recollection of this decorative intention before us. We have no right to demand that which is incompatible with the obvious aim of the artist, unless where he strays into subjects which really demand the intense expression of natural life. Occasionally Mr. Burne-Jones does this, and then we have perhaps a right to feel that he falls short in qualities which the subject specially demands. An instance, as it seems to us, is the picture entitled "Love Among the Ruins" (42), the title of which was evidently suggested by Browning's remarkable little poem under that name. The essential point in that poem is the contrast between the ruins, which tell of a life long since past away, and the intense interest and passion of the existing life enshrined among them. But the picture in the New Gallery gives us nothing of this dramatic contrast. The lovers have no exuberance of life in them; they are as wan, as wasted, as quiescent, as melancholy as the ruins themselves; and here is unquestionably a false note. The same shortcoming is to be felt in the remarkable series of pictures under the title of "The Briar Rose"; not represented in the New Gallery for the sole reason that the panels could not be detached from their place for exhibition. In this subject the sleeping figures of the enchanted palace fall exactly into the way of Mr. Burne-Jones's quiescent and decorative art; but the fairy prince, who represents the advent of life and love to wake up the sleeping palace, is almost as quiet, as melancholy, as destitute of the energy and passion of real life, as the sleepers themselves. Here, again, the contrast intended in the legend is lost in the picture. But these are exceptional cases, because the artist, conscious of the direction in which his powers lie, has for the most part confined himself to subjects which come within his range.

It is interesting to compare the early pictures, some of which we remember well, and are glad to meet again after a lapse of some twenty or more years, with the recent

works in which the painter has brought his peculiar powers to perfection. The early works are small in scale, and the figures but stiffly treated; and in some, as "Merlin and Nimue" (2) and "The Forge of Cupid" (10) the landscape and figures seem to form one conception, and to be equally important in the expression of the idea; in the first named work indeed, the dark rich tone of the landscape and the effect of light over the hills in the background form the most important element in the picture. In "Love Disguised as Reason" (13), one of the most charming and successful of the artist's earlier works, the figures are predominant, the landscape a mere accessory; and the still finer "Phyllis and Demophoon" (17) is nearly a pure figure subject, the tree from which the metamorphosed nymph suddenly leans forming merely the background (necessary to the legend) to support the figures. This still appears to us one of the finest of the artist's works, in composition and in force of expression, though the decorative element is much less prominent than in most of the later ones. It seems almost incredible now (what some of our readers may nevertheless remember) that this fine and poetic picture was actually removed from the walls of the Society of Water Colours, after it had hung there a few days at one of the annual exhibitions, in deference to the vulgar prudery of persons either within or without the society, who could not understand the difference between poetry and realism in art. The fact that it has re-appeared on the walls of the New Gallery without (as far as we have heard) causing dismay to anyone, is an indication that the British perception about art has at all events progressed a little in the interval.

There is a wide interval in style between the earlier works with the small figures and the later ones with which the rest of the west room is mostly occupied. The scale is larger, the drawing and colouring of the figures far more careful and finished. There is a very noticeable difference, among other things, in the treatment of portraits. In the small full-length portrait of "Sidonia von Bork" (11), painted in 1860, the real object of attraction to the spectator, and apparently

to the painter, is the rich and elaborate design of the dress; the face is wanting in life and character. The portrait of a little boy, "Philip Comyns Carr" (25), painted in 1882, is frankly a portrait, a delightful specimen of child-portraiture, in which the face is the main point of the picture. The portrait of the painter's daughter, now Mrs. Mackail (24), painted in 1886, is equally a portrait pure and simple, except in regard to the special effect gained by the circular mirror behind the figure, showing the back of the head, and importing a light into the work; it may rather be doubted, however, whether this device is not injurious to the portrait as such, disturbing the beautiful simplicity of the face and dress. Among the more important works in this room, "The Wine of Circe" (36; 1860) is one of those which most completely illustrates the painter's special powers. As a mere piece of decorative effect, finished in every detail, it is splendid; but it gives also an intense impression of the glamour of the legend; the lithe serpent-like attitude of Circe, stooping stealthily across the picture to drop the black glutinous poison from her flask into the wine, forms one of the most weird embodiments in modern art of that ancient sorcery. A still more powerful work in the way of weird expression, though less attractive in a decorative sense, is the remarkable picture "The Depths of the Sea" (34; 1886) which formed Mr. Burne-Jones's contribution to the Royal Academy the year he was elected. The expression of the face of the mermaid has a *finesse* of sportive malice which reminds one of some of Leonardo's heads (one or two chalk studies for it in another room show how carefully it was prepared); the look of movement through the water, and the tail-fin curled up clear of the ground over which the creature is moving, combine to give a wonderfully real effect to the whole. The artist's power of giving a new reading and motive to an ancient legend is shown, as in the "Circe," in "Danae" (59; 1888) where it seems to have occurred to the artist to consider, for the first time we think among artists and poets, how the building of the brazen tower was looked on by the victim. There is a thus a new intellectual interest given to the legend, and in another sense we may admire the fine effect, in the composition, of the tree which backs up the principal figure, as well as the interesting and minute painting of an old-world and pre-historic architecture. In the series of "Pygmalion and the Image" (47-50; 1879) we again see the painter putting new life into an old legend; giving a kind of Medieval holiness of expression to what was in the Greek mind a merely sensuous story, as it was very frankly treated by Gérôme in his sculpture group in last year's Salon. It is interesting to compare the French sculptor's clever but rather vulgar realism with the English painter's poetical treatment of the same theme, to which "clever" would be the very last word one could apply; and to say truth, the animated statue is not immaculate in design, regarded as a nude figure; like Andrea del Sarto before one of Raphael's pictures (see Browning), we are divided between admiration for the spirit of the work and questionings as to the proportion and modelling of the limbs. The nude figure, however, is a very rare undertaking with Mr. Burne-Jones, in his finished pictures at least; but his draperies are superb. Two fine examples are "Sibylla Delphica" (29; 1877) and "A Sibyl" (33; 1874), the former a beautiful piece of colour; the latter especially remarkable for the bold and broad style of the drapery. "Fides" (38; 1872) is another of the same class, in an architectural framework; unfortunately one cannot but find that the head of "Fides" from which one would expect so much in the way of expression of the idea, is the least interesting part of the composition; the decorative effect of the whole is most satisfying, but one almost feels that the head might do for any other "Virtue," if the title were altered.

There is in other more important works this kind of conflict between the decorative and the intellectual element. The "Days of Creation" (23; 1877) is superb as a decorative work; in this sense it is by itself a thing to immortalise an artist; but as a symbolical representation of the Creation we have always felt it to be naive almost to the point of childishness, and a renewed acquaintance, with it does not modify this feeling. The "Wheel of Fortune" (30; 1883) has received almost extravagant praise, and it is a grand composition, not least so in the treatment of the massive wheel seen in perspective; the head of the principal figure is too small (as may be said also of the "Danaë"). But as a conception it appears to us to illustrate the danger of treating allegory in painting. The very material-looking wheel (reminiscent of a good deal after all of a great fly-wheel in a factory engine) and the figures bound on the rim of it, seem to reduce a great idea too much to the level of a symbolical diagram; in fact, there is just an under-suspicion of the ludicrous about it, the fact being that a metaphor which is very powerful and impressive in poetry may be unsuitable for reduction to painted form, as certain also of Mr. Watts's pictures show. Such a work as "Golden Stairs" (51; 1880) suggests no such contradiction of thought; it is an artistic conception complete in itself, a moment of beautiful effect and grouping of ideal figures, which professes to tell no story, and preserves the balance completely between what painting can show in fact and what it can express in meaning. So does "The Hours" (52; 1883), a beautiful symbolical composition not marred by any machinery; so does the "Chant d'Amour" (40; 1865), the first, we almost think, of the artist's large subjects; a little too palpably, perhaps, an emulation of Giorgione, but so successful an emulation that one can in no way complain of it. There are not too many Giorgione paintings in the world, and a painter who can make another, as good as the real thing, is even on that account a person to be made much of. "The Mill" (46, 1882) is another of those in which there seems a conflict between the idea and the execution; as a piece of colour it is beautiful; it is worth while to look close at the little bathing figures in the background and note their peculiar colour, and then observe how admirably it falls into the scheme when the picture is viewed as a whole. The curious thing is that this is a realistic mill and realistic figures bathed in colours of a kind of dreamland; the forms are of this earth, the light and colour are of the land of *faerie*; and a certain incongruous feeling is the result.

The "Design for a Mosaic for the Church of St. Paul at Rome" (67), which we had the pleasure of illustrating last week, is here again, not in so good a light as in the previous exhibition in the autumn. This appears to us one of the most complete and successful works the artist has produced, because here the decorative and the intellectual (or spiritual) idea are completely in accordance; the destination of the design for mosaic justifies the completely conventional treatment adopted, the adoption of which has in no way interfered with the expression of benign love in the face and attitude of the Christ. In a very different way we may cite, as a remarkable example of purely decorative design combined with strongly marked character, the design for a "Sea Nymph" (44; 1880) or rather mermaid, made if we mistake not for stained glass; the treatment of the sea, which would hardly be defensible under any other supposition, completely conveys that idea. The way in which the combination between woman and fish is worked out is so forcible and real as almost to persuade us of the possibility of the combination; and the floating mass of crimson hair, somewhat recalling seaweed, adds both a touch of character and a brilliant incident in the decorative scheme.

Nowhere, however, are Mr. Burne-Jones's power and delicacy of invention in decorative design better illustrated than in the beautiful little pencil drawings of initials and subjects for the *Æneid* (88 to 94) in the south gallery. Of these it can only be said that they are perfect, and nothing more exquisite of its kind has been produced in any period of art. The collection of sketches and studies in this room is full of interesting and beautiful work, over which however we cannot linger now. It may be added that Mr. Hollier's collection of photographs from the artist's works forms an interesting feature in the gallery of the exhibition, which has been devoted to them.

In looking round again through the exhibition as a whole one cannot but be struck with the immense amount of careful, minute, and painstaking work which it shows. For this class of painting, in which decorative effect predominates, is that which can neither be designed nor executed quickly. It requires the greatest care and study in laying down the lines of the composition, the greatest finish in the execution of detail. An artist who can show such an amount of work with these characteristics has obviously lived for his art, has allowed nothing to draw him aside from his central aim. As a French contemporary recently remarked, Mr. Burne-Jones's supremacy as a decorative artist has been attained by years of unremitting study and constant effort after nothing short of perfection in the type of work at which he has aimed.

THE STUDENTS' DRAWINGS AT THE INSTITUTE.

THE drawings submitted for the annual competitions at the Royal Institute of British Architects this year reach a very high standard, and in many cases considerable difficulty must have been experienced in awarding the prizes. It is highly gratifying to note that, throughout, preference has been given to the more solid qualities of good design and serious, well-directed study, rather than to mere excellence in draughtsmanship.

In the award of the Soane Medallion and Travelling Studentship of 1901, this is particularly the case, the perspective submitted by Mr. A. J. Bolton, the successful competitor, being, as a drawing, one of the feeblest submitted. The subject set was a difficult one, a design for a railway terminus, and rendered none the more easy by the fact that the same subject was set by the Royal Academy a few years ago for their Gold Medal and Travelling Studentship. As might be expected, many of the competitors shirked the chief difficulty of the problem, the expression of the station roof on the front elevation, even although they had not the excuse of a large hotel, as in the case of many of the termini that we know in reality. The author of the winning design has, by making his booking-hall lofty, found it possible to bring the line of his station roof to the front, and makes his building look like a railway terminus. The plan is well arranged, the booking-hall being clear and unencumbered, while the booking-offices are well placed and grouped together. In the arrangement of the platforms and train docks, the suburban traffic is rightly kept distinct, but would hardly be sufficient in view of the modern great extension of that traffic, not only in London but in almost every town of sufficient importance to possess a terminus. The waiting-rooms, refreshment-bars, and dining-rooms, and other accommodation for both public and staff are well arranged, and a thoroughly workable plan is produced. The offices of the company are arranged on the first floor without difficulty. The front elevation adequately expresses the character of a railway terminus by the introduction of an enormous arch, abutted by two lofty towers, and suggests that the designer has taken note of the buildings of the last Paris Exposition, though without plagiarism. The

side elevations are not equal in character to the front and have rather a domestic look. The design of Mr. J. S. Stewart, who received a medal of merit, has a plan in many respects similar to that of his successful rival, but the booking-hall in front is kept low and the station roof at the back is simply treated with a great arched window and flanking towers. The style adopted is a quiet and dignified rendering of modern French Classic, while the perspective is one of the best drawings in the competition, executed in monotint. The design of Mr. A. C. Houston, who also receives a medal of merit, probably owes that distinction entirely to the merits of the plan, as the author has masked the station proper entirely by his offices, &c., in front, and has designed his building in a commonplace type of Renaissance, shown, however, in very excellent drawings.

Comparing these designs it is clear that the prize has been won by the bold expression of the station to the front and considerable originality in design combined with an excellent plan, while the medals of merit have been awarded in the one case to dignified design and good draughtsmanship, in the other to good planning and drawing. This being so we should be inclined to give a high position to the design under motto "Perseverando," which possesses a good plan and excellent draughtsmanship combined with a clever adaptation of the latest craze in fashionable design, early Spanish Renaissance. The booking-hall is here kept low and has a glass dome over, while the station roof shows up well beyond with its flanking towers. We cannot say that the design is either particularly suitable for the character of the building, or equal in all respects to any of the three to which prizes have been given. "Blemundsbury" has a good plan, but entirely lacks dignity in external design, which in no way expresses the idea of a railway station. "L.O.C.O." is another design which, clever and forcible as a piece of ornate building, has missed the mark, and suggests rather a more than ordinarily extravagant striving after the picturesque of the German Renaissance. "Principium" we might almost suppose to be a joke, but we will credit the author with the intention of expressing what he supposes to be the character of a railway station by sheer mass and the avoidance of detail. Even the impression which the designer would seem to intend is, however, marred by the infantile repetition in the small windows of the parabolic form of the great arched window ending the station. The author of the design marked with a "Green device" (which suggests a conventional representation of three tadpoles) is the only competitor who ventures on a Gothic design, which in some of its parts is not without merit, though the plan of the booking-hall is quite spoilt by the vaulted corridor which forms its surrounding parts. The iron shed-roof of the station seems to indicate that the author despaired of giving an architectural expression thereto in Gothic language.

The biennial competition for the Owen Jones Studentship has this year, we are pleased to note, resulted in the success of a student, Mr. A. H. Powell, whose work, with the exception of a sketch of some stained glass at Beauvais, is entirely taken from English examples, and the excellent manner in which this gentleman has made large size studies of coloured decoration from East Anglian screens and other sources is a welcome change from the tendency in past years amongst the competitors to make water-colour paintings rather than serious and useful studies. At the same time such drawings as that of the apse at Copford Church, Essex, the wall-paintings at Pickering Church, Yorkshire, and the details of Southwold screen, show that the author is no way deficient in draughtsmanship. Mr. Francis Masey has again been unsuccessful, though very near success, and can only attribute his failure to the more workmanlike studies of his rival as opposed to his own water-colour paintings. Mr. A. H. Paterson fails also in the same direction to a certain extent, while

he has, perhaps, made his contributions prove rather the extent of his travels than the sufficiency of his discrimination of colour. Mr. A. T. Bolton has relied too much upon his drawings of mosaic work to stand much chance with such competitors as he has against him.

In the contest for the Pugin Studentship we again find success rewarding somewhat of a departure. Mr. J. J. Joass has none of the *petite* style of sketch with fine pencilling that too often appears in this competition. His studies are workmanlike, sufficiently large to show the architecture to real purpose, and both measured drawings and perspective sketches are good and sufficient, while his colour studies are also of fairly high character, though not quite so thorough as those of the Owen Jones student. Mr. T. A. Sladdin, who receives honourable mention, may credit that to his careful and painstaking measured drawings of Fox's chantry at Winchester. His pencil sketches are good and well executed but for the most part too small both in subject and scale, whilst his one coloured drawing serves only to show that he has still a good deal more to learn. Mr. H. Brakspear, who also receives honourable mention, fails in his measured work. His drawings of the North Porch of Wells are not so true in the mouldings as is desirable, and the vaulting is not worked out with sufficient care. His freehand pencil sketches are of excellent character, and have probably largely contributed to the partial success achieved. Mr. J. P. Cooper's drawings are remarkably unequal in character; if all were up to the level of his best, a much higher place would probably have been attained. Mr. C. E. Errington spoils excellent pencil work by tricky and erratic shading, a *reductio ad absurdum* of the modern American style of draughtsmanship, and the same fault exists to some extent in the work of Mr. H. C. Corlette, whose contribution is also deficient in measured work. Mr. P. E. Newton also lacks measured work and sends too many "little bits," shown in too great a variety of medium. Mr. F. Lishmann also handicaps his good colour work and pencil drawing by a deficiency of measured work and tricky shading. Mr. W. R. Gleave, on the contrary, shows careful and good measured drawings, but his pencil perspective sketches are both weak and faulty in drawing.

The drawings submitted for the Tite Prize, showing the interior of the east end of a large town church, are fairly equal in merit, and also adhere with tolerable correctness to the principles of Bramante, Palladio, Wren, or Chambers, as laid down in the instructions, though the design of the successful competitor, Mr. C. A. Nicholson, whilst catching the spirit of English eighteenth century work, is, strictly speaking, somewhat at variance with the work of either Wren or Chambers. As a matter of church design we do not admire the gallery overlooking the chancel, which the author has placed above the morning chapel, on the north side. The organ is well placed above the vestries on the south side, and no complaint can be made of the adequacy of its accommodation. The design of "Crescendo" keeps more strictly to the style of Wren, but the placing of the morning chapel in so isolated a position as is here adopted is hardly satisfactory, while the organ is too small for modern requirements and for such a musical service as the instructions evidently contemplate. "Incognita" has a well-drawn design in an Italian version of Renaissance, with the chapel on the south side and again too much cut off from the rest of the plan. "Modern Worship" in drawing and detail has great merit, but the placing of the organ above the altar and reredos is hardly in the spirit of the motto, while the design is not really for an East-end, as the apse is beyond and superfluous, and the design is really that of a domed space over the body of the church.

For the Institute Medal and 10 gs. for measured drawings, a very careful and

thorough set, by Mr. G. S. Hill, of the crypt to Glasgow Cathedral, takes the first by dint of thoroughness and completeness; beyond that is the drawings of Lacock Abbey, which are superior as drawings, and include an excellent perspective. The drawings of St. Peter, Howden, are inferior to both the former in completeness as well as in draughtsmanship.

The competition for the Grissell Medal and 10 gs., the subject being a design for a timber roof over a hall or staircase 40 ft. square, has produced a very inferior set of drawings. Instead of the medal, a prize of 5*l.* 5*s.* has been awarded to Mr. W. J. Conner, who has used some Elizabethan detail, but has produced a design which lacks both beauty and cleverness of construction, while the construction even is not adequately delineated. "Patria" shows his construction fully, but makes no attempt whatever at any architectural character of design; while "Construction" has some design which may best be described as "brass founders' Gothic," and construction which is neither clever nor sufficient.

Mr. H. Rimmer, the Soane medallist of last year; Mr. F. W. Bedford, the Owen Jones student; and Mr. T. R. Kittell, the Tite prizeman, exhibit work executed by them on their respective tours, and it is a pleasure to see the high quality of draughtsmanship and the excellence of the water colour work which these gentlemen have produced.

Testimonies of study submitted by some of the candidates for the intermediate examination show a high standard of draughtsmanship and a careful and painstaking amount of study which is sufficient in itself to justify the new system of progressive examinations as an incentive to methodical and regular studies. We hope, however, that we shall not again see students' drawings of "the Doric order of the Parthenon" allowed to be exhibited, in which the columns are shown with an enormous visible entasis, equivalent to several inches of deviation from the straight line. This exaggerated notion about the entasis of Greek columns is one of the popular errors among students and draughtsmen at present; and a drawing showing the error to so flagrant an extent as the one we noticed ought not to have been passed, much less hung up for exhibition.

NOTES.



PARAGRAPH in the *Times* of the 10th, "from a correspondent," and apparently written in the interests of the Brompton Oratory, raises a lament over the apparent delay in the building of the new portions of the South Kensington Museum. The writer, after mentioning that the buildings had been entrusted to "Mr. Aston Webb" as architect (the facility of the *Times* in making blunders over names of well-known architects is remarkable), goes on to say that—

"Parliament voted £5,000 to start the foundations for that portion of the buildings which was to be taken in hand at once. But no visible commencement has been made. Some extensive corrugated-iron houses are being erected in the inner quadrangle of the South Kensington Museum, which they threaten to entirely block up, and it is now said that the present Government, so bountiful in promises to the country to promote education, science and art, and technical instruction, has decided not to proceed with the permanent buildings for the Museum."

Various reasons are then suggested for the supposed abandonment. We are informed on good authority that there is not the slightest ground for this fear that the new buildings will be abandoned. The Treasury have completed an agreement with the architect, and the Office of Works are at present engaged in putting up the temporary buildings to accommodate the part of the collection disturbed by the new buildings. The real fact, we believe, is that the Chancellor of the Exchequer is bent on making a popular Budget, and architecture, as is usual in this country, is of

course the first thing to be postponed, in order to keep down the apparent demand upon the revenue. There is no reason to suppose that the postponement will be prolonged further than is necessary to serve the immediate political purpose.

COMPLAINTS of advances in railway rates have already become sufficiently numerous to cause the Board of Trade to call the attention of the railway managers to the matter. A letter has been addressed by Sir Courtenay Boyle to the Railway Companies' Association, asking "whether the rates at present entered in the rate books are to be taken as an expression of the deliberate opinion of the companies in regard to the rates which are in the future to be charged; or whether a reconsideration of the several circumstances attending them may be expected at an early date." This has elicited a reply confirming our impression that the revision as it at present stands will not be final, especially where it is likely to cause any considerable disturbance to trade. Where no protest is made, the new figures will, of course, remain undisturbed. Sir Henry Oakley takes occasion to remark that in order to satisfy the requirements of the Act the revision has been carried out under great difficulties, and that the companies have perforce adopted certain courses contrary to their own wish and judgment. It appears that it is their intention to make further special provisions where necessary as quickly as possible, and that a committee of general managers has been appointed to meet the traders and discuss any grievances which have arisen. The present certainly seems a singularly inopportune moment for raising the charges upon agricultural produce, yet this appears to have been largely done; while the Chambers of Commerce have been notified of heavy advances upon other descriptions of traffic. A peculiar resolution was adopted by the Bristol Chamber last week, requesting the Board of Trade to delay the enforcement of the new rates for three months. This cannot, of course, be done, but the letter from the Railway Association states that many of the alleged grievances will disappear before the end of February, and that all complaints will be immediately investigated. The Board of Trade have issued an analysis of the various Acts bearing upon this subject, which comprises all the new schedules and an alphabetical classification. This will be of much assistance to traders who have not gone to the expense of purchasing the different Acts; and although the book contains 232 pages, it is published at a shilling. The information given may be supplemented by a table showing the charge usually made by railway companies for cartage, an item which is not dealt with at all by the Acts, but which must not be lost sight of in calculating a rate which includes collection and delivery. The following is given by Mr. Cotsworth as a fair basis of cartage cost* :—

Class	Per Ton.									
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Provincial towns ...	1	3	1	8	2	2	6	3	4	
London, &c.	3	9	4	2	5	0	5	10	6	8

Of course, when it is found that this charge is included in a rate, and the company do not perform the service, a rebate should be claimed.

THE recent deputation to Mr. Asquith, the Home Secretary, to urge the appointment of a Minister of Health and various reforms in regard to burials in the interest of the health of the people, was influential and successful, for it obtained from the Home Secretary what was in effect a pledge that he would institute an inquiry in regard to burials, cemeteries, and so forth. Mr. Asquith pointed out, among other things, that as the law now stands Local Sanitary

Authorities could be compelled to erect mortuaries; but it is questionable whether more detailed and direct legislation on this particular point is not required. As regards the appointment of a Minister of Health, the deputation in effect was told that their request was unnecessary and impossible to be obtained. Theoretically, a Minister of Health may be well enough, but in fact the President of the Local Government Board and, at times, the Home Secretary, are Ministers of Health, and it is doubtful if any public advantage would be obtained by the creation of a new office. The present principle, viz., to leave the initiative in matters of public health to the Local Authority, and to leave the Government department in London to supervise to those who are primarily responsible, combines a certain amount of local freedom and self-government with central control. Whether, if every locality were governed in sanitary matters by a central department we should be in a better state at present is by no means certain. A Government department which can advise, superintend, and urge on local bodies is likely to be more vigorous than one which has the whole duty of administration. Nor can there be any doubt that local responsibility in sanitary matters educates the people in sanitary science; and though there is yet much to be done in this direction, the progress of the country during the past decade has been marked and satisfactory.

THE inconvenience that consumers are put to in time of frost, such as is now being experienced, is very serious. The water companies have regulations, which, if they were enforced, would prevent at least nine out of every ten houses being affected. Unfortunately, the companies not only neglect their duty in this particular, but also that of providing stand-posts to supply the parts of their district that are affected. This is especially apparent in the case of small property, an instance of which was given by the Surveyor to the Wimbledon Local Board in reporting to his authority on the 3rd inst. In the case mentioned, a portion of South Wimbledon, having a population of above 5,000 persons, was supposed to be amply provided for by the water company who had fixed four stand-posts, and that after notice from the Local Board. The distance that the greater part of the householders had to draw water was more than a quarter of a mile. Such cases as this should certainly be brought under the notice of the Royal Commission on Water Supply, especially when the enormous profits of the water companies are taken into consideration. These profits are no doubt due, to a large extent, to neglect of duty on the companies' part in not providing sufficient staff to see that their regulations are enforced.

WHEN writing last week of the probable effects of the new railway rates we happened to select the coal trade, as affording an instance of the conflicting nature of the reports on the subject; and since the "Note" in question was written the evidence has become still more confusing. The Society of Coal Merchants of London have drawn public attention to the fact that the recent revision of rates "has caused the railway companies to advance the charges for bringing coal to London by debiting the freighters with the same tolls per ton of 2,240 lbs., as they have hitherto levied on the ton of 2,352 lbs., except a small allowance for wastage in transit." Consumers have long been familiar with the fact that any disturbance, of whatever nature, in the coal trade, is promptly followed by an advance in prices; and but little surprise would be caused by the rise foreshadowed by the coal merchants' circular, were it not for the positive assertions made by the railway managers that they "stand to lose" heavily by their new coal rates. A large proportion of

the coal brought to London by rail is carried by the Midland, yet we have been told that that company will lose 60,000*l.* of its coal revenue. Suppose that this was written before the railway companies hit upon the idea of somewhat reducing their loss by charging for the overweight hitherto carried free. To begin with, the "small allowance for wastage," alluded to in the coal merchants' circular, should not be lost sight of. This amounts really to 2 cwt.s. per truck, thus reducing the extra weight upon which freight will now be chargeable to $\frac{3}{4}$ cwt. per ton. Put the average freight at 10*s.* per ton, and it follows that the freighter will be called upon to pay 4*d.* more for each ton carried. Are we to believe that such an advance more than balances rate reductions involving a loss of 60,000*l.*? Certainly we do not feel at all disposed to accept the latter figure as correct—it is doubtless an extravagant estimate—but we are equally disinclined to believe that freighters will have nothing at all as a set-off against the 4*d.* per ton, or thereabouts, which is so freely paraded before the public as an imposition, which will necessitate an advance in the price of coal.

AN appeal of one Alfred Solomon, against a conviction at the Worship-street Police-court for an offence under the Public Health (London) Act, 1891, came before the County of London Sessions this week. The appellant had been convicted because the drain and water pipes, and the other so-called sanitary fittings of a house in Bethnal Green-road, which belonged to the appellant, were in a very defective condition. We are glad to say that the appeal was dismissed with costs. Sir Peter Edlin said that the owner was now responsible for the sanitary state of his property, and that the law as it now exists must be strictly enforced. The decision will, we hope, do something towards making careless landlords more regardful of their duties, and will also incite Sanitary Authorities to put the law in force without fear or favour, as we have over and over again said. The law is now fairly effective. It rests with Local Authorities to enforce it.

THE freehold property, nos. 34-5, Gerrard-street, Soho, and covering nearly 3,500 ft. superficial, will be offered for sale at the Mart on the 18th inst., in terms of the mortgagees' order, *re* Wells and Croft. The premises were built after the plans and designs of Messrs. Martin & Purchase, architects, for the Pelican Club, of which Mr. A. E. Wells was proprietor. The members removed thither from Denman-street (where they were succeeded by the Eccentric Club) in February, 1890; and the club was finally closed on the last day of the following year. The building stands on the site of Macclesfield House, which, after the fire of August 10, 1887, was officially "condemned." That house was built on a portion of Henry, Prince of Wales's Artillery Ground, for Charles Gerard, first Earl of Macclesfield, of that line, whose granddaughters, Charlotte and Elizabeth, married, respectively, Lord Mohun, and the Duke of Hamilton, principals in the memorable duel fought in Hyde Park, on Sunday, November 15, 1712.* We have read in *Notes and Queries* (October 10, 1888) that Lord Macclesfield left Gerrard-street for a house he had built in Conduit-street, now No. 9,—familiar to many of our readers. His son, Charles, second earl, lived for a while with Anne, his wife, in Macclesfield House, before their separation. According to some, she was the mother, by Lord Rivers, of Richard Savage, born on January 16, 1696-7. In Fox-coat, leading from Brooke-street,

* The exact position of the duelling ground, next south of the Ring, is described in Fielding's "Amelia." In the Historical MSS. Commissioners' Report (1887) upon the Dartmouth papers is a letter written by Swift to Lord Dartmouth—"I am writing almost in the dark in my Lady Duchess of Hamilton's Bedchamber. Her Grace is on one side, and my Lady Ogilthorpe on the other. . . ." The *Dict. of Nat. Biogr.* states that the Duchess survived her husband thirty-two years. So Thackeray seems to be at fault in having affianced Beatrix to Hamilton, who, he says, was a widower.

* "Railway Maximum Rates and Charges." By M. B. Cotsworth. (Benrose & Sons.



Music Pavilion.—G. R. Rice, D.A.S.C., Architect.



Proposed Hotel for Dr. Lawrence.—J. J. Huddart, Architect.



A Residence.—Varian & Sterner, Architects.

SELECTIONS FROM THE ILLUSTRATED CATALOGUE OF THE DENVER ARCHITECTURAL EXHIBITION.

Holborn, into the then Gray's Inn-lane. For a notice of the architectural features of the old house, see the *Builder* of March 22, 1884. What is taken to be an entry of Savage's birth and baptism has been found in the St. Andrew's, Holborn, register, by name of "Richard, son of John Smith and Mary."

WE have received a copy of the illustrated catalogue of an exhibition of architectural drawings recently held at Denver, Colorado, by the Architectural Sketching Club of that city. A few Englishmen conceived the idea of holding such a show, which resulted, we are assured, in a really fine collection of ancient and modern subjects, which was visited during a

week by about five thousand persons. The catalogue includes a great many illustrations from the drawings exhibited, showing a good deal of the rather defiant search after originality which is a characteristic of modern American architectural design. We give reproductions of two or three of the illustrations. The house with the two bays which have their backs, so to speak, on the centre and look outward each way, up and down the street, is a characteristic design, and there is practical common sense in this arrangement of the windows, however eccentric it may appear at first sight. Among the illustrations we may mention a practical and solid-looking design for a hotel, by Mr. F. E. Kidder; a very simple but picturesque station of the Denver Tramway

Company, by Mr. J. J. Huddart; a "Stable to a Wayside Inn," by Mr. J. G. Link; a design for the same class of building, by Mr. W. P. Pulis; and a "Boathouse," by Mr. J. R. Rainbow. These are all of the "American picturesque" order. Other designs based on more classic lines show nevertheless (like the Band Stand which we illustrate) a considerable freedom and novelty in the treatment of old materials. We hope the Denver exhibition may be an annual one, and continue increasing in interest.

FROM a letter printed in the Manchester papers a few days since, it appears that the proprietors of the Manchester Royal Exchange have been advised that it is open

to grave doubt whether the laying down of the new building line (by which any future addition to the Royal Exchange on its main front would be rendered impossible) is within the powers of the Corporation, and that accordingly the proprietors will if necessary assert all legal rights and powers to which they may be entitled of erecting or altering their buildings in advance of the new building line laid down in the notices issued by the city authorities. In order, however, to avoid as far as possible any action in opposition to the wishes of the City Council, the directors of the Royal Exchange have for the present resolved to provide further accommodation for their subscribers by alterations which will not affect the external line of the building. It may be remembered that in consequence of the demand for increased space inside the building, coupled with the refusal of the Corporation to allow of extension of the frontage, it had been proposed to disfigure the building architecturally, in a most unreasonable fashion, by building up the intercolumnar spaces of the portico. It is to be hoped that this piece of vandalism at all events is definitely abandoned.

THE 52nd "Programm zum Winkelmannsfeste" is devoted to a subject of considerable popular interest, i.e., the collection and examination of the extant portraits of Alexander the Great. In three prototype plates and fourteen "process" reproductions in the text, the writer, Herr Friedrich Koepf, has collected not only all the well-authenticated instances, but also such other heads (e.g., of the Apoxyomenos of Lysippus and of the "Triton" of the Vatican) as might throw light on the chronology of the portraits. The whole subject here, he thinks, suffered from having been treated hitherto exclusively from the iconographic point of view. Oddly enough, perhaps, the chief interest of the monograph attaches to the beautiful head and bust published in Pl. III., which turns out not to be an Alexander at all. It comes from the Blenheim collection, and permission to publish it was obtained from the late Duke by Professor Percy Gardner for Dr. Koepf. Why Professor Michaelis, in his book on the private collections of England, ever called it Alexander, it is hard to say. Judging from the plate, it seems so manifestly what Dr. Koepf calls it, an "ideal head" put on to armour-bearing shoulders that do not belong to it. Possibly the armour misled Professor Michaelis. Anyhow, we owe him thanks for calling attention to a head which, if it must still remain nameless, is none the less beautiful.

THE second volume of the Transactions of the Edinburgh Architectural Association (Part I.) contains some very interesting and useful papers, among them that by M. Hippolyte Blanc on Heriot's Hospital, illustrated by plan and elevations. Mr. Blanc goes into the question whether there is any truth or probability in the tradition which assigned this building to Inigo Jones, and concludes that there is not a shadow of real evidence for it. The evidence of the building itself, to our thinking, 'should' be sufficient; it has no resemblance to any known and undoubted work by Inigo Jones. The volume includes papers on Yester House and Drumlanrig Castle, with plans.

WE wish here to express our best thanks to various architects who have addressed to us congratulatory letters and good wishes on the attainment of the fiftieth year of existence of this journal, and of appreciation of the number of the *Builder* in which the "Jubilee" was commemorated. We hope that those to whom we have had no time to reply personally will kindly accept this acknowledgment of their friendly expressions.

THE ENGLISH IRON TRADE IN 1892.

WHEN it was stated this time last year in these columns that not too much ought to be expected from 1892, we were not prepared for the ill-fortune which has attended the operations of the iron industry of this country during the past twelve months. We know now that 1892 has been a bad year for the iron trade, the worst for many years, even worse than 1879, which has hitherto been looked upon as the climax of bad trade. To a great extent business has been much disturbed by labour troubles, to which we shall refer presently; but in the main the continuous falling-off in our foreign trade has been the principal cause, while the position of the iron trade was not improved by home requirements, the volume of which also showed a considerable decline. In reviewing the trade of the past year, we are assisted this time by the opportune appearance of the Board of Trade Returns covering the whole year. We learn from them that our total shipments of iron and steel to places abroad last year amounted to 2,740,217 tons, of the value of 21,763,190*l.*, compared with 3,240,146 tons, valued at 26,877,000*l.*, in 1891. These figures exhibit a decline of 500,000 tons, or nearly 15½ per cent., in quantity, and of 5,114,000*l.*, or 19 per cent., in value. The comparison, it must be remembered, is with a year which likewise showed a serious decrease against its predecessor. Corresponding, if slighter, decreases are likewise exhibited in the exports of other metals (excepting tin and spelter), of machinery, implements, tools, and hardware generally. The consequence of this slackening trade was a restricted output, but very few establishments having to record full work throughout the year. In the train of this slackness came an exceedingly keen competition for the orders which were placed more sparingly than in former years, which manifested itself in the steady downward course of prices throughout the year.

In no year have strikes played a more mischievous part in the iron trade than in the past twelve months, although the chief disturbances were not in that industry, but in the related branch of coal-mining. The only strike worthy of note in the iron trade itself was that of the engineers on the Tyne and Wear, which greatly retarded business in the spring. But the troubles in the coal trade must be credited with the principal mischief done. It was thought that, with the settlement of the sliding scale dispute in South Wales at the beginning of the year, a period of peaceful relations between employers and employed was at hand. This pleasant dream was dispelled by the action of the Miners' Federation of Great Britain, which ordered a week's "play," and more to follow if necessary, with a view of shortening the supply of fuel and of arresting the downward course of coal prices. The federation was compelled to acknowledge the failure of its course, as well as the futility of the plan of working only five days a week, the one being generally condemned by public opinion, the other by the miners themselves. But the most disastrous event of the year was the Durham miners' strike against a reduction of wages, which lasted from March 12 to June 6, and which entailed idleness upon 80,000 miners, besides throwing out of work over 20,000 men engaged in the trades dependent upon a regular supply of fuel. After being out for thirteen weeks, the miners had to go back to work at a reduction in wages of 11½ per cent., instead of the 10 per cent. asked for at the commencement of the strike.

The consequences of this gigantic strike were most serious to the iron trade of the north- and north-west of England, causing an almost entire stoppage of the blast-furnaces at a period of the year when trade in pig-iron is generally most flourishing on account of the commencement of the shipping season. The strike failed completely in upholding prices, and the only results were an enormous loss of trade to the Cleveland ironmasters, which went to other districts, and which will take them years to recover. Scotland, in normal years, draws a good deal of her crude iron from the Cleveland district, and as this supply failed, Scotch ironmasters were able to work their furnaces regularly throughout the year, and to increase their output by about 100,000 tons. In Cleveland it has had the effect of reducing the year's production by nearly 700,000 tons. Although stocks were brought down to almost vanishing point, this had little effect on the price of Cleveland pig, which, from 37s. 9d. in January, rose to only 41s. 3d. in June, and has since steadily declined, being now at 36s. 9d. Nor was the effect on prices more sensible anywhere else. Scotch pig-iron warrants have fallen from 47s. to 41s. 6d.; hematite warrants, in the north-west, from

47s. 11d. to 45s. 9d., and mixed Bessemer numbers from 48s. 6d. to 46s. In Lancashire, the decrease in the price of pig-iron was from 46s. for forge and 47s. for foundry pig to 44s. 6d. and 45s. respectively. Prices of pig-iron were pretty well maintained in Staffordshire, and the makers there did a steady trade, but this was due chiefly to the circumstance that the pig-iron made there chiefly consists of special brands, which it is difficult to replace.

In the manufactured iron trade production was greatly curtailed, on the one hand, by the slackness of demand, and, on the other, by the gradual displacement of the material by steel, which is going on slowly, but surely. Prices, considering the restricted business done, were fairly steady, however, although their downward course could not be arrested. In the north of England, the ascertained price of bars, plates, and angles fell 4s. 3d. per ton; in Lancashire, bars declined 10s.; sheets, 5s.; hoops, 7s. 6d.; while in Scotland common bars receded 7s. 6d. and unbranded bars 10s. per ton. In neither of these districts was the demand for finished iron at any time brisk; in Staffordshire, however, manufacturers both did a very fair business, and maintained prices. With the commencement of the present year the makers of marked bars there have lowered their quotation by 10s. a ton, reducing them to 7*l.* 10s.; but as showing the steady nature of their business, it may be mentioned that they have stood at 8*l.* since January 1891. The tinplate trade was dull throughout the past year, the operation of the McKinley tariff having restricted business greatly, although it is beginning to look up again, and hopes are entertained of an improved condition of trade with the change of the political situation in the United States, a change from which not much should be expected, however. The hardware business was not in a very prosperous condition in 1892, orders being placed in small lots only and for immediate requirements, while prices suffered much from competition.

On the whole, those engaged in the manufacture of steel had a rather better time of it in 1892 than the makers of finished iron, although this is not saying much. Unfortunately, in no department of trade was competition more sustained and more keenly felt, and we consequently see a depreciation in value far more pronounced than in the older branch. In fact, the steady downward course of prices was a feature of the year, while the output was greatly curtailed partly by a quiet trade and partly by the three months' stoppage of steel-works in the north and north-west from want of fuel. Cases, however, occurred where makers rather stopped production than accept ruinous prices. The greatest drop in steel rates took place in Scotland, where boiler plates lost 22s. 6d. per ton, while ship angles fell 20s. and ship plates 15s. Steel boiler plates receded 17s. 6d. in Lancashire, and billets 5s. per ton. In the north of England the fall in steel plates and angles was 15s., rails losing only 2s. 6d. per ton. The decline in steel plates in the north-west was 12s. 6d.; in tinplate bars, 10s.; in angles, 5s.; in rails, 2s. 6d. Steel was kept up pretty well in South Wales, but tinplate bars fell 7s. 6d.; sheets, 5s.; while rails were unchanged at the end of the year. There has not been much change, if any, in the steel trade of South and West Yorkshire. Unremunerative prices only were obtained by the steelmakers of Staffordshire and Shropshire, owing to the keen competition by manufacturers outside the district, but they secured a steady business. The general fall in steel prices necessitated a reduction in wages, which fortunately, in most cases was assented to by the operatives without any needless struggle.

If we were to take the amount of tonnage launched last year as a criterion of trade, we should be able to congratulate shipbuilders on the result of the year's business. The launches aggregated 1,300,412 tons, against 1,300,645 tons in 1891, and 1,303,464 tons in 1890. The building, it will be seen, has been pretty uniform in the three years, but last year's business must be considered unsatisfactory because of the low prices at which tonnage was contracted for. The tempting prices have also probably led to the placing of far more orders for vessels than are wanted in the present low condition of the freight market, a state of matters which, sooner or later, will cause the inevitable reaction following upon over-building. Engineering and the related branches of trade reflected the condition of things that prevailed in iron and steel. Amongst engineers, especially marine engineers, work has not been over plentiful, and locomotive builders have likewise been slack. Ironfounders, if we except makers of cast-iron pipes, reported an unsatisfactory trade; but boiler-makers were doing fairly well last year. Manu-

facturers of heavy machinery, bridgebuilders, and machine tool makers have had a fair amount of work.

It is always difficult to foretell the course of trade in a commencing year, but this year it is a more hazardous undertaking than ever. There are several reasons which induce us to be cautious, for we have entered the new year under peculiar conditions. The new railway rates are generally looked upon as being an additional burden upon trade, the enforcement of which at the present juncture is considered highly injudicious. Then there are ominous signs that further labour troubles are impending. We do not suppose that either railway directors or trade unionists are anxious to kill the goose that lays the golden eggs. Railway magnates are too shrewd a set of men to commit such a blunder, and they will probably retreat from an untenable position. We wish we could be as confident of the action of trade unionists. If only working men were a little more enlightened as to the way in and the conditions under which business has now to be secured, they would be a little less exacting, and strikes would nevermore be heard of. But they are generally ignorant in this respect, and too often look for guidance to men almost as ignorant as themselves and a great deal more selfish. Until workmen are more capable of judging for themselves, labour troubles will crop up, and 1893 promises to yield a good harvest of them. Under these conditions, it would be rash to prognosticate. Of this, however, we are sure, that prices cannot go lower than they are, unless the men are content to take lower wages.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE fifth general (business) meeting for the present session of the Royal Institute of British Architects was held on the 9th inst., at No. 9, Conduit-street, Regent-street.

Election of New Members.

The following gentlemen were balloted for and declared to be duly elected as *Fellows*, viz., Messrs. Alexander Ross, Inverness; William Arthur Heazell, Nottingham; James Henry La Trobe (*Associate*), Bristol; Silvanus Trevail, Truro.

The following gentlemen, having passed the Examination in Architecture, were elected, by show of hands, as *Associates*, viz., Messrs. William Henry Burt, London; John Melville Keith, London; Arthur Heron Ryan-Tenison, London; William Henry Ward, London; Percy Leslie Waterhouse, M.A., Cantab., London; Theophilus Arthur Allen, London; William Nicholson Cumming, Edinburgh; John James Cresswell, Grimsby; Harold Brakspear, Corsham, Wiltshire.

Mr. Thomas Henry Wyatt was elected by show of hands as an Honorary Associate.

Award of Medals and Prizes.

The Honorary Secretary, Mr. William Emerson, then read the Deed of Award of the Prizes and Studentships for 1892-93, made by the Council in accordance with the terms of By-law 66. The following is a list of the awards:—

The Institute Silver Medal, and *sol. ros.*, was awarded to Mr. Geo. S. Hill, Glasgow, for measured drawings of the Crypt of Glasgow Cathedral.

The Soane Medallion, and *sol.* for Continental Travel, was awarded to Mr. A. T. Bolton, A.R.I.B.A., for his design for a railway station. In the same competition, Mr. J. Scott Stewart was awarded a Medal of Merit and *sol.*, and Mr. A. C. Houston was awarded a Medal of Merit.

The Pugin Studentship (Silver Medal and *sol.* for Travel in the United Kingdom) was awarded to Mr. John James Joass; and in the same competition a Medal of Merit was awarded to Mr. T. A. Sladdin, and "Honourable Mention" was made of the drawings sent in by Mr. Harold Brakspear.

The Owen Jones Studentship (Certificate and *sol.* for Travel and Study in Colour) was awarded to Mr. Alfred Hoare Powell.

The Tate Prize (Certificate and *sol.* for Travel in Italy), awarded to Mr. C. A. Nicholson. In the same competition, a special prize of *sol.* was awarded to Mr. R. S. Dods, A.R.I.B.A.

The Godwin Bursary (Silver Medal and *sol.* for Travel outside the United Kingdom), was awarded to Mr. Banister Fletcher, A.R.I.B.A. There were two other applicants.

The Grissell Gold Medal (and *sol. ros.*), for Design and Construction, was not awarded, but a prize of *sol.* was awarded to Mr. W. Thib. Connor, A.R.I.B.A.

The Zevely Prize (Institute Silver Medal and *sol.*), was not awarded, but each of the two competitors for it (Mr. T. Rowland Hooper, A.R.I.B.A., and Mr. C. Bernard Hutchinson, A.R.I.B.A.), was awarded a sum of 5 *gs.*

We are asked to mention that the public exhibition of the drawings sent in competition for these prizes will be open this Friday and

Saturday, Jan. 13 and 14, from 10 a.m. to 9 p.m.; and on Monday next from 10 a.m. to 10 p.m., when it will close.

Architecture in Spain and Majorca.

Mr. A. N. Prentice then read a paper entitled "Notes of Tours made during the last two years in Spain and the Island of Majorca." In his introductory remarks the author said he considered no country in Europe possessed the same variety of styles as Spain; and Seville was one of the most interesting of its cities,—a city in which the hands of the Moor could be traced in the tortuous and narrow streets, the courtyards, the ancient walls and aqueducts, and lastly the famous tower of the Giralda. The original tower was built in 1196 by the Moors, and was of the same height as the Campanile of St. Mark's; the Renaissance work was added by the architect Hernan Ruis in 1568, and though considered by some to have spoilt the proportions of the tower, it was to the author's mind a very picturesque object. The sacristy of the cathedral was a spacious apartment in the Renaissance style, while the Sala Capitular was more beautiful and refined. The latter was in the form of an ellipse, the ceiling, pavement, and walls being decorated in the most splendid style. Through the instrumentality of the Institute Travelling Card, Mr. Prentice obtained permission to measure the great screens around the high altar. After the cathedral, the Alcazar was the next building of importance, and he had spent several weeks making sections and plans of its beautiful details. It was a large Moorish building, somewhat later in date than the Alhambra, and though smaller, equally fine. The entrance gateway was magnificent, and there was greater variety of wall tiles than at Granada, of which he had taken full-size rubbings. Much of the original colouring remained, in spite of the cruel whitewashing to which the building was subjected in 1813. Another palace in Seville in a semi-Moorish style was the Casa Pilatos. It had a large patio or courtyard some 50 ft. square, the walls of which were covered with tiles to the height of 10 ft. The Casa Ayuntamiento was a very fine specimen of the Plateresque style, and worthy of mention. Although familiar with the appearance of the Alhambra from photographs and books, any one entering its courts for the first time could not but be carried away by the novel surroundings, and interest was at once awakened as a new-found treasure. After Seville he, at first, had the idea that the Alhambra was a blaze of colour; but, with a few exceptions of decoration, the delicate traceries and walls were of a creamy and white colour. If the Alhambra had ceased to charm the architect at home, from the many vulgar attempts at its reproduction, still any one with a soul for the artistic could not fail to appreciate the wonderful grace of form in the proportion of the arches and openings. A careful study of any of its parts was a useful lesson to the student: the Hall of Ambassadors, for instance, the entire surface of which was a mass of decoration, although it did not appear in the least degree overdone; this effect, he thought, was gained by the variety of the ornament and the mode of placing a large pattern next to a small and intricate one. The advantage of beginning at the floor level with a delicate arabesque, and increasing in boldness as it ascends, also became apparent. Under Italian influence the still unfinished Renaissance Palace of Charles V. had been begun in 1526,—a building unique in Spain both for its style and plan. Built in close proximity to the Alhambra, Spaniards seemed to have taken a dislike to its formal style, and had evidently preferred to imitate their own buildings, their sympathies laying more with the Moorish work. Having drawn attention to the many points of similarity between the Moorish and Renaissance work,—notably in the increasing boldness of the arabesques the further they receded from the eye, and in the mode of lighting,—Mr. Prentice went on to say that he considered a careful study of the plans of Moorish buildings of great value and interest. Nothing was haphazard. The doors and halls were arranged on a central axis producing charming vistas, while, no matter what size the houses were, they all had courtyards, varying from 6 ft. square, as on the Torre Captiva, to the large Court of the Lions, 116 ft. by 66 ft. During a stay at Cordova Mr. Prentice made a study of the entrance to the Holy of Holies in the Mosque,—a most impressive piece of decoration. Besides the Mosque, many instructive lessons might be gained by an exploration of the town. His first impressions on arriving at Toledo were disappointing. Coming from the South, where the houses and streets were bright with colour, Toledo looked grey and cold; on returning after a journey in the north his impressions were completely

reversed. The town contained many specimens of the Early Renaissance work. The popular idea that Spain was the country *par excellence* of the grotesque in Renaissance architecture he was well aware of, and he knew few countries where the spirit of *abandon* was so completely displayed. But when the Renaissance in Spain was analysed, it was found that it was divided into three distinct periods: the Plateresque; the Græco-Roman or Estelo de Herrera (so-called from the name of the architect who chiefly practised it); and the Roccoco or Churrigueresque. The principal buildings in Toledo described by Mr. Prentice, were the Hospital of the Holy Cross, the Alcazar, and the cathedral, which contained numerous iron screens of the Renaissance period. The study of such screens he had followed up at the Cathedral of Cienra, where the finest collection in Spain was to be found, and where the interior was a perfect mine of Renaissance detail in stone, wood, iron, and rich jasper. Madrid possessed few ancient buildings of note, but several modern buildings had sprung up of late, constructed on the most approved fireproof principles, such as the Bank of Spain, a large new railway station, and buildings connected with the municipality. Salamanca, after Seville, was the most interesting city in Spain, and might justly be called the home of the Renaissance. In the cathedrals of Spain the choir was situated in the nave, but in a number of smaller churches, and especially in conventual buildings, it was placed at the extreme west end. The journey to Leon and Santiago de Compostella should not be missed; the latter place had a distinct character of its own, nearly all the houses being of granite, and the streets being lined with arcades. From Burgos he had brought several sketches of the local Renaissance, and the cathedral at Sigüenza,—a city not often visited,—contained many gems of Plateresque work. Owing to the absence of stone in the locality of Saragossa, most of the houses were built of flat bricks, crowned with wooden cornices. Of the many monastic buildings in Spain, the Benedictine Monastery of Poblet, now in ruins, was the most interesting and extensive after the Escorial. From Barcelona Mr. Prentice proceeded to Palma in Majorca, where subjects for sketching were innumerable, from the large cathedral down to the door-plates of the houses. His object, while in Spain, had been to study and sketch as much of the architectural remains as time permitted, as he was conscious that the past was being trampled out of the country, and that many ancient buildings were rapidly disappearing.

The President, in inviting discussion, said it was always pleasant to have fresh impressions, even of old friends, as many of the buildings referred to by Mr. Prentice were.

Mr. R. Phénix Spiers, in proposing a vote of thanks to Mr. Prentice, said he had not been to Spain himself, but he had been the cause of many students going there, and among them was Mr. Prentice himself. It was sometimes difficult to get people to understand that work of the *Francis Premier* period in France and in Spain was quite as fine and as interesting as that of the Cinque Cento period in Italy—in fact, that of the Cinque Cento period in Italy was more or less confined to the magnificent sculptures on tombs. It was only in France that they found buildings of a picturesque aspect of that period. In towns of north Italy (where he was travelling last year), he was painfully conscious of the absence of that picturesqueness of design which one sees in almost every French town. The fact was, the soil of France and Spain (he meant by the soil the style of the Flamboyant work in both countries) was eminently suitable for assisting and carrying forward the works of the early Renaissance, by adapting the picturesque design found in the Flamboyant work of both countries. The work in Spain was not, perhaps, quite of that exquisite finish which was noticeable in France, but it was, he thought, undoubtedly more vigorous. He was glad that Mr. Prentice had undertaken the journey to Spain, and although that the paper which had been read would induce other students to go there. A journey there would be of great benefit to students, and would introduce to their notice features and decorations, as well as beautiful metal work, which would be of the greatest assistance to those who were endeavouring to evolve a new style. In conclusion, he wished to congratulate Mr. Prentice on the beautiful drawings which he had exhibited.

Mr. Henry Dawson said he had very great pleasure in seconding the vote of thanks. In

reference to what Mr. Prentice had said about the absence of colour in the Alhambra, he thought the absence of colouring chiefly referred to the Court of the Lions. When the other courts were visited, such as the Ambassadors' and the beautiful room which led to the Queen's Boudoir, they were found to abound in colour. There was also the mosque of the Alhambra, which abounded in colour. He had been hoping that Mr. Prentice would have said more about the beautiful mosque at Cordova. The study of that magnificent specimen of a mosque, which was something like three hundred years earlier than that at Granada, would well reward any student. Its remarkably picturesque columns were the contributions of almost all the countries of the world, from Constantinople to France, Spain, and Rome. The country of Spain offered admirable ground for anyone who was enthusiastic and could bring home drawings of the treasures found there.

Mr. Thomas Blashill said he had travelled beyond the extreme north of Spain, and his general impression of the Gothic work which he saw there was fully borne out by the drawings exhibited. The characteristics of what he saw in the north of Spain were an excessive amount of ornament; very elaborate detail, exceedingly heavy, rich, and full of imagination, and he thought this was different from what one saw in France and Italy. One's education could not be considered complete until a visit was paid to Spain and more of its work seen; but he was afraid that before their young students could get there, there would have to be a little more organisation of travel. He thought it would be of interest to them to hear from Mr. Prentice how he travelled about. The means of travelling in Spain were very crude, and unless they had a purseful of money, they were likely to get on very badly.

Mr. Alexander Payne said he should like to call attention to Mr. Heber Rimmer's drawings which were exhibited. They were some of the finest drawings which they had ever seen in that room.

The President, in putting the vote of thanks to the meeting, said the drawings to which Mr. Payne had referred were certainly very beautiful, and well worthy of their study.

The vote of thanks was then put and carried unanimously.

Mr. Prentice, in the course of a brief reply, said that Mr. Rimmer accompanied him during part of his journey in Spain, and many of his drawings were made in his (the speaker's) company. They each sketched different subjects.

The President announced that the next meeting of the Institute would be held on the 16th inst., when he would deliver a short address to architectural students, and Mr. William Emerson, the Honorary Secretary, would make some critical remarks on the students' drawings. The prizes would also be awarded to the successful students, and the subscription portrait of Mr. Alfred Waterhouse, R.A., would be presented to the Institute.

The meeting then terminated.

MAGAZINES AND REVIEWS.

THE *Gazette des Beaux-Arts* continues the articles on "La Propagande de la Renaissance dans l'Orient," by Mr. Eugene Müntz. This second article of the series deals with Russia, and adds some characteristic illustrations of Russian developments of Renaissance detail; a window in a Moscow Palace, with colonnettes on corbels, set in the middle of a wall carved with a great coarse "nail-head" ornament; the Cathedral of the Assumption in the same city, evidently suggested by St. Mark's Venice; the portal of the Cathedral of the Annunciation (Moscow again), a curious example of ornament which is Renaissance in detail, but used with a profusion quite oriental in character; and (to contrast with this) the plain bald pilaster and arch architecture of one of the courtyards of the Kremlin. Mr. Mazorello contributes an article on the retrospective art exhibition at Madrid, and M. Louis Gonse a review of Michel's new biography of Rembrandt. The number is hardly up to its usual interest.

The *Art Journal* devotes an article to the work of Mr. Burne-Jones, somewhat universally enthusiastic, and illustrated, not only from the artist's pictures but from his sketches and studies. An article on "Bardini's at Florence" contains some very interesting illustrations of Renaissance tapestry, as well as other objects. "Round about Coate" consist of a description and some charming sketches of scenes connected with the life and work of Richard Jefferies.

The most interesting article in the *Magazine of Art* is Mr. Walter Crane's on the aspect and the adaptation of objects; the old question of nature and conventionality, but treated with new point, in the illustrations at all events. The sketches of the oak and the daisy in their aspect, and the same treated decoratively, are excellent examples. Mr. Claude Phillips contributes an article on "Current Art," Mr. Theodore Watts concludes his article on "Portraits of Tenyson," a short article on Mr. Burne-Jones introduces among the illustrations a profile study of the head of M. Paderewski, which has more than one kind of interest.

Mind contains the second part of an important article on "The Field of 'Aesthetics Psychologically Considered,'" by Mr. H. K. Marshall.

There could hardly be a more flagrant example of the principle on which some modern magazines are conducted than the fact that in the *Nineteenth Century* Lord Grimthorpe appears "by request," as the reviewer of "Architecture, A Profession or an Art?" The old system, in the good old days of anonymous writing, was to select a writer to treat a subject because he understood it; the present system is to select a person whose name, whether he knows anything of the subject or not, will attract the mass of the public. The editor of the *Nineteenth Century* is (or was) an architect; if he knows anything of his business he must know that Lord Grimthorpe is a perfectly incompetent person to treat such a subject, and that no one who understands it cares a straw for his opinion; but then his name, like Mr. Shaw and therefore architecture is handed over to critics of this class, as attractive to a public who only want to be amused and not to learn anything about architecture. This sort of thing is supposed to sell a magazine; and whether it is true or not is of no consequence. It is needless to add that Lord Grimthorpe's article is one long advertisement of himself, interspersed with sneers at all the architects of both factions. There is one remark in his article, however, with which we can cordially agree, viz.: in regard to his own work at St. Alban's:—"No observer of the least experience or natural eye for differences could mistake for five minutes any of that work for original in any Gothic style that ever flourished." (!) Certainly that is true; even more true than Lord Grimthorpe is aware of.

The *Fortnightly Review* contains an article by an architectural writer of a very different stamp, Mr. H. P. Horne, one of those who is content to know his subject without bragging about his knowledge. His subject is a review of Mr. Symonds's admirable book on Michelangelo. In the course of it Mr. Horne goes into a very interesting criticism on Symonds's criticism on Michelangelo's architecture, the Laurentian Library especially, which he defends with some justice from Mr. Symonds's rather damaging criticism. A passage as to the Sistine ceiling we may quote, as showing it in a new light:

"Imagination, composition, form, in the highest and grandest representation possible to the human mind, I had expected to find in these frescoes before I visited Rome; but I had not looked for the colouring of the design to be equal to these beauty and originality. Alone in Italian art, wholly different from those arrangements of colour which characterise the earlier Florentine, the Venetian, the Roman, the Neapolitan schools; these frescoes present a splendid and solemn scheme of clear dead hues, of greys, russets, tawnies, chaste greens and purples; only the blues, the management of which was ever the test of a great colourist, stand out with distinction, and give force and value to the whole work."

The theory that Michelangelo was a great draughtsman but "no colourist" has been so commonly repeated, that it is interesting to find an independent writer who sees him rather differently.

In *Scribner* there is an interesting paper by F. Crowninshield on "Impressions of a Decorator in Rome." The writer makes a plea for Roman decorative art as not receiving the recognition it deserves. He comments on the craving of the Italian decorator for plaster work, admitting however that the Italian at any rate makes good plaster—"slakes his lime and preserves it in pits, where it lies for an indefinite period in store." In regard to mosaic work he remarks—

"The old mosaicists work (worked?) on the wall from the cartoon which they designed themselves. There can be no doubt that this method, when possible, is the best, not only for mosaics, but for all mural decoration. At the world-famed mosaic factory of the Vatican I was informed that this direct method would be too costly and lengthy; a statement one cannot gainsay without personal experience. It is

likely enough that for equal quantities of work executed in the shop and on the wall, respectively, a greater expense would be incurred for the latter; but I hold that much less work would be necessary were the work attached directly, under the personal superintendence of the artist. Superfluous labour would be at once apparent, and therefore eliminated."

He adds that in the case of Mr. Burne-Jones's mosaics in the American church in Rome a great deal of useless labour has been expended in getting gradations of tint in skies, &c., the effect of which is entirely lost in execution.

In the *Century* there is an article on the Great Wall of China, by Mr. Remy Hitchcock, with some good illustrations. Also the story of Millet's early life, told by his younger brother François Millet, and an article on "Illustrations of Dickens," with special reference to Hablot Browne.

Blackwood's Magazine contains a good and thoughtful paper on "Ornament," by Mr. Herbert Maxwell, who says very truly that "ornament is to form what music is to sound." The writer speaks strongly and in the main with truth in regard to the abuse of gilding, instancing especially the unhappy idea of entirely gilding the central figure of the Albert Memorial. In his strictures on the designing of decorative frames for pictures, by which he holds that the frame is pushed into undue prominence, we can hardly agree with him. It is surely an advantage that the frame and the picture should appear as one whole, designed by the same mind and hand.

The *English Illustrated* includes an article by Sir Henry Wood on the now rather well-known subject of the buildings for the Chicago Exhibition, which, here as elsewhere, are made rather too much of. The same number contains an article by Miss (?) Honor Brooke on "Burne-Jones and his Art," with illustrations from his works.

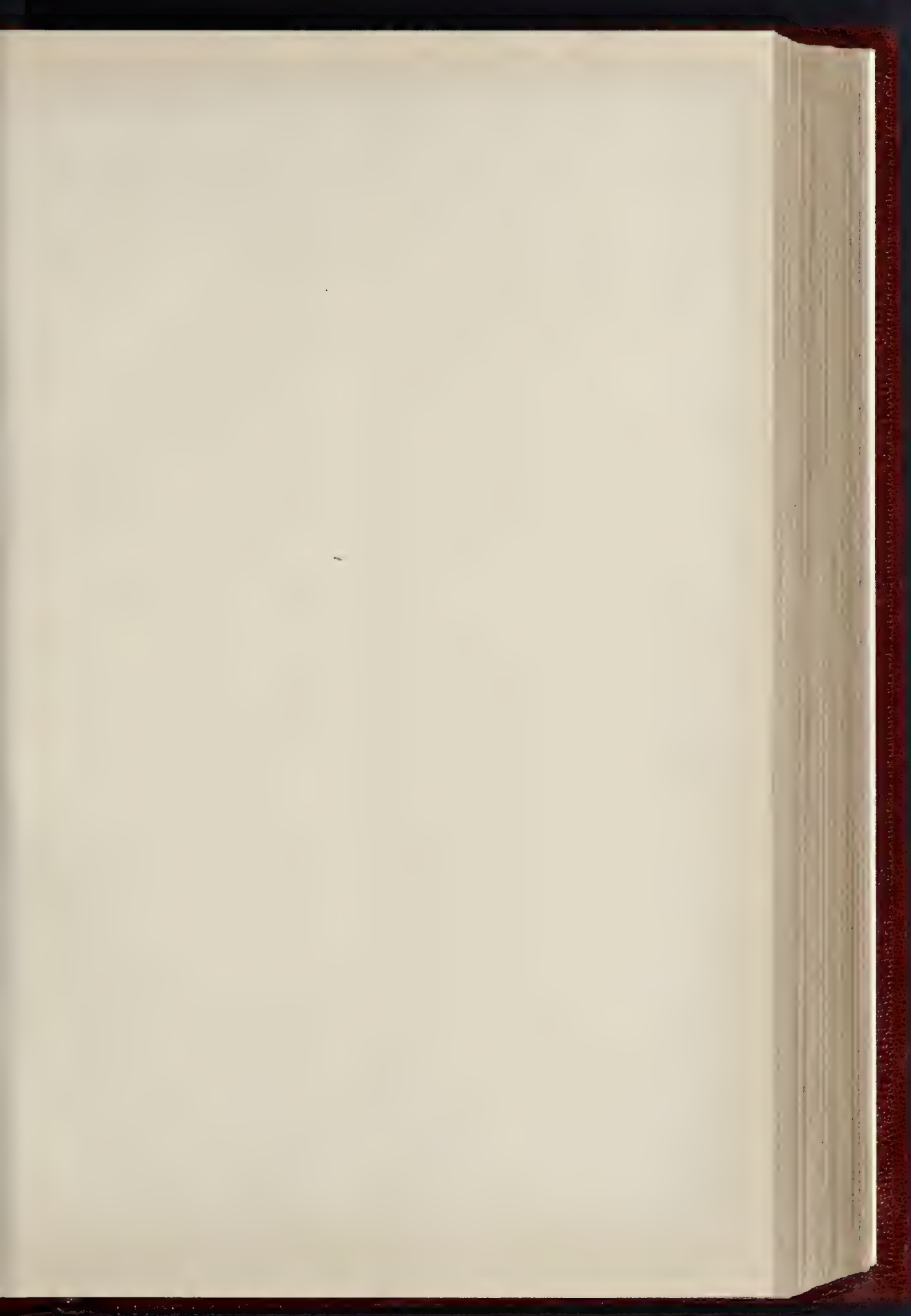
Macmillan contains an article on Bewick, and the *Gentleman's Magazine* one on "Old Church Steeples," by Mrs. Wilson.

In *Temple Bar* is an article on "Gower-Street and its Recollections," which has the air of being taken, in regard to facts, from Mr. Wheatley's book on London, unless he is the author of it. The same number contains an article on Samuel Palmer and his works, summing up with the conclusion that Palmer "conveyed the sentiment and spiritual beauty immanent in a landscape in a way which has seldom been excelled," which is not more than the truth.

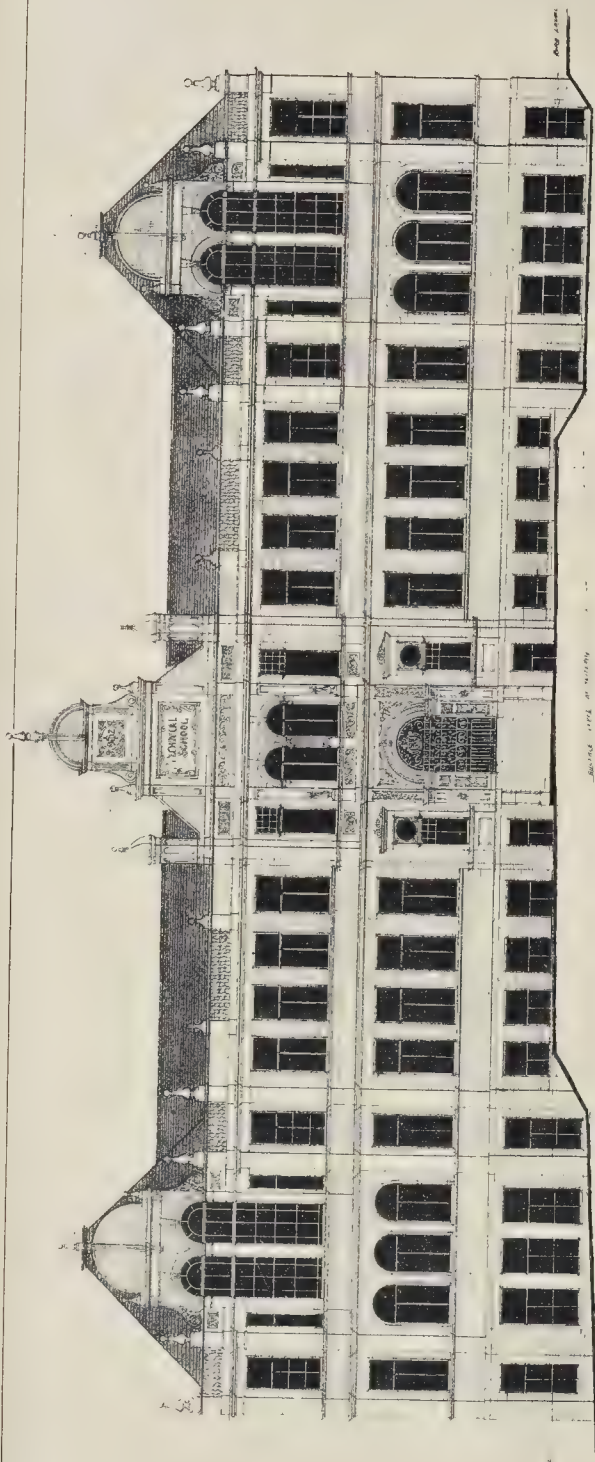
The *Antiquary* includes an article of more architectural interest than usual, by Mr. J. Bilson, on "Norman Work in the Nave Triforium of Beverley Minster"; one on "Some Monuments in Selby Abbey Church"; and one by Mr. St. John Hope on "Excavations in Silchester in 1892."

SANITARY INSPECTORS' ASSOCIATION.

ON Saturday last, Dr. B. W. Richardson, President of this Association, delivered his annual address to the members at Carpenters' Hall, London Wall. In congratulating the Association upon an eventful year in its annals, he said that the vigour of the meetings had been well sustained from first to last, the year's work being crowned by an address which was in its way a model sanitary paper, delivered by Mr. Hutton, the Chairman of the London County Council. The Association had paid an interesting visit to Paris, and an important sum of money, 3,500*l.*, had been granted under the Berridge Trust, which had relieved the Association from embarrassment on account of smallness of income. With regard to future progress, their principal efforts should be in the direction of securing greater freedom and independence in the performance of their duties. The Medical Officers of Health had obtained that independence and permanency which the Sanitary Inspectors must attain to, not that the Medical Officer of Health was yet in his proper position. In place of being the servant of the Sanitary Authority, he ought to be, as in America, the Chairman of the Health Department of his Board. When that levelling up took place, the Sanitary Inspector would find his proper place—would attain a proper professional position—and his office would be more respected and consolidated. The reports of the medical officers in America had the status and authority of State documents, and they ought to attain an equally dignified position in our own country. The principal means to be employed for obtaining that object was the inauguration of a complete system of professional education, and by the elevation from all who desired to enter their ranks, of examination tests appropriate and adequate for the tasks they had to execute. One of the most important points to which they should devote their attention was the establishment of a technical school in which chemistry, physiology, engineering, and the other subjects which it was necessary for an efficient inspector to know could be taught not only to

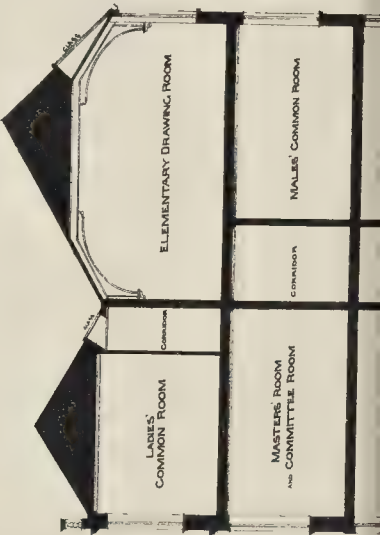
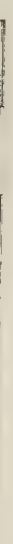


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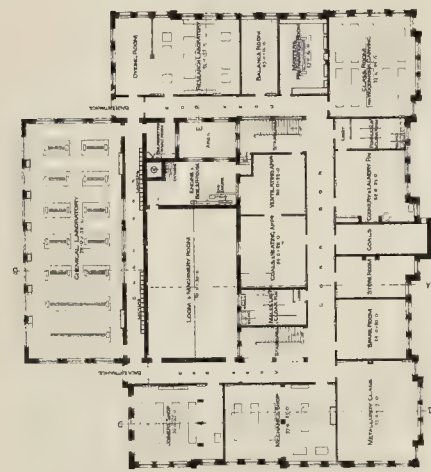


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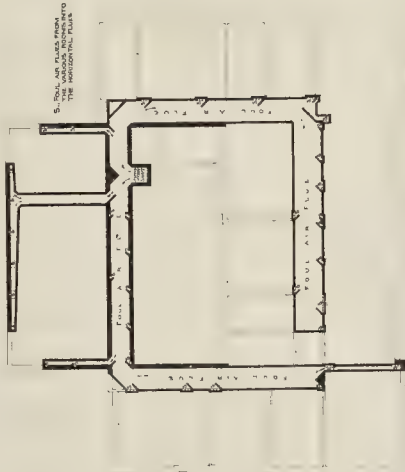
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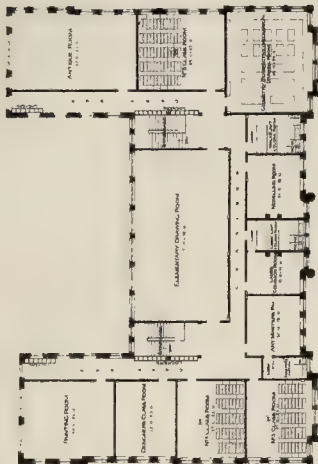
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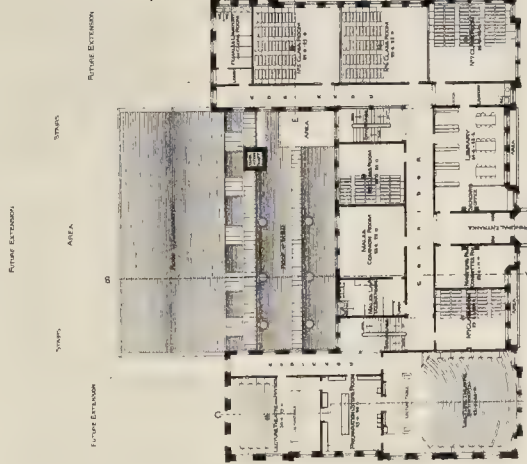
BASMENT PLAN.



SUB-BASMENT PLAN.



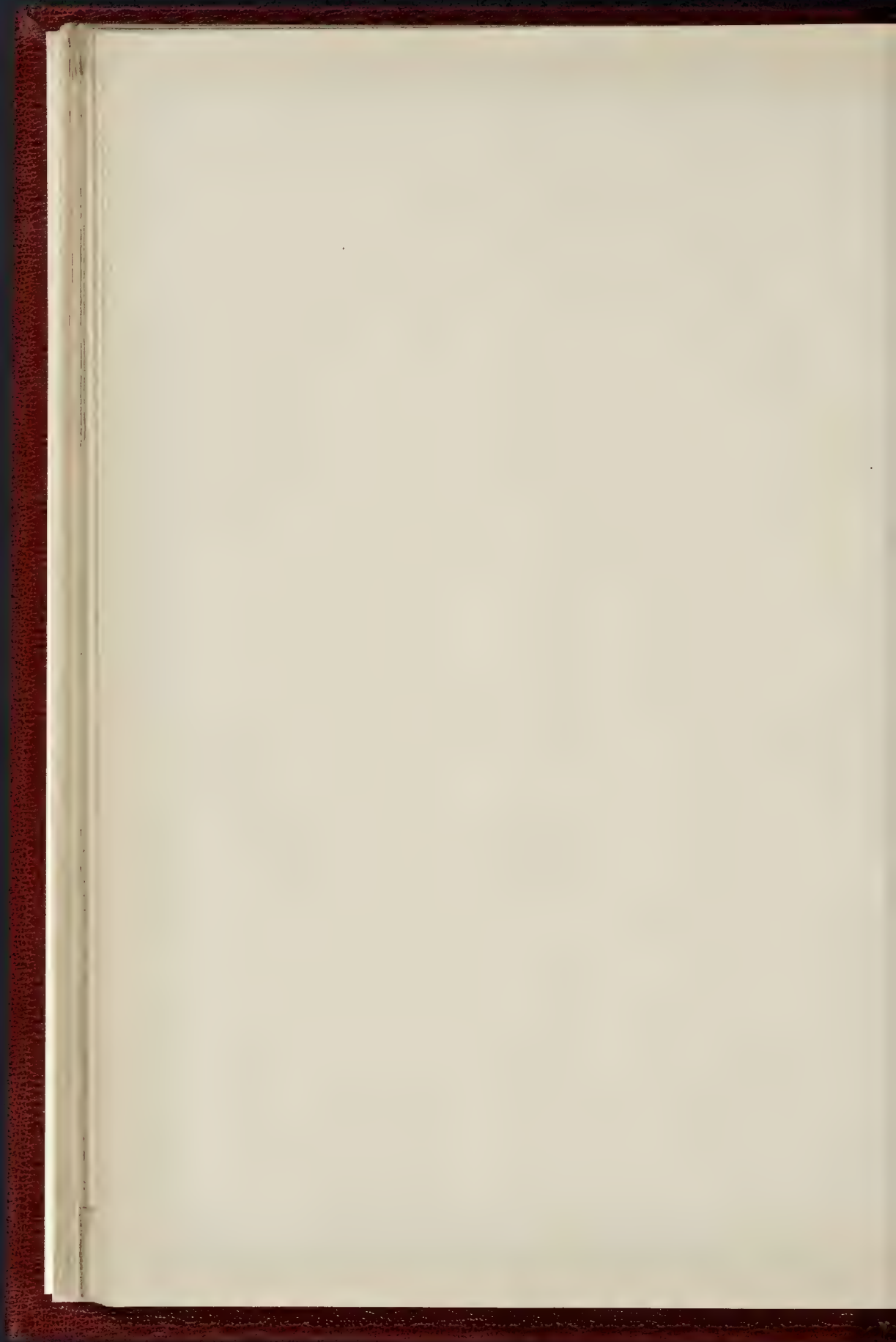
FIRST FLOOR PLAN.



GROUND PLAN.

NO PHOTO SURROUND & C-4 & 5 EAST HADRIAC STREET FLETCHER & L.C.

ACCEPTED DESIGN FOR TECHNICAL AND ART SCHOOL, ACCRINGTON.—MR. W. J. MORLEY, ARCHITECT



their own members but to others, who would be glad to join the classes and to pay for them. A good deal had been said recently of examinations and examining boards, and they had seen rival schemes multiplying around them. An impression seemed to prevail that the Association was not strong enough to stand alone in such matters and that they would find their advantage in co-operating with some other bodies for certain purposes. Any examining board for inspectors ought to be absolutely independent and above the suspicion of desiring to profit by fees paid for examinations. His advice was that they should act for themselves and not be trammelled by connexion with other bodies. He would recommend the Association to appeal to the Government to appoint an independent body of examiners, paid by the State. The medical profession had made an attempt in that direction and had nearly succeeded. If the Association was properly represented in Parliament, it could not fail to succeed, for the request was entirely reasonable. Above all it was necessary to be self-reliant and united. Why should they be desirous of joining any other body, or of putting themselves under the wing of any other body? Wings would fly away and the prey would drop. With regard to general progress in sanitary science he feared it had not been great. The lecturer did not appear to entertain a high opinion of the value of the studies and researches of the bacteriologists. What they wanted was greater encouragement to personal cleanliness and greater facilities for securing personal purity, purity of clothing and domestic surroundings. Then, and then only, would the terrible death bill, due to preventable diseases, be materially reduced. An illustration of practical progress was afforded by the establishment of the museum of sanitary appliances at Hornsey to which the association had paid a recent visit. There, any person proposing to build would be able to find out how he could do it in the best and most scientific manner. To establish such museums and to help in the spread of museums of the kind throughout the country would be a proper object for the association to take up, and by doing that they might render most valuable service. He would recommend them to form an advisory committee to assist the various localities in organising similar exhibitions of sanitary appliances.

After the reading of the paper a vote of thanks was proposed, on which Mr. Tidman, C.E., Mr. H. Alexander (Shoreditch), Mr. C. W. Legg (Hackney), Mr. Middlewick, Mr. West (Walthamstow), Mr. Fairchild (Clapham), Mr. Dee (Westminster), Mr. Bell (Epping), Mr. Goodwin (Richmond), Mr. Grist (Southwark), and other members addressed the meeting. Most of the speakers cordially welcomed the suggestions made by Dr. Richardson, particularly with regard to the questions of examinations and the founding of a school. Mr. Fairchild thought that it would not be very difficult to obtain for South London, perhaps at the Albert Palace, such a museum as North London had obtained; Mr. Bell thought that not much could be done on the higher lines suggested until the inadequacy of the salaries paid to inspectors, particularly in rural districts, was remedied; and Mr. Goodwin, of Richmond, complained of the precarious tenure by which many urban inspectors held their offices. He cited cases in which inspectors had been discharged and censured for doing their manifest duty, one of the cases of hardship arising out of a condemnation of property belonging to the Crown itself.—The vote of thanks was cordially acclaimed, and the President briefly acknowledged the compliment.

Illustrations.

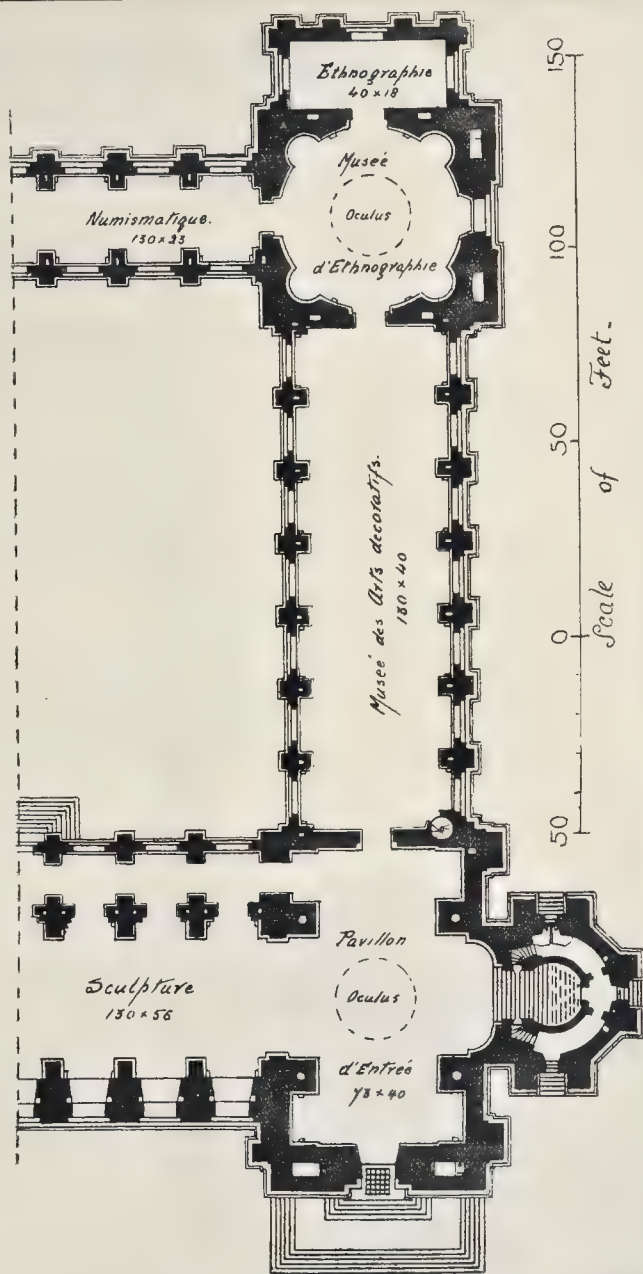
FINE ARTS MUSEUM, LILLE.

IN this issue we give a representation of the Palais des Beaux-Arts at Lille, along with a half plan scheme of the general arrangement of the buildings.

The style of the building is not uncommon in western Flanders, and the choice of this design, out of the quantity submitted in the national competition in 1884, is an indication that the feeling for architectural form is more local than patriotic, or the Flemish Renaissance would have been rejected for something thoroughly French or Parisian.

It is an architecture that at first repels a stranger but which rapidly grows into esteem on acquaintance. Seen in broad sunlight, and seen in the half-light of night or early morning, this building does not appear the same. In the half-lights, from across the wide open space in front, it looks exceedingly fine, but in the hard light of mid-day the heavy massing of sculptured detail and great salience of cornice and column are seen with such breaks in light and shade that the eye refuses to grasp the building as a whole, but is caught by the individual portions which oppose continuity of breadth by the extent of their relief.

On the contrary, the lateral elevations are



pleasing and effective in the daylight, but of no architectural effect seen in subdued light.

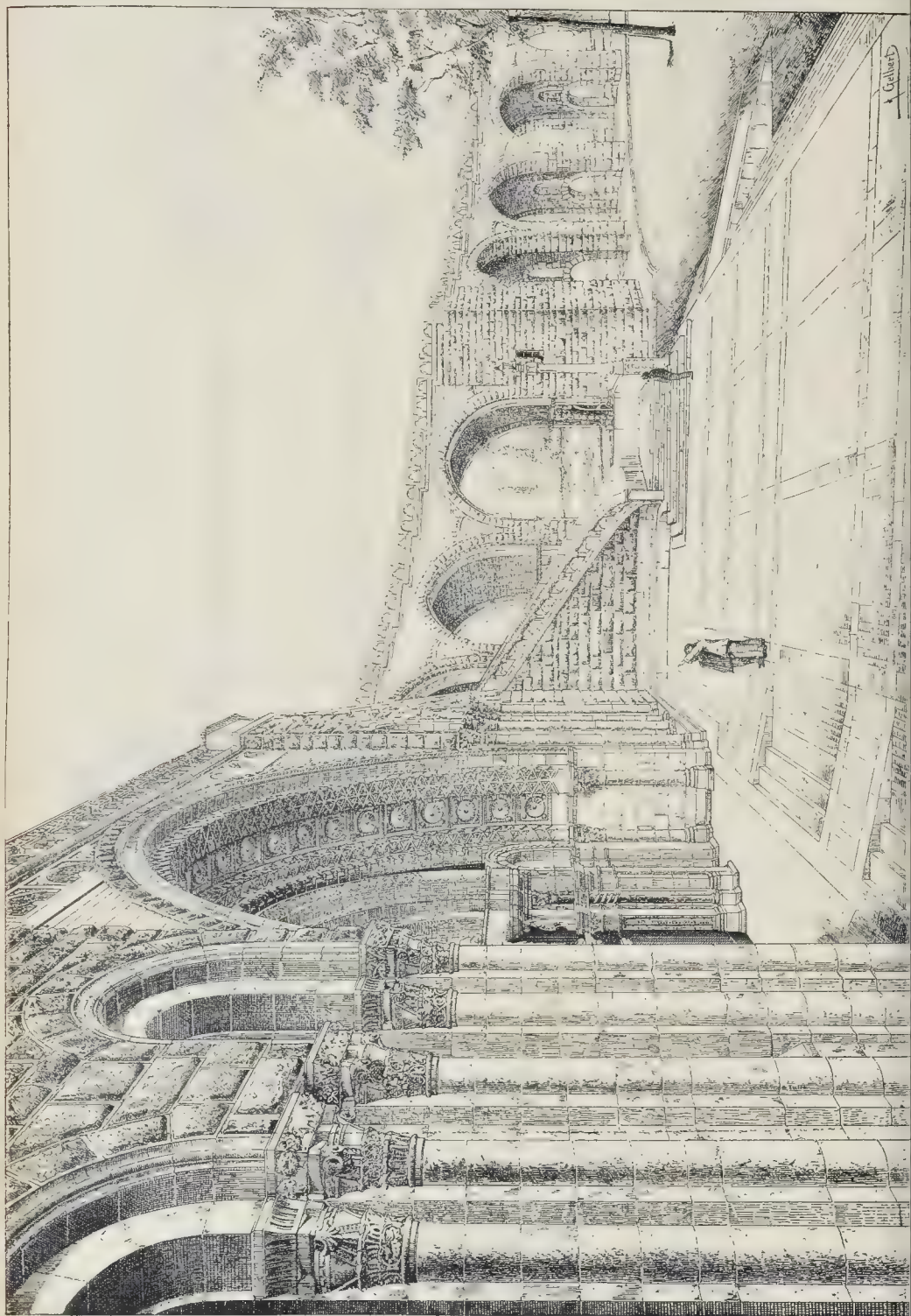
The object of the building is to receive the valuable collection of paintings by old masters for which Lille is considered second only to Paris. These works have hitherto been preserved in the museum of the Lille Hôtel de Ville.

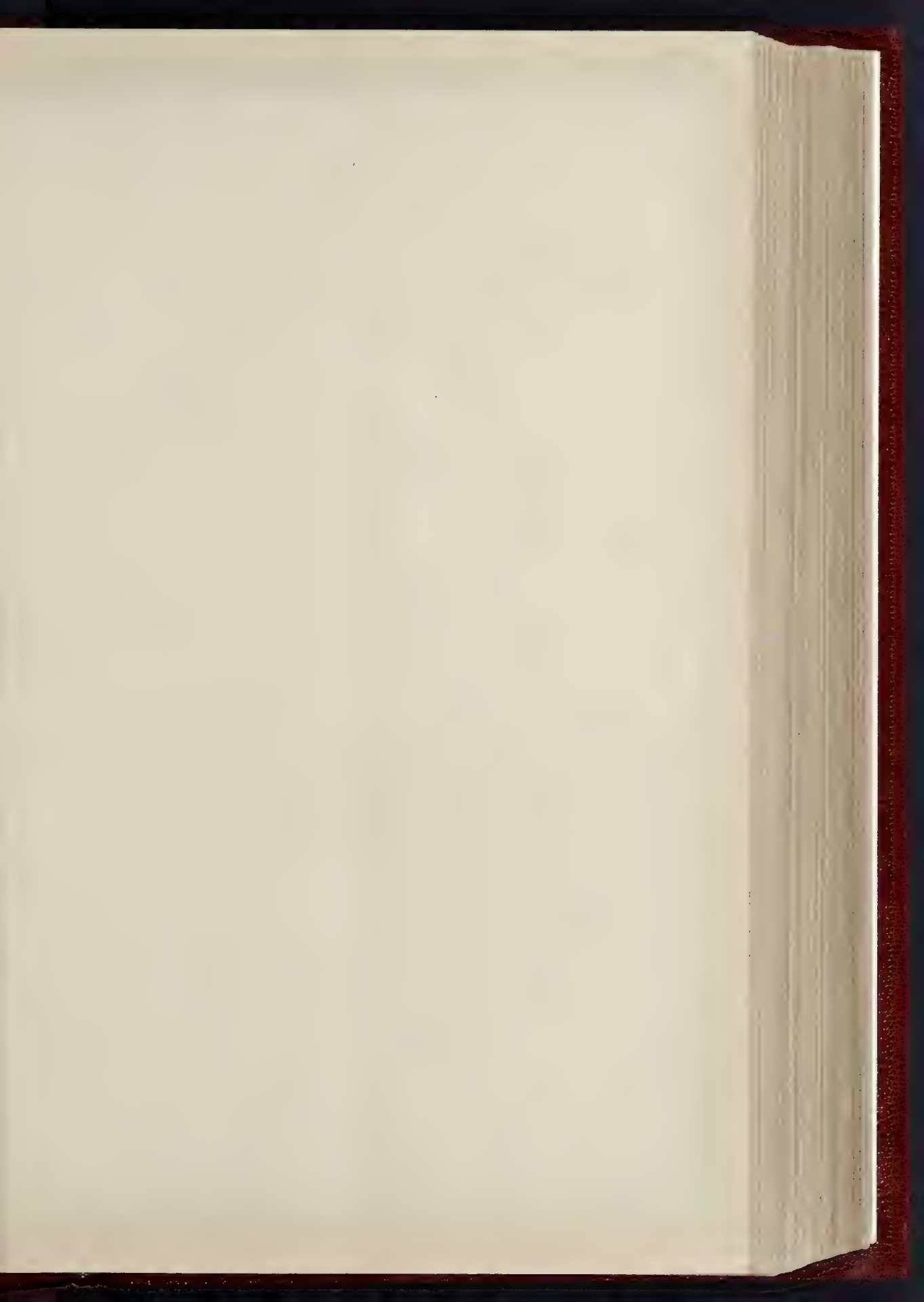
To start the enterprise, the Government, previous to the competition, sanctioned a lottery; 108,000l. were netted towards the cost. The designs accepted were those of M. Berard and M. Fernand Delmas, and the work commenced in July, 1886; but, soon afterwards, M. Berard retired, leaving M. Delmas to complete the building. The chief assisting architect was Mr. Arthur Pye-Parmentier, an Englishman. Pushed on rapidly in the early part of that year, the Palais was finally inaugurated in March, 1892. But as it stands, to all appearances completely

finished, it represents only one-half the extent of the entire museum, which is designed to be duplicated, symmetrically, on what is now the rear—a large ornamental garden surrounded by high-decorated railings. This extension will then give the space demanded for so large a collection.

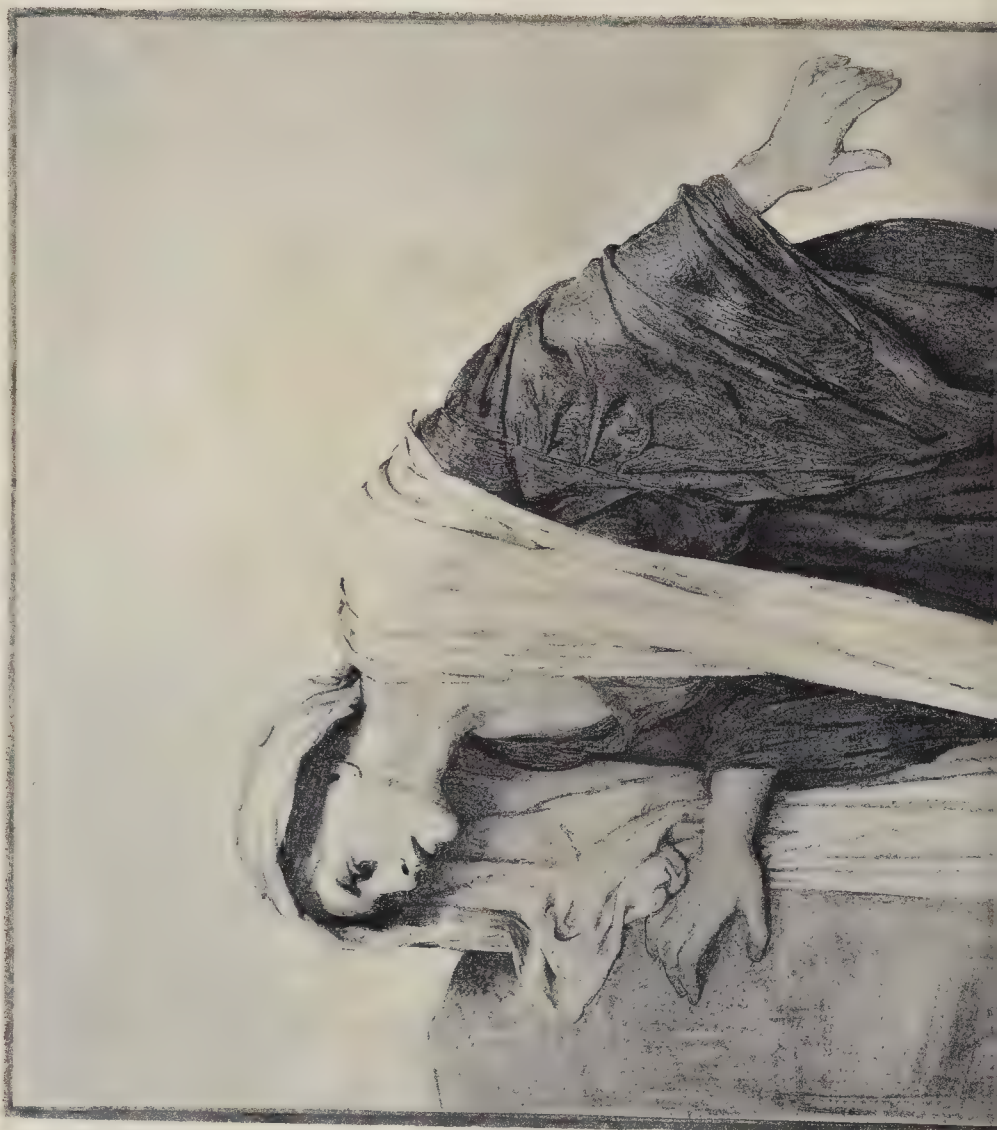
Except the entablature and string course the building is of *Savonnidre*, or soap-stone, coming from the *Savonnidre* quarries on the Meuse, near the Belgian frontier. It carves well, and has the quality of hardening greatly under exposure.

The exceptions referred to are of a stone that does not appear to weather so well, judging from the discolouration already of its most exposed portions. It comes from the "Reffroi" quarries in the same neighbourhood. Up to 4 ft. above ground level a hard blue stone, tooled, is employed. This is *Soignies* stone from Belgium. The whole foundation is on massive brick walls.



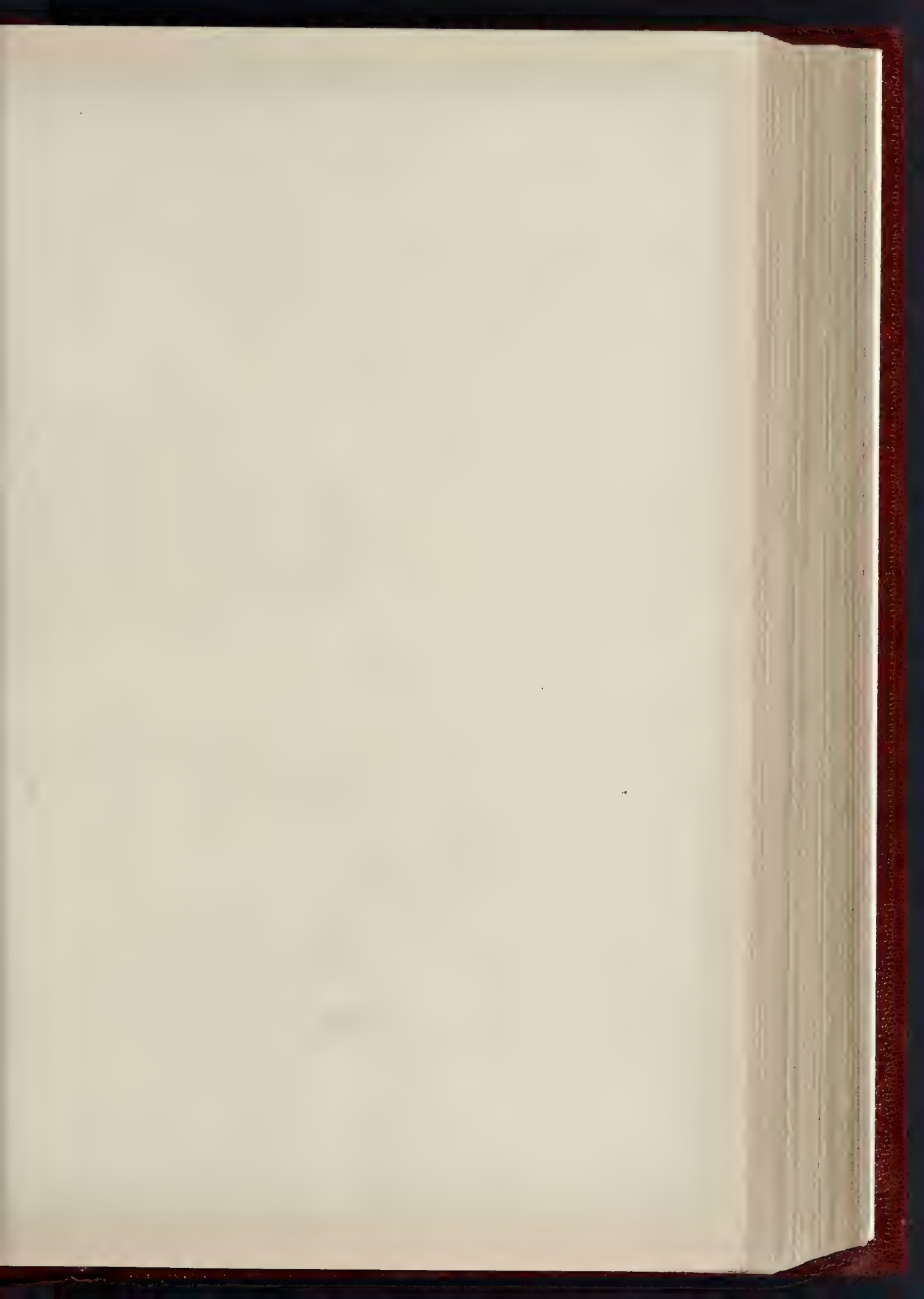


THE BUILDER, JANUARY 14, 1893.





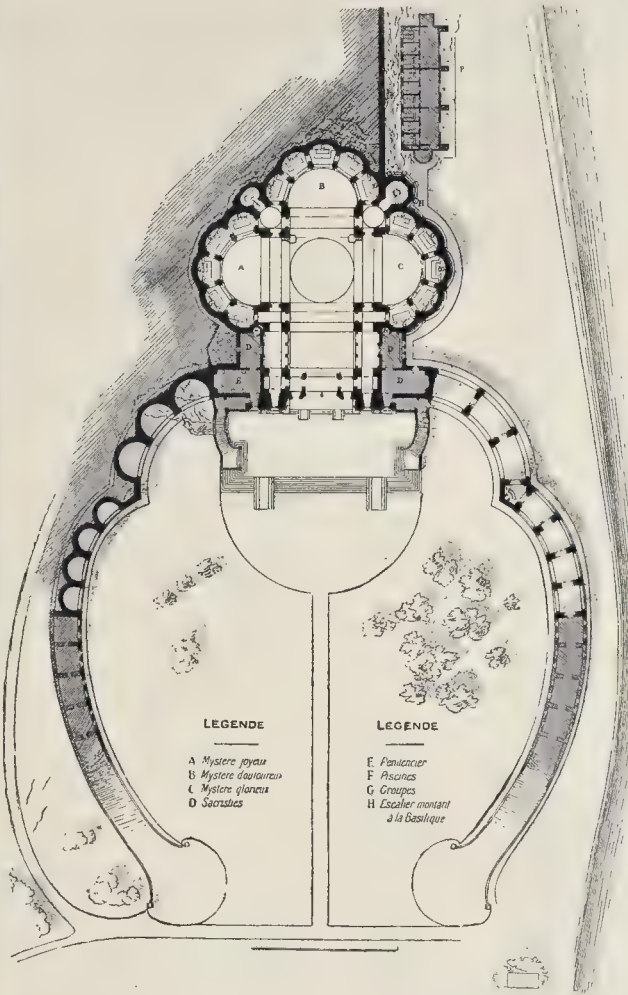
CARTOON FOR A DRAPED FIGURE: "MARY MAGDALENE AT THE SEPULCHRE."—BY MR. LAWRENCE E. KOE







AND FERNAND DELMAS, ARCHITECTS.



Proposed Church at Lourdes.—Plan of Church, showing approaches to existing Church.

and piers. The ground floor is composed of vaulted halls, which are striking from the extreme whiteness of the stone, particularly of the roof, which is relieved from monotony by projecting bands traversing its width and hipped from the side windows and decorated with sculptured knots down the whole length of the centre line. The flooring is of coloured mosaic.

The ground floor gallery between the two entrances, 130 x 56 ft., is lighted on either side, and contains the sculpture. At either end is a lofty entrance lobby or pavilion, each one approached by a staircase from the fronting garden. A well-hole 20 ft. diameter in the centre of the vaulting shows clear through to a lantern in the roof of the first floor. The two octagonal flanking towers, at either side of the lobbies, contain the staircases, with a straight flight to the first landing and doubling around the radius to the head; treads of a dark hard stone. At a somewhat higher level are the windows, with stained glass emblems of the sciences and trades. The painted-glass work was done at Gaudin's (Paris) studios under the direction of the architect. Surmounting the well, the dome, of iron frame work filled in with brick and plastered, is highly decorated with enamel mosaic work of a blue ground with architectural designs thereon supporting escutcheons bearing the names of celebrated painters. The apex of the dome is of blue enamel mosaic with silver stars, and separated from the vaulting sides by an interval. Coignet, of Paris, executed this work at about 150*l.* per panel.

Following the plan of the ground floor, the first

story galleries are of an unusual height. The ceiling of the salon d'honneur is a true half-circle, paneled and ornamented at the centre by deep circular recesses, tinted blue in imitation of roof openings. The principal colour is terra-cotta, but mauve is also employed. This room is 130 x 40 ft. by 52 ft. high, and is lighted by the three lofty central facade windows. The moulding decorations are simple, but striking from their breadth of treatment.

Sketch studies, of all varying sizes, in charcoal and water-colour, are shown on the walls and in oak cases.

At either end are two lofty pavilions, approached by the staircases just referred to. They are 73 x 40 ft. The roof is vaulted in two directions and above all is a circular lantern placed directly over the floor well. This latter is surrounded by a balustrade around which the oak-flooring is slightly raised.

The copings of the balustrades are upholstered with plush, and the whole appears to be designed as a comfortable lounging place for visitors.

The lateral galleries are, as with the remainder on the first story, devoted to the paintings, which are chiefly of the Flemish school. These rooms are lighted entirely by horizontal windows deriving their illumination from the lights in the high-pitched outside roof, the result being more subdued than with the same arrangement at the Louvre. A very handsome appearance has been obtained in the cornice line with its full hollow sweep from the wall to the edge of the lights. At the ends of the lateral galleries are two secondary

pavilions, the ceilings of which are of a deeper pitch than those of the facade pavilions. The gallery connecting them will form the transverse axis of the building when fully built. The flooring is in oak.

The ground-floor lateral-halls are variously devoted to architecture, Medieval house and church furniture and highly wrought decorative objects, and tapestries, ceramic ware, remains from the stone and bronze ages, &c. The end pavilions and the rear corridor connecting them (130 x 23 ft.) contain relics of the middle ages and curiosities from the French colonies: arms, armour, saddles, boats, geographical instruments, tapestries, pottery, and household furnishings. An extensive basement-floor, well-lighted, follows the ground-floor plan and will be devoted to archaeology and heavy stone work, as at the Louvre.

Iron has been used in the roof construction, as also for the ceilings of the first floor.

The heating is by hot water, the boilers for which are situated across the boulevard, some three hundred yards distant, and connected by means of supply and return pipes in an underground passage. The hot water circulates in 400 vertical and horizontal air-heating stoves placed in groups and from which the warm air ascends through conduits in the walls to the various parts of the building. The cost of the heating arrangements was 6,500*l.*

The facade is heavy in its sculptured detail, which, if it be criticised, is bold and somewhat too pronounced. Under the two large window frontons it is entirely floral; but under the voussours of the other three (Louis XVI. style) a childish figure is introduced besides. The bas-reliefs over the principal entrances, of flying figures representing the arts, trades, and sciences, are, however, much less protrusive. A local peculiarity of building is the abnormal height of doorways with an exceptional narrowness. The diminutive side-doors of the museum bear this trait, but they are again minimised in appearance by the very large keystones with sculptured faces thereon. On the lateral walls beneath the frieze is a row of panels sculptured with the busts of the most celebrated artists of past days.

There are nine large niches on the facade, and four at the sides, to fill with statues. These are in hand, and will cost 10,000*l.* The designer of the models was M. Jules Martin, of Paris, working under the direction of the architect.

A high gilded railing, 1,600 ft. in length and costing 6,000*l.*, encloses the museum and its garden. The portico gates are of wrought-iron with bronze escutcheons.

The principal contractor was M. Weber; stonework and mouldings by Marty; interior stuff and plaster work by Deschamps; all the joinery was by Rouzé, of Lille; Robillard (Paris) supplied and fixed the general ironwork; roofing was by Roumens (Paris); and heating arrangements by Anceau, Paris.

The cost of the building, as far as now finished, has been 170,000*l.*

NEW CHURCH AT LOURDES.

THE engraving showing the porch of this church, to which we referred last week in a Note, is reproduced from the pages of *L'Architecture* by the kind permission of the editor. The bridge roadway leads up to the existing church, the new one being below the rock, which is to be cut away for it.

CARTOON FOR A DRAPED FIGURE.

THIS is a reproduction from the life-size cartoon by Mr. Lawrence E. Koe, which recently gained the Royal Academy's prize for "A Cartoon for a Draped Figure," and which was far away the best work of those sent in. The subject given was "Mary Magdalene at the Sepulchre."

DESIGN FOR STUDIO HOUSE.

THE principal feature of this house is a large central room or studio, the nature of which makes it suitable for a variety of purposes, and does not allow it to impinge upon the accommodation of the house. It will be seen that the space saved by varying the ground floor level is utilised in providing space for a billiard-table supported upon a tram and running into the centre of the studio on cannon-balls beneath the floor. A stage can be formed readily by opening the sliding-doors into dining-room.

The architect is Mr. M. Maberly Smith, and the drawing was exhibited at the Royal Academy of 1892.

MISSION HOSPITAL, JERUSALEM.

This hospital is about to be erected for the London Society for Promoting Christianity amongst the Jews, upon a site on the Jaffa-road, about one mile from the city walls. It is planned upon the Pavilion principle, with detached blocks for every department. The central block, which divides the wards of the hospital into two groups, for males on the right and females on the left, consists of a hall for visitors, or for use as a day-room. With the operating and doctors' and store rooms adjoining, open verandahs connect each ward with this central block. In the front to the right and left are the outpatients' and dispensing block, with residence over, and, on the left, the kitchen departments and nurses' dwelling, with bedrooms above. The laundry block and a mortuary are detached buildings in the grounds. The joinery and fittings, as well as the constructional ironwork, will be prepared in England, the walls will be of local stone quarried on the site, and the roofs also will be of arched stonework carried on girders. The architect is Mr. Beresford Pite, and the drawing was hung in last year's Royal Academy exhibition.

TECHNICAL SCHOOLS, ACCRINGTON.

The plans for this school, which were selected in competition, were sent in under the name of Messrs. Morley & Woodhouse, but are here given under the name of Mr. W. J. Morley, the Partnership being now dissolved.

The general arrangement of the building will be seen from the plans, but we may give some extracts from the report sent in with the drawings, in regard to details:—

"The Chemical Laboratory is placed in the quadrangle as suggested, and would have top light as well as side lights; ten benches for four each and two benches for ten each, and fume closets are provided between the windows; distillation and evaporating closets are also shown. Facing Hartmann-street are the balance-room, dyeing-room, research laboratory and master's room—the research laboratory being closely accessible to the chemical laboratory. Besides the entrance from the front, side entrances are shown to the basement floor, and which would serve also for access to future extensions, the suph. hydro. room opens out of the laboratory.

The Lecture Theatres are placed on the ground-floor along Lister-street, and the level of the floor of these is 5 ft. below the general level of the ground floor, so that after allowing sufficient height for the proper use of the seats, sufficient head room is left under first floor. (See section C.D.)

The Preparation Room is placed between the theatres as directed.

The Loom and Machinery Room is also in the quadrangle, and is separated from the chemical laboratory by a corridor; this corridor we propose to roof in with a glass roof (see section A.B.), and could be fitted up with students' lockers.

Class-rooms.—We show five class-rooms on ground floor, three of the larger being so to throw into one, and three class-rooms on the first floor, thus dividing the accommodation between the two floors; another class-room could be made in the basement if desired. (Marked spare room.)

Heating and Ventilating.—The heating would be on the low pressure system, and would be mainly by coils of pipes or radiators, placed mostly in the window recesses; the fresh air inlets would be behind them, and, consequently, the cold air would pass over the pipes and enter the room warmed; screens and valves would be arranged in the coil casings to regulate the supply and direction of the air.

It would probably be desirable to have two systems side by side from separate boilers—one for the laboratories and shed, lecture theatres, &c.; one for the class-rooms and art-rooms, &c.—both, of course, in the same chamber.

The Ventilation would be by mechanical means. A powerful rotary fan would be fixed at the base of the ventilating-shaft, worked by the gas-engine or steam-engine as the case may be, and with a coil of pipes above it to assist the aspiration. These would convey the vitiated air under the floors and corridors from all the rooms to the ventilating-shaft, the flues being graduated in size proportionately as they traversed in the direction of the final exit; all rooms would have descending flues carried into the horizontal shafts, and all flues also from fume closets in chemical laboratory would be taken the same way; thus the whole of the foul air throughout the building would be constantly drawn out and changed. We have successfully carried out this system recently in a large Board school in a neighbouring town, and can, therefore, speak confidently of its efficiency.

It may be desirable to put in one or two top ventilators to the shed and laboratory, which could be used occasionally when desired.

Power.—As nothing is said as to what kind of power it is proposed to use we provide in basement a room in which either a small steam engine and

boiler, or a gas engine may be placed, whichever the committee decide to use.

Sanitation.—The drainage and all sanitary fittings would be of the best description and would be carried out in accordance with the Bye-laws and under the approval and direction of the Borough Engineer."

COMPETITIONS.

ST. PANCRAS NEW MUNICIPAL BUILDINGS.—At a meeting of the Vestry of St. Pancras, on Wednesday last, it was announced that designs for the new municipal buildings would be received on the 16th inst., and the Vestry unanimously supported the proposal that the President of the Institute of British Architects should be appointed assessor to advise the Committee in the consideration of the designs submitted. Messrs. Brunson & Henderson were also appointed to act as quantity surveyors for the Vestry.

ARCHITECTURAL SOCIETIES.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The general meeting of this Society was held at the School of Art, on the 10th inst., when Mr. J. B. Mitchell-Withers, jun., A.R.I.B.A., read a technical paper on "Architectural Illustration by means of Photography." Mr. Innocent presided, and there was a large attendance of members. The lecturer gave a description of the various processes through which photography had been, especially during the past five years, brought to perfection for illustrative purposes, and his paper was made further interesting by a number of fine photographs and photo prints hung round the room. A discussion took place, in which the President, Messrs. F. Fowler, C. Hadfield, E. M. Gibbs, and H. L. Paterson took part.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—At the meeting of this association on the 4th inst., Mr. W. de Gray Birch, F.S.A., in the chair, some Roman coins of Hadrian and Antoninus Pius, found near Newbrough, Northumberland, on the line of the Military Way, south of the Roman Wall, were exhibited by Mr. Loftus Brock, F.S.A. They afford some evidence that the roads of approach and the Wall itself are of the same date. Mr. Oliver described some curious old MSS.; Dr. Fairbank, F.S.A., exhibited an admirable rubbing of the fine Brass of Lord Camoys and his wife in Trotton Church, Sussex; and Mr. Oliver gave a description of various other "Garter" brasses. The Rev. Cave-Browne read a paper on the Church of St. Martin, Deiling, Kent, where two interesting sepulchral slabs were found some few years since, and carefully preserved by him. The staple for receiving the point of a lance, formerly deposited in the chancel by a member of the Deiling family, has been uncovered, in the roof, and also the iron hook to receive its foot. Drawings of the well-known lectern were exhibited. It is, however, most likely a music-stand of foreign workmanship. Mr. Park Harrison, M.A., exhibited a copy of one page of the MS. Life of St. Guthbert, by the Venerable Bede, now in Corpus Christi College, Cambridge. It represents King Aegfrith and St. Guthbert standing beside a church, and is surrounded with a border of foliage of remarkable character; the date is about 950, but the foliage is similar to work of the thirteenth century. Part of an elaborate paper on the Old Traders' Signs in Little Britain, by Mr. H. Syer Cuming, F.S.A.Scot., was then read. In that street were assembled a great many of the early booksellers and publishers. The signs were very numerous and peculiar, and they date from an early period in the sixteenth century until well into the eighteenth, when the locality was abandoned by the booksellers. Additional interest was given to the list of the signs, by notices of many of the most curious of the books issued from the shops named. The lateness of the hour caused the remainder of the paper, on the signs in Duck-lane, adjoining, to be deferred.

ROYAL ARCHÆOLOGICAL INSTITUTE.—The Athenæum announces that Mr. Hartshorne and Mr. Hellier Gosselin have resigned their respective official positions in connexion with this Institute.

UNIVERSITY COLLEGE, LIVERPOOL.—Evening penny lectures on technical subjects are to be given at this institution; on Engineering, by Professor Hele Shaw; on Architectural Brickwork, by Mr. T. Tallessen Rees, A.R.I.B.A.; and on Sanitary Plumbing, by Mr. R. J. Angel, A.R.I.B.A.

ENGINEERING SOCIETIES.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—At the ordinary meeting of this society, held on the 5th inst., the President in the chair, Mr. Sidney A. Court, A.M.I.C.E., read a paper on "Gas versus Electricity for Illuminating purposes." Speaking of public lighting, attention was drawn to the necessity for better lighting of streets in London, and it was shown that the new high-power public gas-lamps lately adopted in Westminster and Hyde Park Corner, while costing practically the same for installation and annual expenses, yet gave only one-tenth of the light of a ten-ampere arc-lamp. Thus for street-lighting it is evidently much cheaper to use arc-lamps, wherever we require a good illumination. For lighting our dwelling-houses it was shown that, with the exception of cheapness, electricity is far better than gas either as regards health and comfort or absence of danger. The author stated that gas companies cannot manage to keep the whole length of their mains at one pressure, nor can they even keep the pressure steady at any point, and mention was made of a difference in gas pressure, even in the houses of the rich in Westminster within the space of an hour. Referring to tests made by Dr. Wallace in 1880 on an ordinary Bawsing burner, with gas pressure varying from 5 in. up to 14 in., it was shown that when the evening pressure is put on the gas mains, unfortunate people who have not invested in expensive regulators are burning an increased quantity of gas and getting less light. In the case of electricity, 2 per cent. variation either way is the most permitted by law, and the higher the pressure the more light. As canal coal is running short, the author expressed the hope (which will, perhaps, echo in the hearts of the Londoners) that when gas companies give up making illuminating gas and supply non-illuminating gas at a low rate for heating and motive power, they will, at last, be doing the one thing which can cure a London fog of its yellow character by doing away with all coal smoke from our chimneys, and supplying us with electric lighting at a cheap rate.

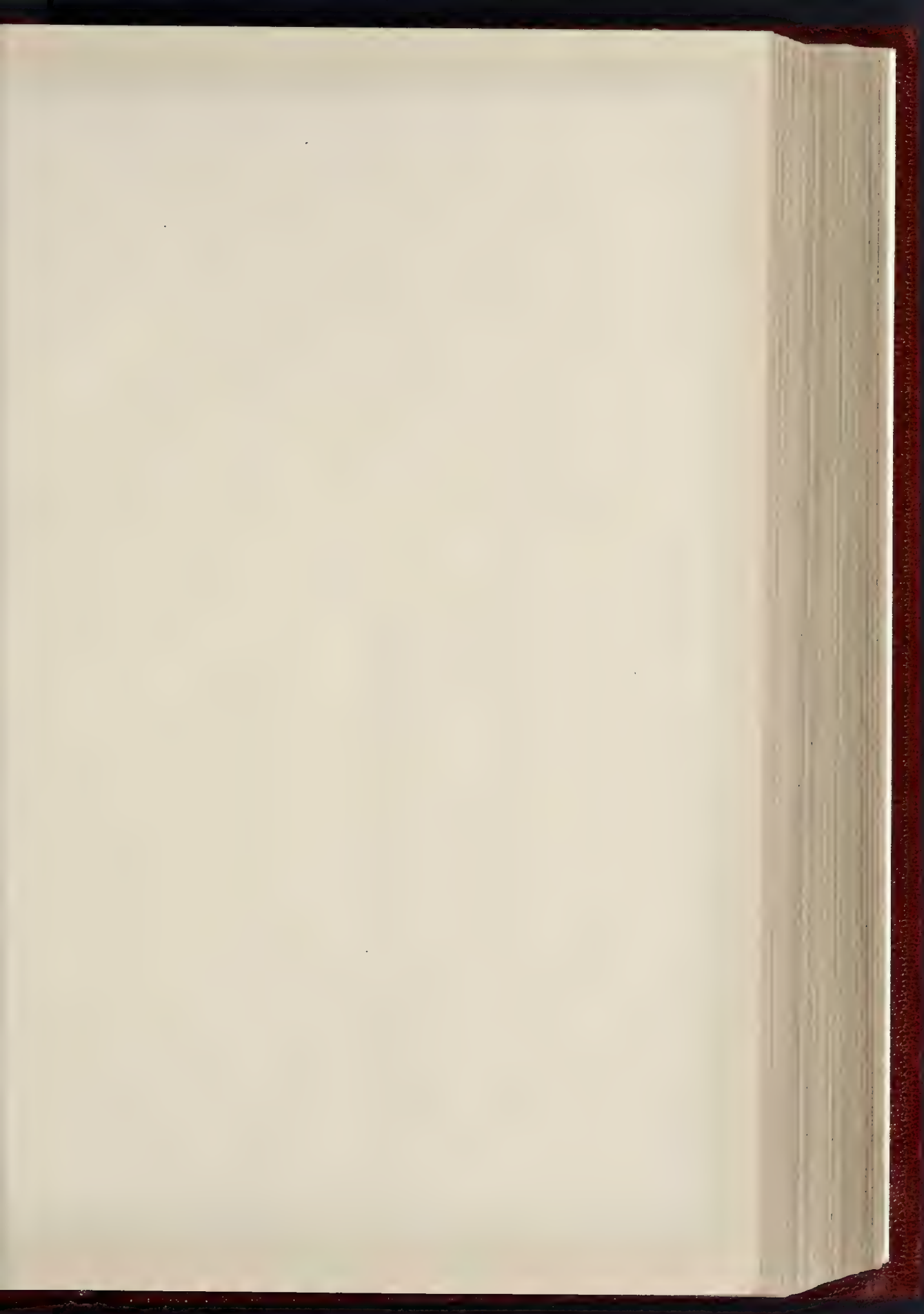
Correspondence.

To the Editor of THE BUILDER.

ELMES AND ST. GEORGE'S HALL.

SIR,—Will you kindly allow a small space in your journal for a few remarks upon some portion of the article in last week's issue on St. George's Hall at the Adelphi, which was, as to "architectural morality," the "obstinacy" of the architect, and his "caring nothing for music." Having been a good deal engaged upon this work from its commencement to the completion of the interior in 1854, I have the circumstances pretty well in mind, assisted by many notes and papers.

My first acquaintance with Mr. Elmes was in 1843 as a student at the Royal Academy, and afterwards when he used to come to the office of the late Professor Cockerell. On one occasion it was to ask Mr. Cockerell how he had his models made; Mr. Cockerell's reply was "If you talk to John Goodchild in the next room, he will put you in the way of having it done." I undertook the matter for him and had a model of the great hall made with one of the courts at the end, together about 12 ft. in length. After this I was in frequent communication with him till he went to Jamaica, where he died in 1847. Mr. Elmes was passionately fond of music, and an excellent violinist. Sir Robert Rawlinson could speak more on this point—I only heard Mr. Elmes once on his favourite instrument. In his first design for the hall chosen by the St. George's Hall Company, the acoustic effect, permanent orchestra, &c., had been carefully considered and provided for, but through the subsequent arrangements of the corporation committee, the St. George's Hall Company and the Philharmonic Society, this part of the scheme was entirely altered. After the competition for the hall came another for the Assize Courts when Mr. Elmes was again the successful competitor. The hall was intended to occupy the north end of the site between St. John's Churchyard and Lime-street, facing south; and the Assize Courts, the west side of the land, back to the churchyard and facing east. The width of the ground was too narrow for the hall without its being partially overlapped by the end of the Courts, and knowing that the company could be dealt with, Mr. Elmes proposed to unite the two in one design; this was suggested in sketch plan and so far approved that the corporation offered to take over the company's project and carry out their intentions in the same building with the Assize Courts. This having been arranged, Mr. Elmes was instructed to prepare the plans accordingly. At the same time, however, the Philharmonic Society started their great hall for the performance





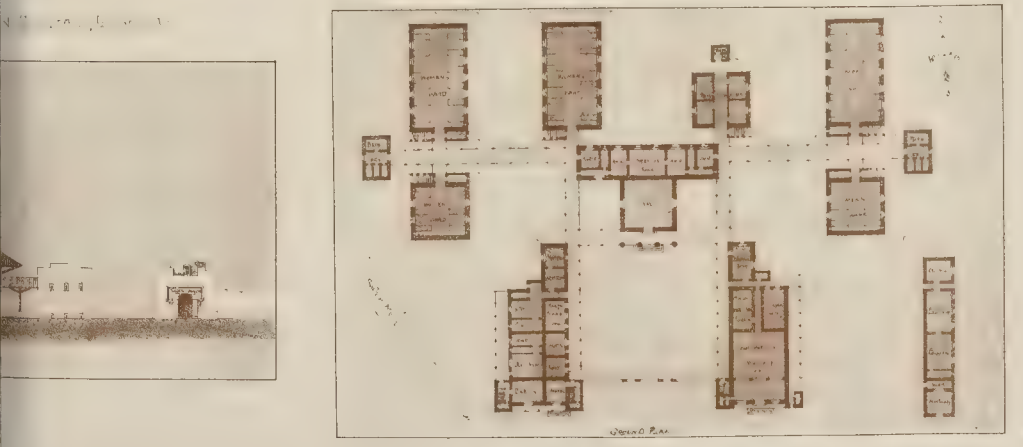
A STUDIO HO



MISSION HOSPITAL, JERUSALEM -- MR. BERESFORD PITE, A.R.I.B.A., ARCHT



I. M. SMITH, ARCHITECT



INK PHOTO SPRAGUE & CO. 4 & 5 EAST HARDING STREET FETTER LANE, E.C.

of oratorios and other music, thus supplying what the St. George's Hall Company had proposed. The Corporation, however, determined to carry out their united plans, to provide an organ for popular concerts for the people composed chiefly of organ performances, and to treat the great hall as a "Westminster Hall" in connexion with the law courts and for public meeting; thus the permanent orchestra dropped out of the programme altogether, and no such organ as that now existing was thought of until a deputation visited the 1851 International Exhibition, where they saw Mr. Willis's great organ, and, by the advice of Dr. Wesley, this was ultimately chosen, and under his hands it grew to its present dimensions. Two of the recesses at the side of the hall had been considered sufficient for the organ, but having grown so large there was no place for it but at the end of the hall. Dr. Wesley and the organ-builder insisted upon its being placed with the organist's seat upon the floor of the hall, and with the largest metal pipes in front. Mr. Cockerell, who then had the works in hand, objected to this, and it was found when put up in full-sized model that these large pipes, 28 inches in diameter—and taller than the columns each side of the hall—so injuriously interfered with the architecture, and the solid organ itself prevented all direct access to the Nisi Prius Court, that Mr. Cockerell proposed putting the large pipes out of sight—and bringing forward these of less diameter, placing the organist upon a platform or gallery under which sufficient space could be had for access to the court; the gallery could be made to accommodate some twenty people as a small chorus, and would also serve as a platform for speakers at public meetings. I well remember when this plan was put before the committee, the remark was made "we do not intend to have a chorus in the hall; that will be sufficiently provided for in the concert-room above" (this room was an addition by Mr. Elmes), but the necessity for a platform at public meetings carried the point, and the gallery was determined upon. Several designs were submitted for this work by Mr. Cockerell which are still in existence, and I attended him at every meeting of the committee except one, after this matter was decided. It will be seen, I think, that Mr. Elmes' memory may be spared these strictures, and that everything he did was in perfect agreement with the wish of the committee. A temporary orchestra was erected in front of the organ for the musical part of the ceremony of opening the hall in 1854, in the majority of Mr. John Buck Lloyd; this was immediately afterwards taken down and the popular organ recitals were carried on for some sixteen years before the present orchestra was put up, completely covering the marble and brass work of the stairs, the sculptured supports of the organ, the polished columns of the gallery, the brass gates of the court, and other ornamental work. The wooden floor was made in sections, so as to be easily shipped and unshipped, but we should be glad to see it and the orchestra both taken away entirely. I may say that Mr. Cockerell entered upon the work of finishing the hall and concert-room under some disadvantage. His first inquiry was for Mr. Elmes' drawings, the Corporation having paid Mrs. Elmes 400*l.* for drawings prepared by her husband for finishing the works, but they were not to be found, and I have a note from the gentleman then in charge of the works, in which he says, "All Mr. Elmes' drawings disappeared some years ago." I believe they have since turned up, and are now in the Corporation offices.

J. E. GOODCHILD.

* * We were not aware that any previous design of entirely different type had been made by Elmes for the Hall. If Mr. Goodchild or any one else knew anything of the drawings for this "acoustic" St. George's Hall, it would be interesting to know something about the design. In the meantime, our "moral" is merely shifted from one shoulder to another. Some one, whether Elmes or the Corporation, did not know their own minds, and built a room in which an orchestra is now put up which spoils the architecture, while the room itself is entirely unfitted for music. In regard to the organ, at any rate, it appears to us that Elmes knew there was to be one, and entirely ignored any provision for it, whether architectural or acoustic. We distinctly remember reading a published letter of Elmes's, in which he spoke with contempt of the subject of the organ, and used the phrase "Do you think I am making my hall as a case for the organ?" We cannot turn to the letter at present, but our memory is clear about that sentence, and it shows what was Elmes' attitude in regard to the musical use of St. George's Hall.—ED.

CONCRETE FLOORS.

SIR,—Your article on "Concrete Floors" in the *Builder* of December 17 is very interesting and important, and the data and formulae given will be found very valuable. No doubt, as you say, "architects have been chary about using concrete for want of data as to strength," &c., and I think articles as yours will supply the want; but I think neither the only reason nor the chief reason for the non-use of concrete floors. If it was it might almost be dismissed at once in ordinary cases; concrete, if well and properly made, being so enormously strong one would always err on the right side in the matter of strength.

The chief drawback has been cost, and one important way to meet this is, as you point out, to adopt an arched section for the floor, thus reducing the amount of iron used to the minimum, iron being the principal factor in the matter of cost.

I am glad to find Mr. Colson's experiments confirm my own experience, that the arched section is as strong as the flat, and only about half the dead weight, and it uses less iron.

By graining the ends of each bay of my floors I have practically tested Mr. Caw's method, and I believe it materially strengthens the floor. There is no difficulty in doing this, and, in the case of dwelling-houses and more important buildings, besides the additional strength, it improves the appearance of the ceiling, enabling you to have a straight line for your cornice all round the room. I have executed such floors in concrete, the bays having spans of 7 ft. and a length of 15 ft., without the slightest sign of failure.

I certainly endorse Col. Seddon's conclusion that the aggregate for concrete floors should not consist of much, if any, sand. Brick or tile is the best aggregate, broken rather *finer* than for concrete in other positions.

With reference to the skimming coat for ceiling falling off, I would point out that this only happens if the concrete and skimming coat are composed of different materials, such as Portland cement and gauged lime, or Parian cement. I do not quite follow Mr. Caw's mode of treating the ceilings, but presume he is only referring to warehouse buildings, where the under surface of concrete is sufficient for the finished ceiling; but this would not answer in more important buildings.

I hope the day is fast approaching when concrete upper floors will be universal. There is nothing to prevent their use in all classes of houses, the cost now being, in new buildings, very little in excess, if any, of a wood floor of first-rate construction, while the advantages are undeniable.

You refer to the great disadvantage of concrete in large slabs or spans as the liability to give way suddenly under excessive loads, but this danger applies only to buildings of the warehouse class, and not to residential buildings, where the strength of concrete being so great, the excessive load is almost an impossibility, and the advantages of being fire and vermin proof are so important.

J. H. MARTINDALE.

LOW SIDE WINDOWS.

SIR,—Some years ago, in a conversation I had with the late Mr. Matthew Bloxam, of Rugby, he told me that the so-called Leper Windows were in reality "Confessional Windows." They were used by the Regulars—Dominicans and Franciscans, who interfered greatly with the Seculars, and heard confessions through them. Mr. Bloxam found a document of the Reformation period ordering them to be walled up, and describing them as confessional windows. They are very common in the Midland counties, and there is one on the south side of the chancel in the old church of this North Yorkshire parish.

J. C. FOWLER.

Whariton Vicarage, January 11th, 1892.

A POINT IN ARBITRATIONS.

SIR,—May I be permitted to explain a point to which you have drawn attention in your flattering notice of my "Arbitrators' Manual" in your impression of the 7th inst. regarding the costs of a reference? When I said that "in ordinary cases, unless there appears to be reason to throw the costs upon one side or the other, it is better to say that each party shall bear his own costs of the reference, and pay half the costs of the award," I had in my mind the very simple cases of the construction of a contract, where very little expense is incurred, and neither party would be really in fault. I did not mean the large proportion of cases in which one party is compelled by the obstinacy and conduct of another party to enforce payment of an account, and where arbitration is chosen as the proper mode of determining the liability of the parties. Undoubtedly I agree with you that the general rule is that the successful party shall obtain his costs from the other side. The principle of an arbitration is that the arbitrator has discretion as to the costs, and if he finds that one party is in the wrong, and has compelled the other to go to any expenses, the losing party should pay the expenses.

T. SEYMOUR SALAMAN.

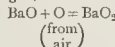
* * We are obliged to hold over two or three letters for want of space.

ANONYMOUS LETTERS.—That particular class of idiots (or worse) who think it amusing to write anonymous letters may as well be informed that their efforts in this direction are futile. It is the invariable practice of the editor of this journal, unless where handwriting and address are known to him, to look at the signature of a letter before he reads it; and if there is no signature, or an obviously "bogus" one, the letter is thrown into the waste-paper basket without being read. Practitioners in this art are therefore, as far as we are concerned, merely wasting their own time, paper, and postage stamps.

The Student's Column.

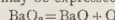
CHEMISTRY.—II.

THE method used for the manufacture of oxygen on a large scale for commercial purposes by the Brins' Oxygen Company of Westminster has been described by Mr. Murray in a paper read before the Institute of Mechanical Engineers. It is obtained from the atmosphere by means of barium oxide (BaO), which is a mineral closely resembling lime in its properties. When this substance is subjected to a low red heat and a current of purified air it absorbs the atmospheric oxygen forming barium dioxide (BaO₂) while the nitrogen of the air passes on unchanged, thus—

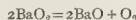


When the BaO has been treated with a sufficient quantity of air to convert it into BaO₂, the air supply is cut off and the vertical steel tube or retort containing the dioxide is connected with a suction pump. The same degree of heat being still maintained, pure oxygen is obtained from the dioxide as soon as a vacuum of 26-in. of mercury is obtained, and is stored in suitable gas-holders. The gas drawn off before this vacuum is reached has to be blown away, as it is impure on account of the air left in the retorts.

The reaction may be expressed thus—



or if it is desired to show that *free* oxygen is obtained, the molecular equation should be adopted, thus—



for it must be remembered that a molecule is the *smallest* quantity of an element capable of existing in a free state.

When all the BaO₂ has thus been reconverted into the monoxide, BaO, the pump is disconnected, a current of purified air again passed over the heated material and the whole process is repeated indefinitely. The gas prepared by this process, however, never contains more than 97 to 98 per cent. of pure oxygen.

Oxygen is also obtained on a large scale from the atmosphere by the Parkinson's Condensed Gas Company, by alternately passing purified and dried compressed air and steam over heated potassium or sodium manganate mixed with about 15 per cent. of China clay or similar inert matter in order to bring the manganate into a more porous condition for the atmospheric oxygen to act upon. It is claimed that the gas collected by this process contains 98 to 100 per cent. of pure oxygen.

Oxygen is a great supporter of life and combustion, but is not itself inflammable. All substances that will burn in air burn with increased brilliancy in oxygen, and many substances, such as fine iron-wire that will not burn in air, burn with great brilliancy in oxygen.

It is through the presence of oxygen in the air that we are able to live, for nitrogen which forms most of the remaining four-fifths of the volume of the air is not a supporter of life or combustion, but acts merely as a diluent. The oxygen we breathe is converted by the carbonaceous compounds in the blood into carbonic acid, and as such, is respired into the air in conjunction with water vapour. This conversion of atmospheric oxygen into carbonic acid in the act of respiration is common to all animals. On the other hand, the green colouring matter called "chlorophyll" existing in the leaves of plants and trees, under the influence of sunlight absorbs carbonic acid from the atmosphere and decomposes it. The plants retain the constituent carbon for their own nourishment, and the oxygen gas is returned once more into the atmosphere in a free state. Sufficient proof, surely, of the necessity of preserving as much vegetation in our towns as possible. As, however, it is found that in the dark chlorophyll exercises, in a slight degree, a reverse action, plants should be excluded at night from the sleeping rooms.

Ozone O₃.

Ozone is an allotropic form or modification of oxygen. It contains no element other than oxygen, and two volumes of ozone may easily be decomposed into three volumes of ordinary oxygen. It may therefore be regarded as oxygen in a condensed form. Ozone is a colourless gas, but has a peculiar characteristic odour. It is produced when a series of electrical discharges are made in oxygen or air, and is therefore formed in the air during thunderstorms and during the working of ordinary electrical machines. If a piece of white blotting paper is soaked in a solu-

additions to Dental Hospital, Newhall-street. From the above return it would appear that the past year has been one of much activity with all branches of the building trades in the city, especially if the prolonged strike of bricklayers and bricklayers' labourers in the early part of the year is taken into consideration. During the year 935 notices have been forwarded to property owners and others as to dangerous buildings, projecting signs, emblems, &c., and a quantity of land amounting to 144 superficial yards has been conceded to the Corporation by owners of property setting back windows, steps, and other projections. During the same period 275 factories have been examined in accordance with the provisions of the Factory and Workshops Act, 1891, and as to the means of egress for the employees in the case of fire. Of these 174 have since been altered, and are now provided with satisfactory means of egress, and the necessary alterations are at present in progress at forty-eight other factories.

NEW POST OFFICE, LIVERPOOL.—According to the Liverpool papers, the plans for the erection of the new General Post Office for Liverpool have now been completed. The site of the new post-office faces several streets, including Victoria-street, Sir Thomas's-buildings, and Stanley-street. It does not yet extend to Whitechapel, but the scheme of the post-office authorities intended to ultimately secure the whole of the large square bounded by these four streets. The plans prepared by the Government architect show a large square building with a well for light in the centre of 30 ft. by 70 ft. The principal frontage will be to Victoria-street. The building, which will be of stone, will rise from the street to the eaves to a height of about 60 ft., and the style of architecture may be described as approaching French Renaissance. The elevation shows a three-story building, with the basement in the front barely noticeable on the level of the street. The proposal of the architect is to put the sanitary accommodation for the sorters, &c., under the large well, and to otherwise use the basement for stores, kitchen, engine-house, boiler, &c. In the centre of the building, as it faces Victoria-street, is the office where business across the counter will be conducted. For this purpose a room is provided, measuring 72 ft. by 68 ft. The rest of the ground-floor, practically the three-fifths of the square, is to be devoted to a sorting office. This department will be 60 ft. wide and 500 ft. in length. Behind the sorting office will be the yard for the vans for the conveyance of letter bags, &c., and it is proposed that these vehicles shall enter from the Stanley-street side and pass out at the Sir Thomas's-building side, the work of unloading and loading being carried on under a glass cover. On the mezzanine floor offices are provided for superintendents who can enter from these under an open gallery, and see what is going on in the public office and in the sorting-rooms. On the first-floor it is proposed to place the sorting and delivery rooms for the local postmen. The postmaster's rooms will also be placed on this floor, as well as those for his assistants, clerks, &c. The next floor is almost entirely devoted to telegraphing and telephoning. On the second-floor are also dining-rooms for men and women, and other rooms for accommodation. On the third-floor provision will be made for the telegraphic and other batteries. It is stated that tenders for the execution of the foundations have already been received, and in a very short time work will be actively commenced.

THEATRE AND OPERA HOUSE, HULL.—The new Grand Theatre and Opera House, erected in George-street, Hull, at a cost of over 50,000l., has just been opened. The new theatre has been built from the designs of Mr. Frank Matcham, of London. The main entrances are from George-street, and, owing to the width of the site, private roadways have been formed on each side of the building, and these have enabled the architect to obtain wide and fireproof exits from all quarters. A feature of the exterior of the building is the stone portico, which not only forms a shelter for the early arrivals, but a balcony, which, entered from the casement windows, will serve as a smoking lounge in the summer. Over the pavement of the principal entry is a glass and iron shelter. The front of the building at night will be illuminated with electric lights in the shelter, together with two large lamps. The principal entrance is in the centre of the building. The pit is a large one, and has a good seating. The auditorium is divided into stalls and pit. The stage is about 50 ft. deep, and nearly 80 ft. in width from wall to wall. The theatre is heated throughout with hot water, and hydrants are provided on each floor for the extinction of fires. Electric light is used for illuminating purposes instead of gas.

RESTORATION OF IPPLEDEN PARISH CHURCH, DEVON.—The parish church of Ippleden has just been re-opened after undergoing partial restoration. It has been decided to do the work in sections, as funds become available. Messrs. Fulford, Tait, & Harvey, of Exeter, were appointed architects, and their plans were approved at the Vestry meeting held in April, 1891. Tenders were invited for the first section of the work, which is now completed, viz., the removal of the old dead-end tank-like pews, laying a new floor of concrete foundation, on which is laid, embedded in pitch, a top floor of small wooden blocks. The aisles are laid with tiles, interspersed with original slabs. The walls have been cleaned and newly plastered. The pillars and

arcades, which are of red sandstone, have been cleaned and pointed. The nave has been re-seated with open pine seats, and a heating chamber has been built; a new vestry has also been supplied. Messrs. Parker Bros., of Newton Abbot, were the builders, under whom Mr. Haydon has supplied the heating apparatus, and Mr. Knight, both of Newton, has carried out the stone carving for the vestry, &c. The rood screen, which is of the fifteenth century, had been sadly despoiled, part having been cut away entirely and the rood destroyed. Mr. Read, of Exeter, has restored the part which was cut away.

PROPOSED NEW THEATRE AT BACUP.—The *Rochdale Observer* reports that plans of a proposed new theatre and opera house in Rochdale-road, submitted by Messrs. Walters & Lowe, have been passed by the Bacup Town Council.

AGRICULTURAL COLLEGE, ASPATRIA, CUMBERLAND.—Extensive additions and alterations are at present in progress at this building. The plans were prepared in May last by Mr. T. Taylor Scott, F.R.I.B.A., of Carlisle, and since then the work has been proceeding. The site is a large open space forming one of the highest parts of the town, with fields at the rear for recreation grounds. Two red houses occupying a portion of the site have been removed, and one extensive wing—T shaped—has been erected, the larger portion being three stories high, and consisting of a large new class room, smoke room, and reading room, boot and store room, &c., lavatories, and bath room, and a number of cubicals, &c., on the first floor, also large dormitory on the second floor. A new dining hall, billiard room, and private rooms are being built at the opposite end of the site, the two new buildings being connected by a corridor. A large tower has been erected in the centre of the main wing forming a portion of the new reception hall, with stained-glass screens at both ends. The work is being carried out under the architect's supervision by Mr. Latimer, joiner, Carlisle; Mr. L. Ferguson, builder and plumber, Workington; Messrs. S. Ferguson & Sons, plasterers, Carlisle; Mr. Gordon, painter and glazier, Maryport; and Mr. J. Walker, slater, Cockermouth.

THE BUILDING TRADE OF DUNDEE DURING 1892.—According to the *Dundee Advertiser*, the year 1892 has been a busy one for masons. No important structures have been reared in the city, but in the suburbs a large number of houses have been erected. Operative masons have been in request, and more highly esteemed builders, would have found work had they come to the city. Wages for the year have been very good, hewers receiving 8d. and builders 84d. per hour. There have been no disputes between employers and employed, and therefore operations have been carried on without interruption except during spells of hard and inclement weather. When builders are busy it follows that cognate trades have plenty to do. That has been the case during 1892, and it seems from all appearances that the present satisfactory state of matters will continue for some time.

FOREIGN AND COLONIAL.

FRANCE.—The Société des Artistes Français has appointed its officers for 1893. M. Bonnat has been unanimously re-elected president, MM. Daumet and Cavalier vice-presidents; MM. de Villefroy, T. C. Garnier, and Lamotte secretaries, M. Boisseau treasurer, and M. Tony Robert-Fleury "rapporteur." The Municipal Council of Paris have voted the funds necessary for removing the contents of the Art-Museum at Auteuil to the Palais des Arts Libéraux on the Champ-de-Mars. The forestry museum, projected by M. Alphonse, is to be installed in the old "Eaux et Forêts" pavilion of the 1889 exhibition, rebuilt near the lake Daumesnil. The town of Versailles will be shortly put in communication with St. Germain by a tramway with mechanical traction. The Department of Public Instruction is about to open a competition among the French glass painters, for the execution of windows for the Cathedral of Orleans, illustrating the principal incidents in the life of Joan of Arc. A competition has been opened at Troyes for the construction of the Hôtel de Préfecture. At Corbeil the design submitted by M. Molin (engineer) of Paris and M. Buscubal (architect) of Jussy, have been awarded the first premium in the competition for public markets for the town of Corbeil (Seine-et-Oise). The associated artists of Marseilles have just opened their fourth exhibition of painting. The town of Cadenet has opened a subscription for a monument to the young drummer André, who distinguished himself at the battle of Arcole, and whose figure is introduced in the pediment sculpture of the Panthéon. The art exhibition at Monaco was opened on the 10th, that at Nice a few days before. The latter includes more than 600 works. A committee has been formed to raise, at Nogent-sur-Marne, a statue in memory of Watteau, who passed his last years in that town. The following deaths have occurred in the artistic world: that of Mr. Henry Steiner, enamel painter (an Englishman by birth); M. Eugène Baudouin, landscape painter, of Montpellier; and M. Louis Mouchoir, a portrait painter, who had always declined to exhibit at the Annual Salons, but whose talent was well known to many amateurs.

WORK IN THE COLONIES.—Work in New South Wales, especially in the towns, continues to be scarce. According to a circular issued by the Emigrants' Information Office, Sydney suffers, as usual, most of all from the prevailing depression, and no one without money should go there at the present time unless he has work waiting for him. Between February and October last over 14,000 persons registered themselves as unemployed at the Government Labour Bureau in Sydney; employment was found for about 6,500 of these, mainly in country districts. The late strike at the Broken Hill Silver Mines has thrown large numbers of miners out of employment. With respect to Victoria, over 13,000 persons have registered themselves since last June at the Government Labour Bureau in Melbourne as unemployed. The great bulk of the applicants were labourers, and among mechanics, carpenters and painters appear to have suffered the most. In South Australia almost the only demand last quarter was for ploughmen, shearers, and general farm and station hands, of whom, however, there was a plentiful local supply. In Queensland the re-introduction of the Pacific Islanders to work on the sugar plantations has given an impetus to sugar growing at Bundaberg and elsewhere, but work generally is slack, and there is no demand for fresh hands. In Western Australia, farm labourers, men in the building trades, navies, general labourers and miners have been well employed. In Tasmania the mining industry at Zeehan has been much depressed; owing to the bad times the Government has reduced expenditure on public works, and has introduced proposals for increased taxation. In New Zealand, the main feature during the last few months has been the continued demand for public land, which has been taken up for the most part on the perpetual lease system by large numbers of settlers. Cape Colony and Natal offer reduced passages to mechanics, female servants, and others, for whom there is a limited demand in parts. In all the above-mentioned Colonies there is a demand for small capitalists, the farmers, fruit-growers, and female servants. As the Brazilian Government are endeavouring to introduce European labourers into some of the tropical provinces of Brazil, it becomes necessary to repeat again most strongly the warnings which have been frequently issued from the Emigrants' Information Office against British emigration to that country. The heat of the climate, the strangeness of food and language, the low rate of wages, and the conditions of life generally, which a British farm hand or mechanic must put up with in Brazil, are such as to make that country quite unsuited to him.

MISCELLANEOUS.

SLATE TRADE IN 1892.—The past year has been the best the quarries have had since 1876, the good demand which we anticipated in our last year's report having continued, and being likely to improve still further, as merchants have been for some time looking largely for future delivery. The make of slates will probably show a diminution, though not so great as in 1891, the returns for that year showing a decrease of over 50,000l. in value, and the supply cannot readily be increased owing to the very limited area of good slate rock, and the time and expense required to open new quarries. Only one quarry company was registered last year, and that the conversion of a private firm into a limited company. A rise in wages of 10s. to the men. The new railway rates, if enforced, will rejectably affect users of slates at a distance from the quarries so every effort should be made to keep the rates as at present.

PROPERTIES FOR SALE.—At the Mart, on the 17th instant, by an order in Chancery, the lease for an unexpired term of thirty years from June, 1884, at an annual ground rent of 1,500l., of Hengler's Cirque, in Argyl-street. The present premises, having a capacity of 2,500 seats, were reconstructed of iron, cement, and stone, under the superintendence of Mr. C. J. Phipps, architect, in place of the former building. The arena ring measures about 150 ft. by 102 ft.; the extreme height of the house is 57 ft. At the auction in September, 1889, the lease was withdrawn after a highest bid of 5,000l., the reserve price being, it was understood, 20,000l. On February 2, a freehold property, covering 21.100 superficial, lying between Newgate Prison and Warwick-lane, Newgate-street. The sale is made by order of trustees under the late Mr. Alfred Tylor's will, and their co-owners. This property, which has a frontage of 80 ft. to Newgate-street, and extends southwards, behind Cutlers' Hall, to Warwick-square, by a depth of about 250 ft., comprises two large buildings, with their lofty water-tower in the square, two warehouses in Phoenix-court, the three shops, Nos. 3-5, Newgate-street, and the adjoining house, No. 2, being a portion of the premises occupied by Messrs. J. Tylor and Sons, hydraulic and sanitary engineers, brassfounders, and manufacturers of water supply appliances. In a "Note" on July 5, 1884, we alluded to the discovery on this site of a stone vase and four leaden *assaria*, and to Mr. Alfred Tylor's remarks thereupon; on March 13, 1886, we described the circumstances under which at that time the only remaining portion of Wren's College of Physicians was exposed to view, standing between

CONTRACTS—continued.

Those marked with an Asterisk (*) are advertised in this number. Competitions, p. iv. Contracts, pp. iv., vi., and viii. Public Appointments, p. xx. and xxi.

Society of Antiquaries.—8.30 p.m.
Dundee Institute of Architecture.—Mr. D. Cunningham
on "Harbours, and the Discharging of Vessels." 8 p.m.

FRIDAY, JANUARY 20.

Society of Arts (Howard Lectures).—Professor W. C.
Unwin on "The Development and Transmission of Power
from Central Stations." II. 8 p.m.

The Builder.

VOL. LXXIV. No. 2507.

JANUARY 4, 1903.

ILLUSTRATIONS.

Principal Office, Mutual Life Association of Australasia, Sydney.—Messrs. Sulman & Power, Architects	Double-Page Ink-Photo.
St. Mark's, Venice, at the End of the Eleventh Century (In Illustration of Mr. Phené Spiers's Paper)	Two Single-Page Ink-Photos.
Byzantine Ornament at Venice, Rome, Constantinople, Cividale, and Brescia	Two Single-Page Ink-Photos.
Design for a Small Country House.—By Mr. G. C. Horsley, Architect	Single-Page Ink-Photo.
Design for Free Library, Stoke Newington.—By Mr. Ernest Rüntz, Architect	Single-Page Ink-Photo.

Blocks in Text.

Panopt of the Ponte Salaro, Rome	Page 49	Capitals, St. Stefano Rotondo, Rome	Page 49
Capital, St. Lorenzo-fuori-le-Mura, Rome	49	Historical Plan of St. Mark's, Venice,	51

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Corroyer's "Gothic Architecture."



IF we do not learn to understand Gothic architecture it will not be for want of new treatises and new theories on the subject. The new theories are in fact almost a necessity now for anyone who wishes to produce a book on Gothic architecture. What may be called the central and the sound view of the subject, in regard to the history, development, and essential characteristics of this school of architecture, has been so much dwelt upon and illustrated, that except in regard to additional drawings of examples not hitherto well known, or not before published (which are always welcome), there seems no room for a new author to say much unless he has a new theory to advance. Thus we had not long ago the book by an American professor, Mr. Moore, in which it was attempted to show, for the first time in a treatise in the English language, that Gothic was a purely French architecture, and that nothing out of France had any claim to be called Gothic at all, or to be regarded with any respect. This has been for so long the expressed opinion of French architects (as we have observed from time to time in noticing the successive volumes of the "Encyclopédie de l'Architecture"), that this resource for novelty of view is completely cut off from them; it has long become only a parrot-cry. So accomplished a student and practitioner of Gothic architecture as M. Corroyer, whose name is, we hope, familiar to our readers as one of the most learned and capable of the French architects of the day, must therefore look for some other means of giving individuality to his book* on Gothic architecture.

This special feature which characterises

*"Gothic Architecture": by Edouard Corroyer, Architect to the French Government and Inspector of Diocesan Edifices. English translation; edited by Walter Armstrong, director of the National Gallery of Ireland. London: Seeley & Co.; 1893.

his book consists in the theory of the origin of the Gothic form of vault. This has generally been regarded as the natural descendant, through the Romanesque buildings, from the quadripartite vault of the Romans, gradually modified and elaborated under the influence of the practical difficulties presented by the round arch in the first instance, and by the manipulation of ribs of necessarily differing curvatures starting from and meeting at common points. The steps of this development are so obvious and follow so naturally on one another, that a comprehensive review of the past history of Romanesque and Gothic architecture seems to show us the whole process in operation before the mental eye. But M. Corroyer rudely disturbs all this panorama of the history of the Gothic vault. Apparently such an origin was not sufficiently French for him. His endeavour is to show that the Gothic vault developed from a class of buildings which in one sense are peculiarly French, though they have hitherto been regarded as strongly influenced by Byzantine architecture; viz: the early domical-roofed churches of the type of Angoulême and Périgueux. The general idea that St. Front at Périgueux is suggested by St. Mark at Venice, M. Corroyer scouts:—"The cupola of St. Front, which we may reasonably call the mother cupola of France, was not an imitation of that of St. Mark at Venice, for both were based on the church built by Justinian at Constantinople, in honour of the Holy Apostles. But the form thus imported into Aquitaine received such modification and development, as to make it virtually an original achievement." Having thus claimed the Aquitanian architecture as practically French, and denied any indebtedness to Italy, we have next to show that the whole system of Gothic vaulting sprang from these domed churches, and that thus the Gothic style radiates from the South of France. If the reader naturally asks what is the connexion between the domed roof of St. Front and the cross vault, he is told that it is to be found in the pendentive of the cupola, which "gave birth to the intersecting arch, which is the main feature of so-called Gothic."

In what sense it can possibly be said that the Aquitanian cupola gave birth to a feature which had existed since the days of the Romans, and been repeatedly put in practice in Romanesque architecture, it is difficult to understand. M. Corroyer seems in part to be led away by the similarity between the aspect of a dome pendentive and that of a severy of a vault. In a certain sense they are similar, but they are performing very different architectural functions. The plea upon which the author gets rid of the responsibility of the Roman and Romanesque vault in leading up to the Gothic vault is, that the Roman intersecting vault had no built or constructive rib, but "the stones at the line of intersection were in complete solidarity with the filling on either side in which they were buried." True enough, but surely there is some similarity between a Roman or Romanesque quadripartite vault without a groin-rib, and the early Gothic quadripartite vault with a built groin-rib. The method of construction is different in detail, but the main principle and the main appearance are the same; whereas both the constructive principle and the aspect of a domical roof are perfectly different. Mr. Corroyer's idea seems to be that the pendentive is the same thing as the later vault severy, because its surface or filling is bounded at either edge by a constructive arch, like the constructive arch which forms the rib in complete Gothic vaulting.

"The identity of function in the pendentive and in the Gothic intersecting arch, both constructed as they are of stones dressed" normally to their curves, shows that they sprang from a common origin, which is as much as to say that the Aquitanian cupola begat the intersecting vault."

M. Corroyer seems to forget that if the cupola were erected over a square of solid walls, the pendentive would have no such bounding arch and "set up normally to its curve," it would simply represent the same thing (in another position) as the vaulting-

* We have not had an opportunity of comparing the original with the translation, but if, as we suspect, "dressed" represents "dressée" in the French, it is a very naive blunder on the part of the translator. "Dressée" would mean "placed" or "set up," which is the obvious meaning of the author; "dressed" has no sense at all in the sentence as given by the translator.

surface of a vault, apart from the vaulting-rib. In short, instead of regarding the vaulting-surfaces and ribs of a complete Gothic vault as an elaboration of the normal intersecting vault, he seems to regard it as a series of pendentives placed in juxtaposition at different angles; ignoring not only the distinction between the genesis of the two forms, but the important fact that the pendentive is a device for carrying the weight of the cupola, whereas the vault-severy carries nothing but itself.

The architectural world in general has long regarded the type of architecture shown in the Aquitaine churches as a special local phase of architecture, having a remarkable similarity with Byzantine work, and illustrating in a very marked and picturesque manner the former prevalence of a special local Byzantine influence in the district, arising from causes which one cannot now clearly define. It has always been regarded as a special chapter of French architecture, standing apart from the main progress of Romanesque and Gothic architecture, into which latter it was very soon absorbed; that is to say, the semi-Byzantine style of Aquitaine reached no high development, and only exists in buildings of a very early Mediæval date. We are now asked to regard this exceptional phase of early French architecture as the central point of the whole, to ignore (almost) its essentially Byzantine character, and to treat this dome-roofed architecture as the starting-point for the development of a vaulted-roof architecture which has no resemblance to it in construction, but has a direct resemblance to the vaulting of Roman and early Romanesque architecture—and all this paradox in order to find a purely French origin for Gothic architecture.

It is to be regretted that this paradoxical view of the origin of Gothic architecture should be given such a prominent place in a book which in every other respect is an admirable one. The chapter to which we have taken exception forms but a small proportion of the volume, but it is the leading feature and is evidently intended to be the key to the whole, and therefore we have felt bound to give special prominence to it. The illustrations to the book are numerous and mostly well executed, and sections of construction form a large proportion of them. The chapter (V.) on the origin of the flying buttress is excellent. Chapters VI. and VII., on Churches and Cathedrals of the twelfth and thirteenth centuries, collect together a number of sections which are of great interest for comparison, especially in regard to the treatment of flying buttresses. In speaking of the section of Beauvais, the author draws attention to the peculiar hardness of the builders in seating the intermediate buttresses, midway between the centre aisle and the large external buttresses, to a great extent on corbelling within the line of the piers which form their proper supports. As he observes, the wonder is that a building so put up should have stood at all. In the following chapter, on cathedrals of the thirteenth and fourteenth centuries, some consideration of some of the English Cathedrals is grudgingly admitted. Anything which is admirable in them is put down to French influence, including the choir of Lincoln, which is perhaps about as thoroughly English a piece of architecture as could be found. This kind of special pleading is tolerably harmless in the English translation, as any one in this country whose opinion is worth anything knows how much to believe of it; but it is annoying to think of these statements circulating in France, where no one, comparatively speaking, travels or makes use of his own eyes in studying such buildings, and where all this foolish and one-sided depreciation of English Gothic will probably be received as gospel. "The vast and magnificent Cathedral of Lincoln," we are told, "is an admirable subject for comparative study. Its architecture combines most strikingly the characteristics of the two

nations. It blends in one harmonious whole the massive solidity of the English structure overlaid with detail, formed by lines vertical, rigid, and hard as iron, and the mingled grace and strength of French architecture, which may fitly be compared with gold, in its union of the supple and durable, of solidity and power of resistance equal to those of the less precious metals, with an adaptability to artistic ends far greater."

Where is this French influence in Lincoln? The supposed English hardness is certainly shown in the illustrations given, which seem purposely drawn in a style different from the drawings which illustrate French architecture. It is worth note that the author has nothing at all to say about the finest characteristic of English cathedrals, their large centre towers; a feature which, as Fergusson has remarked, the French builders deprived themselves of by their over-ambitious efforts at loftiness and slenderness in the supports of the lower structure, leaving nothing for a tower to stand on, thus missing entirely the fine composition afforded in so many of our cathedrals, of the dominant central tower and the minor western towers, and having to content themselves with a mere *flèche* at the crossing. Surely such a feature as the central tower is no small compensation, to say the least, for the comparatively limited height of the English cathedral.

In the chapter on sculpture, very fully illustrated, we find the same almost exclusive attention to French work, which indeed in such statues as those of Rheims is superior to most English work; yet certainly some reference might have been made to Wells, particularly to the resurrection sculptures, which are at least work done on English ground, though perhaps their English execution may be questioned. If not by English hands, however, they are Italian rather than French. And if the author admires so much the leafage sculpture from Mont St. Michel, he might have found at Wells examples of this kind of work of even finer style. In his remark as to the influence of Roman sculpture on French Mediæval work the author is probably right; certainly the treatment of the drapery in the examples from Rheims given on page 156 bears out the idea, as does even the very attitude and pose of the figures.

In the chapter on abbeys and monastic institutions there is a great deal of valuable observation and illustration collected in a small space, especially in regard to the great pile of building on Mont St. Michel, on which the author's observations are of special value from the fact that he was for a long time its architectural custodian, until unworthily removed from his post by the bigotry of the present anti-ecclesiastical French Government, as an architect of too Mediæval a turn of mind to satisfy an enlightened modern people.

A much larger proportion of the book is devoted to military architecture than is generally the case with books on Gothic architecture, and this portion is largely illustrated with plans and sketches of buildings which are not so much known in England as the ecclesiastical buildings. Some of the author's remarks in connexion with this part of the subject have a special interest for us at present. M. Corroyer believes in the architect as a scientific constructor, and "protests against the degradation of the architect from his high and noble estate to the rank of a mere decorator, however skilful." He observes on another page:—

"The system by which the architect and the engineer have each their separate functions and responsibilities in the construction of the same building was unknown. The builder, or mason, as some would have him called, was an architect in the fullest sense; he himself traced the diagrams of his conceptions, and directed the execution of every detail, careful alike of stability and beauty."

It is a curious and disheartening phenomenon that such a direct contravention of the principles of Mediæval art as the modern system of divided responsibility implies, should obtain only among the French, the very people to whom Western Europe

owes its initiation into those principles. In England, in Belgium, in Holland, Switzerland, and Germany, the architect is also the engineer; the science and art of his craft are inseparable."

The statement that this is so "in England" is another example of the author's want of acquaintance with this country, since otherwise he would have been aware that there are a number of people here who wish to dissociate the architect altogether from that class of responsibility which may be said to come under the head of engineering, and to reduce him to the rank of "a mere decorator." The opinion that it is the architect and the engineer, rather than the architect and the sculptor, who should be united in one profession, is one that we have more than once expressed lately; and we are glad to find an eminent French architect in concurrence with us on this head, however much we may feel constrained to differ from him on some other points.

In fine, with the exception of the peculiar paradox with which the book sets out, and which to some extent discounts its value, this is an admirable little treatise, written by one who is a thorough architect, calculated to interest alike both the amateur reader and the architectural student, and one which should be read by every one who is about to visit France for the study of her Mediæval architecture; always bearing in mind that the book must be read and regarded not as a work on "Gothic architecture," but on "French Gothic architecture." We may add a word of praise for the very judicious notes inserted here and there by the editor, which are calculated to set right, for the English reader, some of the peculiarly French ideas and prejudices of the author.

THE CONSOLIDATION AND AMENDMENT OF THE HIGHWAY ACTS.

THE better management of local districts has been a prominent subject of legislation during the past few years. It is hardly necessary to point to the establishing of county councils, and to the several Acts relating to sanitary matters as examples. It is therefore high time that the Local Government Board took in hand the consolidation and improvement of the existing Highway Acts. It may be said that this question must stand aside until either parish or district councils are established. But the highways have to be managed whether such councils are in existence or not, and if a good code of highway law were in existence any legislation on the subject of parish or district councils could have reference to such a code.

There is no subject which needs a clear and sensible code of law more than highways, because they have to be managed by ordinary persons who are not lawyers, and therefore it is essential that the law in relation to them should be stated in clear terms and in a harmonious form. At the present time there is far from being that one clear code; on the contrary, highways are regulated by a number of confused Acts of Parliament. There is, first of all, the General Highway Act, 1835, which is the principal statute on the subject; there is next the Highway (Better Management) Act, 1862. This statute was followed by one in 1863, to prevent waywardens from contracting for works within their district, and, in the following year, by one known as the Highway Management Amendment Act, 1864. This was succeeded, in 1878, by another Amendment Act, and, in addition, there are other statutes on the same subject, such as those which deal with the use of locomotives on highways and with the duties of auditors. It has to be remembered, also, that, in addition to this mass of statutory law, there is a considerable quantity of common law and judicial dicta, which also form part of the general highway law of the country; such as that in reference to the indictment of a parish for the non-repair of highways; since it is by the common law of England, and not by force of any

statute, that a parish can be indicted for the non-repair of a highway. The first requisite in legislation on this subject is, therefore, the consolidation of the law relating to highways in a single statute which shall incorporate all that is useful in the existing statutes, in the common law of the land, and in judicial decisions. But the two chief statutes to which we have already alluded, namely, the Act of 1835 and that of 1862, contemplate two different highway authorities. The old Act looks to the parish as the highway authority; the later statute was not only intended to regulate highways, but enabled highway districts to be formed, consisting of the whole or part of a county, and of several parishes, and, in places where a Local Board of Health exists, by that body. It is certain that, for the efficient management of highways, the election of a surveyor or surveyors by a vestry, consisting of perhaps half-a-dozen persons in addition to the clergyman, is a bad mode, and in every single parish or in every union of parishes a highway board should be elected. Should a measure be ultimately passed by the legislature for parish or district councils, these bodies would simply take the place of the highway boards, and the code of law relating to the management of the highways would be applied by the parish or district councils. It would probably be advisable to have the code of management in a separate statute from that which regulated the formation of a highway board, because main roads which are under the control of the county councils would be administered by these bodies under the code of highway law, just as they are at the present time under the existing body of statute, certain to judge-made law. The fact that county councils have now to administer the main roads of the county under the existing umbrella of law is a pressing reason for the codification and amendment.

In regard to this latter point, a considerable number of details have to be considered, and it is impossible to do more than have a glance at some of them. One of no little importance is in regard to the widening of highways; it is the duty of a highway authority to keep existing roads in repair, but there is no obligation on it to widen a highway which has become too narrow for existing traffic. But at the present time, however necessary such work may be, it is more than doubtful if a highway authority can be compelled to undertake it. In any new statute, a specified number of ratepayers should have the right to call on a highway authority to widen a road, and in case of refusal there should be an appeal to the county council. The same procedure should also exist in regard to the making of footpaths, work which is far too much neglected all over the country. Again, when we turn to the subject of pruning hedges, we find that "no person shall be compelled, nor any surveyor permitted to cut or prune any hedge at any other time than between the last day of September and the last day of March." It is impossible to have dry, sound roads unless edges and banks are well trimmed, yet for six months in the year there is no power by the law, as it exists, to keep hedges from injuring roads and even inconveniencing passers. Nor can roads be conveniently used unless clear and legible sign-posts are placed at all necessary places. But by the twentieth section of the principal Act, when a new sign-post is required, the surveyor must obtain the consent of the inhabitants in vestry assembled, or receive the direction of the justices who have sat at a special highway sessions. In other words, an ordinary and necessary administrative Act requires the sanction of the electorate body, or the special mandate of a body of magistrates. The natural consequence is that in many districts sign-posts are conspicuous by their absence, because the surveyor naturally does not like the trouble to assemble a vestry or authorise him to do a work which could not give the village carpenter a day's labour. Of course, the authority to

put up such posts should be part of the general authority of the highway officials. These are but a few of the details which require amendment in the existing law; to give others seriatim would answer no useful purpose. The fact is that the existing body of highway law is inconvenient and confused in form, and unsuited to the changes which have occurred throughout the length and breadth of the line. It is not in its present form fitted for localities which are becoming more populous, and whose character is changing; and it is incomprehensible in its language to most of those who have to administer it. Its co-operation and amendment are a pressing need, alike for the benefit of purely rural districts as well as of those which have become more populated, and which, without having become quite urban localities, are somewhat removed from places of arcadian simplicity and arcadian mud.

NOTES.

THE fact that a large number of persons of all nationalities will visit Chicago this year, unless Cholera puts a substantial veto on the proceedings, renders the sanitary condition of the city a matter of wider importance than usual. It is satisfactory, therefore, to learn that the mortality records are improving, according to a return made by the City Health Commissioner. In 1891 there were 27,754 deaths, in 1892 but 26,073, a decrease of 1,681. The early date at which the returns are published speaks well for the promptness of American officialism, even when we learn that the average for the last fortnight in the year is an assumption. The decrease is largely accounted for by the improvement under the heading of zymotic diseases, and of these the loss from typhoid fever has shown marked diminution. The suggestive note is added that the new four-mile water intake tunnel has just been put in use. The reputation of Chicago has not always been of the highest in this respect, the city having been accused of spreading typhoid germs even so far afield as St. Louis, and the improvement promised is, therefore, additionally welcome.

WE drew attention a week or two ago to the discovery of a reservoir at Athens which Dr. Dörpfeld, from its site and general character, announced to be the long sought Enneakrunos. This statement was not likely long to go unchallenged. The *Berliner Philologische Wochenschrift* for January 14 says (we translate): "It is demonstrated without possibility of doubt that at this spot there was situated a reservoir intended for general use; it is not demonstrated, as the Hestia and EpheMERIS assume, that the reservoir is the 'Εὐνάκρονος of the Peisistratidæ." Unfortunately, the *Wochenschrift* gives no better basis for its scepticism than the statement that Pausanias and Thucydides say that the "nine-piped spring" lay in the neighbourhood of the Ilissos, a mere revival, in fact, of the old, out-worn literary controversy as to what they saw and what they knew. Some further and more profitable details are given, however, which deal with facts not with hypotheses. The "find" near the Panathænaic road may have been quite unlooked for. Dr. Dörpfeld has come on two primitive graves, one of which, the grave of a child, contains vases of the Mycænean type. The second contains remains of a partially cremated corpse, and, which is important, cremated in the grave itself. We have, therefore, an analogy in Athens itself to the graves found in Eastern Attica (at Varna). Possibly it was this *pro forma* partial cremation that had been carried out in the "shaft graves" of Mycæne.

THE proposal to improve the west end of Cheapside, which is now before the City Commission of Sewers was advocated a few years ago by Mr. Edwin de Lisle in

"The Majesty of London" (1885). On February 13, 1886, we reproduced two plans from Mr. de Lisle's book, together with his remarks upon them, to illustrate his scheme for *inter alia*, widening the roadway from Cheapside and St. Martin's-le-Grand into St. Paul's churchyard. A memorial presented to the Commission at their meeting on the 10th inst., asks for the demolition of the houses north and south of the east end of Pater-noster-row. Mr. H. H. Bridgman, upon whose motion the memorial is referred to the Finance and Improvement Committee, is reported to have said that it is computed 30,000 vehicles and 100,000 pedestrians pass daily where the average width between the buildings is 44 ft., and only 28 ft. between the kerbs; and that the cost of the improvement would be 100,000*l.* at least. The houses in question stand in the parish of St. Michael-le-Querne, and on part of the site of the church; known also as St. Michael ad Bladum, or at the Corne; which was not rebuilt after the Great Fire. The original church, taking its name from the corn market there, was built temp. Edward III., rebuilt or enlarged in 1430, and repaired by the parishioners in 1617. Here were buried Thomas Newton, first priest (in the choir, 1361), Leland the antiquary, and John Bankes, the wealthy mercer, *obit* 1630, whose daughter Anna married Edmund Waller, the poet. At the church's east-end,—where is now Sir Robert Peel's statue,—stood the Old Cross, taken down in 1390, and replaced in 8 Henry VI., with Lord Mayor William Estfeld's conduit, called the Little Conduit, in (West) Cheap, by Paul's Gate.* Some consider that the sculptured figure of a boy seated on a panner in Panyer-alley, and dated "1688," is the successor of the "Hwaet-mundes stane," cited in King Alfred's reputed grant, 889, of land here to Wenefrith, Bishop of Worcester, for a market. Whilst "maund" is another term for a large basket it seems more likely that the "antiquum petrosum aedificium" of the grant refers to a stone structure at this spot of one Hwaetmund, than that the old English *maund* or *mond* (basket) should appear as *mund*.

MANY champions on either side have now entered the lists in the revived railway rates tournament,—Board of Trade officials and railway officials, Sir James Whitehead (on behalf of his militant organisation, the Mansion House Association on Railway and Canal Traffic), Mr. Acworth, ever ready for a bout with critics of railway management, and Dr. Hunter, who, like Mr. Acworth, has "written a book" on this, just now, prominent subject. Perhaps it is scarcely fair to say that Dr. Hunter "entered the lists," as he was pressed into the controversy by the insatiable interviewer. Professor Hunter, in saying that he was not in the least surprised that the result of the revision of rates is not satisfactory to the traders, only repeats the opinion he formed and expressed before the Board of Trade inquiry was commenced. He wrote in February, 1889, "The traders, if they do not watch closely the proceedings about to be initiated, may find out that they will lose much and gain little by the symmetry and uniformity which are to take the place of the chaos of the old special Acts." The traders certainly did watch the proceedings closely, as did the Board of Trade, and also the Parliamentary Joint Committee, of which Dr. Hunter was a member; but the result is, at present, decidedly discouraging. The outcry still continues; even Ireland,—where the existing rates were always regarded as constituting a very heavy burden,—joining in with complaints of increases amounting to 30 per cent. Mr. Acworth is not always in accord with Professor Hunter, but two years ago he expressed his "firm persuasion that the present settlement can settle nothing." Dr. Hunter's remedy for the injustice which

* For the conduit and church see Mr. H. W. Brewer's view of "Cheapside in the Time of Henry VIII." published in the *Builder* of February 2, 1884.

fixed *maxima*, however carefully adjusted seem bound to entail, lies in conferring upon the Board of Trade still higher powers in determining the "reasonableness" of rates. Perhaps when Parliament re-assembles it may be called upon to consider this and other proposals for dealing with the problem. In the meantime, traders are seriously endeavouring to arrange for water-carriage in several parts, the railway managers find it necessary to hold daily meetings at Euston to investigate complaints, and even the organs of the Money Market (which may be taken as indicating the views of shareholders) are urging the desirability of granting timely concessions.

OWING to the present premises of the Bavarian National Museum at Munich not being large enough, as well as on account of structural defects, the Bavarian Government decided some time back to erect a new building, at a cost of some 250,000*l.* An open competition for the design was expected, but the authorities apparently intend to take the unusual course of forming a Special Commission of curators, artists, architects, Government officials, and prominent citizens, who are to give instructions as to the kind of building thought advisable, and to have preliminary sketches made under their supervision. The Munich *Allgemeine Zeitung* and the South German provincial Press say that there is much feeling in the Bavarian art circles at this mode of procedure, and apparently no good results are expected from the deliberations of the Commission. A competition would have cost the Government 1,000*l.* in premiums, but a small sum compared to that of the proposed building, and in Germany it should be remembered that competition assessors do their work *honoris causa*, and not for fees.

THE case of the Leyton Local Board *v.* Causton, decided on Saturday last by the Queen's Bench Division, was one of such a simple character that it is surprising the Court of First Instance should have come to a wrong conclusion. The third section of the Public Health Act, 1888, says that it shall not be lawful to erect any building in any street or road beyond the line of the front main wall on either side of it. The respondent, who owned a corner house, built it 7 ft. beyond the front line in either street, and when the Local Board brought the matter before the magistrates, the latter decided in favour of the building owner. The higher Court observed that the case was practically unarguable; in truth, the building owner's contention was really ridiculous. The case should be noted, but there is no more to be said about it.

ON Thursday, the 12th instant, Professor Silvanus Thompson delivered the first of a series of three lectures at the London Institution on Electric Lighting. The lecture was entitled "Generation of Electric Currents," and Professor Thompson chose the historical method of treating it. Beginning with the remark that a hundred years ago the only known method of producing an electric current was by turning the handle of a frictional machine, he, with a graceful allusion to Sir George Grove's work at the Institution, briefly noticed the discovery of the electric battery, and Sir Humphry Davy's use of it to produce an arc. He explained how the expense of the fuel (zinc) used in a battery prevented this method being of any great commercial importance, and passed at once to Faraday's great discovery in 1831 of the mechanical means of generating electric currents by the motion of a coil in a magnetic field. With the remark that Faraday, as was his custom, left to others the development of his idea, the lecturer proceeded to show, with the aid of lantern slides, how this had been accomplished, noting the main points of advance

from year to year,—the magneto-machines of Clark and Sir William Sturgeon, the introduction by Wheatstone of successive coils to give a continuous current, the introduction of subsidiary electro-magnets by Hyorth and Holmes, and the further advance by Wilde, who used electro-magnets excited by a small magneto-machine, leading to the nearly simultaneous discovery by Wheatstone, Varley, Siemens, and Ladd of self-exciting dynamos. At the same time he traced the development of the commutator from a mere split tube to its present form. Professor Thompson then passed on to modern machines, from the Gramme of 1870, through a long list, including Gordon, Westinghouse, and Edison machines, down to the Mordey alternator and the large Ferranti dynamos at Deptford; and it speaks much for his skill in interesting his audience that their attention did not flag as a long succession of but too familiar illustrations appeared on the screen. There was no attempt to go into details, rather the unity of principle was insisted on, whether the current were direct or alternating, whether the coils or the magnets rotated. In conclusion, an ordinary arc light was lit by the alternating current from Bankside, the lecturer showing that its light could be varied by a regulator; and a glow-lamp in the circuit of a small coil was lit by placing the coil over an electro-magnet excited by the same current. This last experiment was greeted with enthusiastic applause, which shows the advantage of reticence. Had the audience been told that the arrangement was merely a highly inefficient open circuit transformer, they would hardly have been so impressed. The lecture was evidently not intended for students or *employes* in electrical works, who would find little new to them in it, but rather for a public with no previous knowledge of the subject. For such it was well adapted, and quite within their comprehension; and, doubtless, most present went away with a much clearer notion than they ever had before as to how electric currents are generated.

THE long-expected judgment in the case of *Hopkinson v. The St. James's and Pall-Mall Electric Light Company* was pronounced last Saturday, by Mr. Justice Romer, in favour of the defendant. The judgment is a model of lucid, and,—despite Mr. Justice Romer's modest disclaimer,—scientific statement of the facts and points at issue. Since the infringement is undisputed, the whole question turns on the validity of Dr. Hopkinson's patent of what is generally known as the "three-wire system." The judgment deals first with questions of the wording of the specification, and decides that it was, when fairly read, intended to refer to the constant potential method of supply. The next point is that of anticipation, of which it was contended there were three principal examples, viz., the Sauchie Hall, the Alexandra Palace, and the Luchigore installations. With regard to the first of these, the facts were disputed, and the learned judge considers that the evidence of the defendants broke down, otherwise "an anticipation would have been established." The other two cases are regarded "as not belonging to the parallel system at all," and not coming within the plaintiff's specification, since, "the central wire cannot fairly be said to carry away excess of electricity between lamps on one side and lamps on the other." Mr. Justice Romer has a high opinion of the intelligence of the British workman since he thinks "that any workman of ordinary skill who would be employed to put up the dynamos to be used in accordance with the plaintiff's specification would know that the dynamos to be worked in series with alternating currents must keep time, and that the ordinary method of effecting this would be rigidly coupling the dynamos." We venture to think that a workman who should have come from works where direct current was used on the three-wire system would, at

that time, have been almost certain to couple the dynamos, direct or alternating electrically, not rigidly. The last point dealt with is highly technical, both from the legal and electrical points of view. It concerns the regulator, which Mr. Justice Romer calls a "potential measuring machine" (showing that in this part of the case he has failed in his usually clear grasp of technicalities), and with regard to it there was great difference of opinion between experts of the highest attainments and indisputable integrity. On the one hand were called Lord Kelvin, Dr. Hopkinson himself, and Dr. J. T. Bottomley, who all testified that the regulator would work with an alternating current. On the other hand, Mr. J. S. Swinburne, Mr. W. M. Mordey, Mr. Hugh E. Harrison, and Professor Silvanus Thompson gave evidence that, under ordinary conditions, it could not so work. To the ordinary lay mind it seems strange that the failure of an unimportant detail should invalidate the whole patent; and perhaps this feeling was unconsciously at the bottom of the learned Judge's decision, together with a suspicion, clearly suggested by the plaintiff's side, that the experimental regulator put in evidence by the defendants had, to use his own expression, been constructed with perverse ingenuity so as *not* to work.

IN the volume of the Proceedings of the Institution of Civil Engineers, just issued, a description is quoted of the manner of mixing the cement, to form test briquettes, pursued by the Engineers of the St. Louis Waterworks, where some large additions have been recently made, in the carrying out of which a great quantity of Portland cement was used. The method appears to recommend itself from the fact that it gives more uniform results than hand mixing, and it is said that with the apparatus described two dozen briquettes can be turned out in an hour. The cement was tested neat, and most of the mixing was done by means of a machine called a "jig," the principle of which is very simple. Sufficient cement to form one briquette is put into a cup, the proper proportion of water is poured on the cement, and a tight-fitting cover put on. The charged cup is then shaken violently at the rate of 500 to 800 oscillations per minute, until the cement and water are thoroughly mixed. The frame upon which the cups are fixed moves vertically, and is actuated by a crank. The cups themselves are of brass with covers ground to fit accurately, and on the top of the covers a steel plug is inserted to withstand the abrasion of the tightening screws. The inside of both cup and cover is finished very smooth, so that the cement will not adhere. The cement is first passed through a coarse sieve to remove chips and other impurities, and 135 grains are weighed into each cup; 8 drachms of water are then poured into each cup. The cups having been fixed upon the jig by means of thumb screws the flywheel shaft is turned at about 500 revolutions per minute for about a minute and a half. The contents of the cup are thus formed into plastic balls quite soft on the surface, but of a consistency of soft putty within, and they can be pressed into moulds.

AN American electrical paper states that constant complaints are received by water corporations of leaks occasioned by the corrosion of water-pipes caused by ground currents of electrical circuits; and it is even said that in connecting gas mains arcs have formed between the ends of pipes. The West End Street Electrical Railway of Boston has lately been called to order on this account, the water-pipes of the city being said to be much affected in the matter of corrosion by the influence of the current generated to work the line. The electrician to the railway has pointed out the desirability of metallic returns; and it has been suggested that a provision to this effect shall be inserted in the legal instrument empowering future lines to lay tracks for

electric street railways. Now we are promised (or threatened with) more electric railways in London the matter is worthy of attention, even if the lines proposed are not intended to run on the surface.

HERR REINHOLD BEGAS seems to have unexpectedly satisfied his critics with his last design for the National Monument to the Emperor William I. The teams of horses and menagerie of wild beasts have disappeared from the design, as also the portraits of men of the time (perhaps this is owing to the present position of Prince Bismarck, who must have had the prominent place among such a group), and the design now includes only a portrait statue of the Emperor and some symbolical figures. The monument will be about 21 metres high. The model exhibited is one-eighth of the actual size.

THOSE of our readers who intend visiting Italy this spring may be interested to know of the programme of lectures (always generously thrown open to the public of all nations) to be held this year, under the auspices of the German Archaeological Institute (Roman Section). From January to April a course will be held weekly in the Capitoline and Vatican collections, chiefly in Latin epigraphy. These lectures will be given by Herr Hülsen, the second secretary of the Institute. If sufficient applications are made he will also repeat in May, in somewhat briefer form, the course given in November and December of last year on the topography and monuments of ancient Rome, with special reference to the Campagna. During the spring, but at dates not yet precisely fixed, excursions will be made for the purpose of studying *in situ* the antiquities at Nemi, Ostia, Palestrina, and Corneto. These will be conducted by both secretaries. Finally at the beginning of July Herr Mau will hold an eight days' course at Pompeii. There could be no more competent guide to Pompeii than Herr Mau, but even his instruction might be dearly bought by eight days' exposure to the Neapolitan sun in July. Probably this course is intended for sun-proof Italians. As to Athens, Dr. Dörpfeld this year wisely limits his class in April to Peloponnesos to twenty, so that early applications are the more needful.

CHESHUNT has been holding a rejoicing over the restoration of its Eleanor Cross. The cross seems to have been restored in 1834, with the best intentions no doubt, but in such a manner as to remove much of its original interest and value as a Mediaeval relic. Mr. Ponting, the architect to whom the present further work has been entrusted, seems to be much of the same opinion, as he recommended in his report that any renewals should be confined to those parts which had totally disappeared, and stated that the monument had suffered less from time than from neglect and injudicious repair. We should have preferred that the cross should have been left as it was before 1834, with the exception of such repair as was necessary to keep it from further dilapidation. It is not a building for use, but a monument, and the original stones, however worn, are of more value than any modern attempts to "preserve the design" could be.

UNDER the title of "Gardens, Grave and Gay" the Fine Art Society exhibits another collection of Mr. Elgood's pleasant and interesting garden pictures. Among them one or two drawings of Levens show the clipped tree fashion *in excelsis*, and the effect is as ugly as it is curious, a lesson to avoid extremes. Some of the slighter studies, such as "Cactus and Spurge" (44) are among the best in the collection. "A Quiet Hour" (18), a corner of a garden, with a seat under an angle of massive clipped hedge, with a bit of distant landscape, shows the

true value of the reposeful expression of this style of treatment of a garden, when not carried too far. A drawing of the clipped alley at Melbourne (28) exhibits one of the dangers of formal gardening, as the masses are not straight or vertical, but tumbling about. This sort of formal work must be kept absolutely formal, or it loses its special effect and charm. The Fountain at the Palazzo Doria (65) is a very good bit of architectural work. The catalogue is prefaced by a short and pleasantly written essay on gardens by Mr. Reginald Blomfield.

WE hereby offer our best thanks to the large number of our contemporaries who have expressed themselves in such cordial and congratulatory terms on the occasion of our recent fiftieth anniversary of publication.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The sixth general meeting of this Institute for the present session was held on Monday evening last, the President, Mr. J. Macvicar Anderson, in the chair.

Portrait of Mr. A. Waterhouse, R.A., Past-President.

The President said that on their programme for the evening the presentation of the portrait of their past-President, Mr. Alfred Waterhouse, R.A., had been put down last. As, however, he thought that would be scarcely courteous, he proposed to take that business first.

Professor Aitchison, A.R.A., then rose to make the presentation. He said that by the amiability of his colleagues he had been elected chairman of the committee which had had the matter in hand. He said it was needless for him to dilate upon Mr. Waterhouse's great merits as an architect, and upon the distinguished position which he occupied in the regards of the architects of this country and of foreign countries. He was glad to say that the subscriptions received towards the portrait fund were sufficient to pay for the portrait. Mr. Orchardson, R.A., who had kindly consented to paint the portrait, had met the committee in a very handsome way, saying that it would not only be an honour to paint the portrait of a distinguished colleague and architect, but a pleasure. He thought that when they saw it they would say that the portrait was very successful, and that Mr. Orchardson had fully sustained his great reputation. It was satisfactory to know that the Institute now possessed portraits, either on canvas or in marble, of all its past-Presidents except one,—the late Mr. Edward L'Anson, whose lamented and unexpected death had left them without any opportunity of obtaining his portrait. On behalf of the subscribers he had very great pleasure in presenting the portrait to the Institute. (The portrait, which had up to this point been covered with red baize curtains, was then unveiled, amidst the applause of the meeting.)

The President said that on behalf of the Institute, he gratefully accepted the portrait, which he regarded as an admirable presentment of their distinguished and honoured ex-President, Mr. Waterhouse. Their warm thanks were due to Mr. Orchardson for the generous manner in which he had met the portrait committee, and to Professor Aitchison for the great trouble he had taken in organising the purely business part of the transaction. He felicitated the Institute upon the acquisition of so admirable a portrait for their collection.

The President then delivered the following address to students:—

On Some Responsibilities of the Architect.

Gentlemen,—Life is full of responsibility. If this be true of human life in general, it is emphatically so of the department which most concerns us—architectural life. Before entering on an undertaking the wise man counts the cost, and so it behoves you, who are about to enter on the career of the architect, to realise at the outset the responsibilities that will beset your path. Forewarned is forearmed. It is from no desire to deter you that I now crave your attention, for I hold that—provided you possess the necessary natural qualifications—the pursuit of architecture is one of the most delightful, as well as useful, avocations in which you can engage; but I have thought that to you, whose experience is as yet for the most part theoretical,

it might not be unprofitable to learn something of the responsibilities you will be called on to discharge, from one who has had many years practical acquaintance with them.

Training and Study.—The primary responsibility, however, which meets you is one which you are yourselves competent to judge of without much assistance or guidance from others. The preliminary to all life-work is training. What is essential in other professions is equally so in architecture. There are those who tell you that artistic instinct is the essential qualification, and that if you have that, technical training is comparatively of little consequence. Without for one moment discounting the paramount importance of artistic endowment, to which I may refer later on, let me warn you against being misled by a doctrine so delusive. True, there have been, and no doubt will be, exceptionally gifted individuals who seem to grasp knowledge by intuition and to leap in a single bound over the laborious methods that have to be pursued by ordinary beings. But to rear on the basis of such rare exceptions arguments applicable to members of a large profession, is as absurd as it is misleading, and at the threshold of your career you may be absolutely certain that there is no royal road to the acquisition of knowledge, and that the only stable foundation on which to build the superstructure of a successful life's work is laborious and enthusiastic study. Hence it devolves on you, as students of architecture, to prepare yourselves for fully discharging the responsibilities of life by availing yourselves now of such educational advantages as lie within your reach. Until recent years such advantages were hard to find, and it was mainly—if not solely—by picking up casually such knowledge as could be acquired during apprenticeship in the office of a practising architect that the student could educate himself. Now the case is different, and it is, I apprehend, in some measure attributable to the freedom of intercourse with foreign nations inaugurated during this century that such progress as we see has been attained. In France and Germany, as you are no doubt aware, the architectural student has to pass through a regular course of theoretical teaching in the school or the university. The same system is being adopted in America. The curriculum of the Architectural Association, as well as those of University College and King's College, indicate a distinct tendency to adopt—at all events in a modified degree—a similar procedure here—departures which thoroughly deserve all the support and encouragement we can extend to them. I do not desire that the practical training which can only be acquired by contact with actual work in an architect's office should be forestalled, but it is greatly to be desired that such training should be accompanied by theoretical and technical teaching such as is to be found in the courses to which I have referred. In the world's labour one day in seven is reserved for rest. In the routine of apprenticeship* it would be well were one day in seven also set apart for study outside of and apart from office work, and that the office hours were for pupils so arranged as to render it practicable for them to take full advantage of evening classes in the studio and the lecture-room, without unduly taxing or injuriously affecting brain-power. That a generous spirit now pervades the profession, exhibited in the desire to promote the education of students, is unquestionable. The establishment of teaching centres, not only in the Metropolis but in the provinces, demonstrates this.

I have already indicated that the development of this spirit may be to some extent traced to international intercourse, but I cannot doubt that it is more directly attributable to the action taken in recent years by the Royal Institute of British Architects, as the chartered representative of the profession in inaugurating and establishing a system of Examinations; for it is a fact, whether expressly stated or not that the curriculum of each teaching body is so framed as to meet the requirements of such Examinations. Now if the Examinations of the Institute had done nothing else, it must surely be admitted by all, be they advocates or opponents of the system, that to have in a few years produced such a result is a distinct gain to the profession, the possibilities of which in the future it is difficult to forecast or to limit. As by the enlightened policy of provincial societies educational facilities are provided, preparatory to local

* In the forms of Articles published by the Institute it is stipulated "that with the object of enabling the pupil to qualify himself for passing the Examinations for Studentship and Associateship," the Principal "shall and will allow the pupil such absence as he, the Principal, shall deem reasonable for the purpose of attending Lectures, Classes of Instruction, and the said Examinations."

Examinations in connexion with the Royal Institute, the whole country will be gradually embraced in an educational network the meshes of which will be occupied by the embryo architects of the future, who will thus enjoy educational advantages which were not at the disposal of our older men in our early days. Hence it seems to me that the Royal Institute, in awakening in recent years to the responsibility of providing education by creating an examining body and thus stimulating the organisation of teaching bodies, has conferred lasting benefits on the profession.

Having so far discharged our duty, we may fairly call on junior members and on students to fulfil the responsibility thus devolved on you by embracing the educational privileges which are now brought within your reach. Do not imagine that you will thus weaken the artistic instinct with which you may be endowed. The result of diligent study preparatory to examination is not in any sense to cramp or retard artistic development, but to equip you with knowledge which it is difficult otherwise to obtain, and without which no one would now be worthy of the name of architect. Let me, then, press on you the primary responsibility of qualifying yourselves for your life-work by entering on the educational courses and preparing for the educational test, which have been established with a view to your welfare. Quite recently I received a request from one who a few years since was a pupil of my own, and who is now practising in South Africa, that in order to promote his professional status I would propose him as an Associate of the Institute, accompanied by the incidental intimation that he was—I suppose by way of further fortifying his position—about to be married. I had to inform him that the only way to become an Associate was to prepare himself by study for the Examination, and I suggested that he might usefully turn to advantage the interesting position he occupied by spending his honeymoon in a visit to the old country for the purpose of passing the Examination. I have been tempted to mention the incident because of the sequel, for he has responded by asking me to send him a list of the books he should study and the particulars of the Examination. The spirit thus evinced in a resident of a far-distant colony is creditable, and I venture to commend it to your favourable consideration, at whose door the educational privileges lie, which he can only embrace subject to serious difficulty and sacrifice.

Commencing Practice.—Let us now pass from the responsibilities of the student to those of the architect, and assume that you have, after years of study and preparation, attained the goal of having your first commission confided to your care. I have still a vivid recollection of the emotions which this event creates; the sense of pleasure derived from the reflection that at last one is freed from restraint; the enthusiasm with which one anticipates the fulfilment of long-cherished hopes; the delight with which the youthful mind revels in the feeling that now has come the opportunity of teaching the world something worth learning! All such emotions are natural, and incidental to the freshness of youth, and the first sense of emancipation from thralldom, and, although subsequently sobered by experience, constitute a lighter era of hope and expectation than in after life one recalls with pleasure and would not obliterate. I shrink, therefore from uttering anything that might detract from the hopeful anticipation with which you rightly regard this event. Only one word would I venture to interpolate. It is natural that in the first blush of actual experience feelings I have depicted should predominate, and that you should indulge with unstinted satisfaction the prospect of crystallising your long-cherished fancies. But remember that this is not all. The indulgence of your fancy must be duly tempered by consideration for the fancy and wishes of him who has given you the opportunity so welcome. I know by experience that in early years the tendency is—I admit not unnaturally—to consign this consideration to a subordinate place, or not to regard it at all. Do not forget, amidst the exuberant joy of youthful bloom, or the justifiable pride of a first success, your responsibility is to your client, and that are bound, while indulging your idiosyncrasies, to do so in giving artistic and practical effect to requirements and in promoting his interests. Should you ever entertain doubt in respect to the fitness of your advice, a good test will be to yourselves whether, were you occupying the position of your client, you would yourselves act conformably with the advice you are giving him.

Architectural Design.—You will now have entered on the part of an architect's experience in which unquestionably is to be found the most

absorbing interest and the keenest pleasure—the creation of design. This is the most elevating sphere in which you can work, because it opens the field for the exercise of your inventive faculties. Call it instinct—call it genius—call it what you may—here is educated and exhibited what makes the architect, and without which he is not an architect at all, the spirit of the artist. Cherish this native inspiration. You cannot create it by human agency. You cannot destroy it. But you can misapply it, or you can by discipline and control make it the medium of conferring lasting benefit on your day and generation. Responsibility attaches to every faculty, every talent we possess, and for the cultivation and use of this inspiration—the indispensable, as it is the noblest, qualification of the architect—you are responsible to Him who endowed you with it. Let this ennobling consideration inspire your work! When I refer to artistic design, I desire not to be misunderstood. To apply it to the design of the elevation only is unjustifiably to restrict its sphere, for the plan offers the primary, and perhaps the most important, field for the display of artistic skill. I must not dwell on this, having on a previous occasion specially treated the subject of the Art of Planning, but I venture to express the hope that I then succeeded in demonstrating the conviction I strongly entertain, that no part of an architect's work, from an artistic point of view, is more important than the study of the plan. I have referred to the responsibility of regarding your client's wishes and studying his requirements. Let me here say that to do so is not only a duty, but it is often the means of imparting to work its highest interest. To embody in design one's own fancies is comparatively easy: to combine one's personal proclivities with the requirements of a client is frequently most difficult. Difficulty creates interest, and to succeed in spite of it is always enjoyable, and imparts to any work a zest which it would not otherwise possess.

Working Drawings.—The general design approved, you will have to proceed with the preparation of working and detail drawings, in which you will find the continued opportunity for the exercise of creative power. Every part of a building drawn to a large scale, and every detail drawn full size, form subjects of constant and engrossing study, a true idea of which can only be acquired by experience. Apart, however, from the interest of design embodied in such drawings, it must never be forgotten that they are in their character and object totally different from preliminary sketches. The latter are prepared for the purpose of illustrating the design, and when drawings they may be said to have served their purpose. Working drawings, on the other hand, are records on the basis of which the interests of others depend. From them the quantities are measured. Upon them the contract is framed. Hence it is obvious that you will be responsible for making such drawings clear, precise, definite, practical. Anything like sketchy indecision admitting the possibility of a twofold interpretation—any contradiction between one part and another, or one drawing and another—anything in the nature of slovenly draughtsmanship—these and such-like careless defects are unpardonable. Working drawings are not worthy of the name unless they are drawn with decision and accuracy, consistent with one another, finished in ink, coloured, and reproduced in duplicate. You may naturally think that this goes without saying, but experience proves the reverse. It is because I have not infrequently seen working and detail drawings, prepared by so-called architects, which I have regarded as discreditable and unworthy, that I venture to urge upon you what I consider will be your responsibility in this respect. It is simple injustice to those whose interests are affected by them that working drawings should be other than unmistakably clear and definite. This does not necessarily imply that they must be devoid of artistic feeling. I have seen many, admirable in respect of their succinctness, and charming in respect of artistic draughtsmanship. Let me say that where practicable it is most desirable that detail drawings should be prepared prior to the quantities being completed, in order that there may be no room for misconception as to the amount of work intended and the labour on it. I am well aware—only too well—that the rush with which much modern work has to be prepared—greatly to be deprecated—often renders this impossible; but whenever it can be done it should be done, for the advantages to all concerned are obvious.

The Specification.—Following on the completion of the working drawings, your next responsibility

will be the preparation of the Specification, the proper execution of which is of the greatest importance. Allow me to press upon you, from experience, the enormous advantage of writing your own specifications. No one can so clearly describe what he wants as the architect himself, and there is no valid apology for a young man failing to discharge this essential part of his duty. I always did so, until the pressure of work rendered it impossible to continue the practice. The work, I admit, is dry and uninteresting as compared with design and drawing, but it has an interest of its own, as all work has when honestly engaged in. Besides, it is no excuse or apology for the neglect of a part of our work, that it may not be so engrossing as other parts. That which is not unpalatable is frequently most beneficial, and a well-disciplined mind will take the bitter with the sweet and strive to do all alike well. To write your own specifications is to be familiar with every detail in a sense in which you cannot otherwise be. On your visits of inspection during the progress of the work, you will find yourself master of the situation with every detail at your finger ends in place of being dependent on others or constantly requiring to be refreshed by reference to a document with which you are only partially familiar. A specification, to be of use, must be full and clear, describing in terse language every branch of work, and leaving no room for doubt in the interpretation of its clauses. It should also have ample marginal notes for facility of reference. Much time will thus be saved. To write a specification is not artistic, but it is instructive work, and involves much consideration in respect to the nature of materials and alternative methods of construction. No one can properly write a specification who does not possess some practical knowledge of the building trades, and the materials employed in each. Hence to leave the preparation of the specification in other hands when you can do it yourself, is deliberately to abandon the means of keeping yourselves in touch with much of the scientific progress of the day in its relation to architecture. Never, therefore, be induced to relinquish the personal discharge of this responsibility, so long as it is by any means possible to accomplish it.

The "Quantities."—With the completion of the drawings and specification other personages come upon the scene, in relation to whom your responsibilities will be extended. The appointment of the quantity surveyor will generally rest with you, and you will find it of the utmost importance to secure the services of one who, having acquired a thorough practical training, is conversant with the details of each trade, and who is quick and accurate. These qualities, combined with experience, will alone inspire the necessary confidence. The customary practice of including the charges of the quantity surveyor in the builder's contract and account does not commend itself to my judgment. For many obvious reasons, it would be better that they should be charged direct to the client and paid direct by him, subject to the approval of the architect. Need I add that the charges of the quantity surveyor, whether made direct or embraced in the contract, should, in every instance and without exception, be entirely independent of the charges of the architect. For the architect to participate, in any form whatever, in charges made by another, instead of being made direct to his client, would be alike unjustifiable and dishonourable. The practice with some architects is to take out their own quantities—a practice which very generally prevails in the provinces, though comparatively rare, I believe, in London. That such a custom is remunerative goes without saying, and it is justified on the ground that the necessary dissection of the building in the bills of quantities makes the architect more familiar with every detail than he would otherwise be. For my own part, while there is, of course, nothing dishonouring in the practice to those who care to engage in it, I consider that it is not in the least degree the case of one aiming at a purely architectural practice, it is not desirable. If an architect is not sufficiently conversant with every detail after having designed the building and prepared the working drawings and specification, he must be obtuse indeed. You will find quite enough to engross your time and thoughts in what—to my mind at least—is the more legitimate domain of architecture.

The Contractor.—To the contractor who engages to carry out your designs in accordance with your working drawings and specification, you will stand in a relation of undoubted responsibility. You will be the medium by whom arrangements between your client, on the one hand, and the contractor on the other hand, will be made. You

will thus occupy the position of an agent, and cannot be relieved of its responsibilities. You will have to see that the contract is fairly and honourably carried out by both parties to it—protecting your client, on the one hand, from any attempt at evasion by the use of faulty materials or defective workmanship, and protecting the contractor, on the other hand, from any tendency to deprive him of legitimate remuneration for work properly executed. This dual responsibility you will only be competent to discharge by possessing such practical knowledge of materials and workmanship as will enable you to judge what is good and what is defective, and by uniformly maintaining an attitude of independence and integrity. I have met with clients who have not hesitated to condemn contractors as a class whose habits are predatory and who live on robbery, forgetting that there have been those in their own position to whom such strictures, if fair in the one case, would be equally so in the other. That such sweeping condemnation is unjust I need scarcely say, and your responsibility will sometimes consist in protecting the honourable client and the honest contractor from its injurious effects. My experience of life has been that one class is morally no worse and no better than another. Human nature is much the same, regardless of external circumstances. Morality is an individual, not a class, distinction. It has been my fortune, and I trust it may be yours, to meet with but few clients and few contractors whom I could regard with feelings other than those of respect and confidence. The large majority have been men whose gentlemanly courtesy, on the one hand, and whose admirable work, on the other hand, have reflected credit on themselves, and inspired confidence in others.

Conduct of Works.—In superintending the execution of your designs you will find ceaseless pleasure, for there is a singular fascination in watching the gradual development of your ideas and their translation into a material and durable form. You will, if you care for your work, experience regret—as I have often done—that you are unable to live on the work, as the monks of old did, personally judging of each feature and detail in the position it is to occupy. Seeing that this is impossible in modern practice, it will be necessary for you to have a resident representative or clerk of works. In the selection of this official the greatest care and circumspection should be exercised. Practical experience, moral integrity, and tact are indispensable qualifications. Once find a man on whose honour you can rely, and whose efficiency has been demonstrated, part not with him if you can help it; he is invaluable, and worthy of being regarded as a friend indeed. But your responsibility will in no way be diminished by reason of your having such a local representative, for without periodical visits of inspection it would be impossible that you could attest that the work had been properly executed, or that you could append your signature to documents certifying that the contractor is entitled to payment. To sign a certificate should never be regarded as a matter of form; it is, on the contrary, a serious responsibility which your client will rightly expect you to discharge with fidelity. It is satisfactory to all concerned when the final certificate represents no more than the balance of the contract, and you should regard it as a responsibility to do all in your power to attain this result. In the case of a new building you will experience no difficulty, provided changes are not made in the contract drawings; but in the alteration of an old building there is more room for uncertainty, and therefore the more reason for circumspection and foresight. Architects are often censured for incurring increased cost, when it is really attributable to changeableness on the part of clients who will not be controlled, and who, although willing enough to embark in variations, do not always display corresponding elasticity in paying for them. Hence you will find it well not too readily to sanction variations which will involve additional cost, and not to encourage erratic clients to entertain them. An architect should strive to achieve a reputation not only for designing good buildings, but for completing work entrusted to his care without any increase on the amount of the contract. In superintending work, knowledge of materials and workmanship is essential, but knowledge of men, and tact in exercising it, are also invaluable qualities. Firmness combined with tact and courtesy will induce willing and cheerful compliance with your instructions, where mere bullying—too frequently resorted to—will only lead to opposition and induce contempt.

Responsibilities of neighbours.—Besides those I have mentioned, there are others to whom, in

practice, you will occupy a position of responsibility. I cannot refer to all. Take one as an illustration. Most of you will in due course be called on to build in London, and you will in that event have to deal with the complicated Acts of Parliament controlling Metropolitan building and specifying the relative obligations and privileges of building and adjoining owners, for one or other of whom you will have to act. To rightly interpret Acts of Parliament is not always easy, and if I may venture to say anything so heterodox, I fancy difficulty is occasionally experienced even by those whose official duty it is to enforce them; but there are, I think, certain general principles which should always inspire our responsibility. Building and adjoining owners, whoever and whatever they may be, have one common characteristic—they are neighbours. Many centuries since the question was asked, "Who is my neighbour?" It would be well were the spirit which inspired the reply more frequently found to pervade the negotiations between those neighbours with whose responsibilities architects are sometimes concerned. Too often is the building, or the adjoining owner, as the case may be, regarded as one whom it is well to pass by unheeded, one whose interests are opposed to our own, one who if he has the chance will take advantage of us, and one, therefore, of whom we are perfectly justified in taking advantage. I do not draw a picture that experience does not justify. Who has not heard of work having been pushed forward to completion with undue haste, or in the dull season, in the hope that, once done, it will remain, whether it inflicts injury to a neighbour or not? To designate such procedure as sharp practice is to use too mild a term; it is dishonest, dishonourable, and worthy of all reprobation. Apart, however, from its immorality, it is stupid. Honesty not only commands the approval of conscience, but in such matters, it is the best policy. You are much more likely to get what you want from a neighbour by approaching him in a straightforward spirit, treating him with frank confidence, and asking his permission to deal with joint property in the manner you wish, than by unworthily trying, directly or indirectly, to take advantage of him. Do as you would be done by, is the motto of the Christian and the gentleman, which I recommend for your invariable adoption when discharging your responsibilities in connection with the interests of those who are neighbours.

Practice and Art.—Now it may have occurred to you that in regard to some of the responsibilities of the architect to which I have referred, it is difficult to trace any direct connection with Art. The drafting of a specification, the arrangement of the conditions of a contract, the adjustment of differences between your client and the contractor, the treatment of the rights of your client in respect to his neighbour; or, again, the provision and arrangement of sanitary appliances, or the endless correspondence on mere matters of business which occupies so much time—these and other matters of a similar nature cannot by any stretch of imagination or any exercise of ingenuity be brought within the category of artistic work. Yet these are unquestionably responsibilities the discharge of which properly falls on the architect, and the neglect of which involves the necessary sequence that he fails in his duty to his client. Is it, then, true that the avocation of the architect is a purely artistic one, and that such matters as those which I have just specified should be relegated to the surveyor or the engineer? If so, then much of what I have said to you of your responsibilities is false teaching. But I appeal to common sense—I appeal to universal experience—nay more, I appeal to the practice of architects who are undoubted artists, to demonstrate that the assumption is unfounded. I have, I hope, said enough to satisfy you that I consider your noblest and highest responsibilities will be found in the development of your artistic faculties in design. This is indisputable. To design in truth, purity, and with artistic feeling, is unquestionably the most elevating attainment to which you can aspire, success in which will constitute the keenest pleasure you can hope to experience in your professional career. This is the most important part in the architect's work, but to assert that it is all is deliberately to close the eyes to patent facts in the vain effort to establish as truth a purely visionary theory.

Gentlemen, in this necessarily brief survey I have touched on some only of the responsibilities which you will be called on to discharge in the practice of your profession. Others will occur to you on which I might have dwelt had time permitted. One, however, remains, reference to which I dare not omit—your responsibility to yourselves. In this, after all, is to be found the key of the whole

position. Be true to yourselves, and you cannot but be true to others in every relation of life. Truth must and will prevail. Enthroned in the heart, it will find outward expression through the intellect in design, and through the courtesies of life in practice. If true to yourselves in the earnest preparation for your career by diligent study and laborious research—if true to yourselves in the firm resolve to develop to the utmost those faculties with which you may be naturally endowed—if true to yourselves in the lofty ambition to consecrate your powers to the promotion of art and the benefit of the community, you will not only be true to all others, but you may cherish the well-grounded hope that you will attain success. And in all your struggles and efforts to discharge with fidelity the responsibilities of your calling, remember this—that you will not be less likely to inspire confidence and attain success as architects if you constantly bear about with you, in the complicated relationships of your professional life, the unmistakable characteristics of gentlemen.

Mr. William Emerson, Hon. Sec., then read an interesting review and criticism of the students' drawings. Inasmuch, however, as these remarks extended to considerable length, and could not, with justice to them, be abridged, we are unable to find room for them, owing to the great demands upon our space. It is, indeed, unnecessary that we should print them, seeing that the gentlemen most concerned, the student-competitors themselves, will be able to read Mr. Emerson's remarks in the *R.I.B.A. Journal*. Our own criticism of the drawings submitted will be found in last week's number of the *Builder* (see p. 24, ante).

On the motion of Mr. John Slater, a vote of thanks was accorded by acclamation to the President and the Honorary Secretary for their addresses.

The President then proceeded to distribute the prizes to the successful competitors, whose names we published last week (see p. 29, ante). Mr. Anderson very happily contrived to address a few appropriate and well-timed words of congratulation or encouragement to each recipient.

The meeting then terminated. The next meeting will be held on Monday, the 30th inst., when Mr. Arthur Cawston, Associate, will read a paper "On the Advantages of Undertaking the Improvement of London Streets on a Comprehensive Plan."

BYZANTINE ART IN ITALY: THE ARCHITECTURAL ASSOCIATION.

THE sixth meeting of this Association for the present session was held on Friday, the 14th inst., at 9, Conduit-street, the President, Mr. H. O. Cresswell, in the chair.

Mr. W. Peteh was elected a member of the Association, and five gentlemen were nominated for membership.

Mr. E. S. Gale, Honorary Secretary, having announced several donations to the library, a vote of thanks was accorded to the donors.

Mr. R. Phené Spiers, F.S.A., then read the following interesting paper

On the Influence of Byzantine Art in Italy, from the Fifth to the Twelfth Century.

The archaeological researches of the last fifty years, and the valuable records which have been left to us in the works of Rickman, Professor Willis, Parker, Sharpe, Scott, Street, and Burges among our own countrymen, and Viollet le Duc and de Caumont in France, have so far raised the veil of obscurity which hung over that period known as the "dark ages" as to have eliminated from its shadow the second half of the eleventh and the three following centuries. Attempts were made by Hope, Dr. Whewell, and Professor Willis to carry back the date, but still within the last few years the entire absence of documentary evidence, the want of a systematic study of the fragmentary remains left to us, and a general inclination to ascribe to buildings a greater antiquity than the civilization of the precise epoch would admit of, has created some confusion, and failed to penetrate the mystery of the period I have selected for my paper. The subject, however, is so vast that I have found it necessary to confine my remarks to a portion of one country only, viz., the North of Italy, and to the influence of one particular style only, the Byzantine, in the development of its art.

The two books to which I am the most indebted for my information are, de Dartein's "Étude de l'Architecture Lombard," completed in

1882, and Cattaneo's work, published 1890, which bears the same title as my paper, except that I have taken another century in order to include St. Mark's and a large series of buildings, which illustrate the extensive influence of the Byzantine style in Italy during the twelfth century.

With de Dartein's work I had long been familiar, and failing other evidence had acquiesced to a certain extent in the dates given to the various churches illustrated in it. When, however, in the beginning of 1892, I came across Cattaneo's work, and found so wide a difference of opinion, a new interest was awakened, which increased as I followed the arguments brought forward. It was necessary for me to master the facts in order to revise the new edition of Fergusson's "History of Architecture," on which I was then engaged, and it occurred to me that it might be of some interest to the members of this Association, and induce those of you who in future years have the opportunity of travelling in Italy, to carry further the inquiry. I felt, however, that my statements would come with more authority if I were able to visit some of the monuments in question, so as to be able to differentiate the dissentient opinions expressed by the two authors above named, and also to make drawings, or procure photographs of some of the more important details, which would enable you better to judge for yourselves. I could not hope to get as far as Rome, but in the months of August and September last I visited Como, Milan, Brescia, Verona, Vicenza, Padua, Venice, Ferrara, Ravenna, Ancona, Bologna, Parma, Piacenza, and Pavia, and studied most of the buildings with which the immediate subject of my paper is connected. The Byzantine influence in Pisa and Lucca, and in the South of Italy—at Troja, Bari, Bitonto, Altamura, &c.—is of an entirely different type, and was inspired by the work of the later Great Empire. The North of Italy it radiated from Ravenna, and is of much earlier date.

To place my subject clearly before you, I must commence by pointing out the essential characteristics of Byzantine buildings—1st, as regards plan; 2nd, construction; and 3rd, decoration. I shall only be able to touch on the salient points, otherwise my paper would be one on the Byzantine style, which has already been treated by Professor Aitchison at the Royal Academy. When Constantine transferred the seat of empire from Rome to Byzantium, he rebuilt the ancient town, doubling its size; he surrounded it with walls, and divided it into fourteen Regions or quarters. The buildings which he erected consisted of churches, palaces, *thermæ*, forums, &c., all of which would seem, from the descriptions given, to have been based on those of the Eternal City, with one important difference: they were so hurriedly built, and in materials of so ephemeral a nature, that none of them have been preserved to our day; in fact, many were pulled down and rebuilt by Justinian two centuries later. Two constructions of his time remain—the *Bin-Bir Dereh*, or cistern of the thousand and one columns,* and the *Yeribatan Serai*—two large underground reservoirs for storing water. There is one great basilica, built by Constantine, still existing in Syria, viz., the Church of the Nativity at Bethlehem. This church, and those which are described by Eusebius as having been erected in front of the Holy Sepulchre at Jerusalem, and in other places, show us that the type of plan adopted was not dissimilar to those which Constantine built in Rome, viz., the ancient Church of St. Peter, pulled down in 1506, the Church of St. John Lateran, which still exists, and others which have been rebuilt since. In all these to the Mosque of St. Sophia at Constantinople, commenced by Justinian in 532, in which the chief feature is an immense central dome with eastern and western semicircular apses, and with aisles and triforium galleries, all vaulted, surrounding the central space. This church must be looked upon

as the apotheosis of the Byzantine style, and no dome of similar size was ever again attempted in the East; but it gave the key to a new plan, which is usually called the Greek cross, in which there is a dome in the centre and barrel vaults over the nave, transept, and choir. In later times this dome was raised on a drum in which vertical windows were pierced, and sometimes other domes of slightly less importance over nave, transepts, and choir, or over the four angles included by them. In the Church of the Holy Apostles the four other domes were over the nave, transepts, and choir; in the Church of the Assumption at Moscow, on the angles. A second type of plan is found in the round churches, but these do not differ from much earlier examples in Italy; the most important variation, however, is found in the Church of St. Sergius at Constantinople, also built by Justinian, a church with an octagonal central space covered by a dome, seven semicircular niches, and a choir, with aisles and triforium galleries all round. Towards the end of the sixth century, in addition to the central apse in Greek churches, two others were added to contain altars for ceremonial purposes. As they were always hidden by the *Iconostasis*, they served a different purpose from that in the Roman Church. It is, perhaps, more a question of construction than of plan, but I may here note that whilst internally in Byzantine work the apse is circular, externally it is almost always polygonal.* In Western Europe it is always circular unless influenced by Byzantine work.

I come now to the second section, that of Byzantine construction. Besides the architects and workmen whom Constantine took with him to Byzantium, he is said to have exported other treasures, and not only bronzes and marble statues, but even columns and capitals. It was evident, however, that these would, in course of time, come to an end, so that he was probably soon obliged to have recourse to whatever materials were at hand. Of timber he had plenty, but there was no stone except of small dimensions, unless it were imported from distant quarters. The means at his disposal were apparently not sufficient to enable him to undertake those stupendous works in concrete, one of which—the Temple of Peace in the Forum—he had completed in Rome, and which still exists in part after fifteen and a-half centuries. He was obliged, therefore, to do the best he could with rubble masonry or with brick, the materials for making which were abundant in the vicinity of the new city. De Dartein points out in his work that brick, when employed as the chief material, exercises a considerable influence on architectural design, on account 1st, of the regularity of its form and, 2nd, of its restriction in construction. It offers great facilities for the employment of arch construction, and tends to replace the architrave or lintel. It restricts the projections of cornices, and, on account of its numerous joints, it suggests the employment of relieving arches supported on piers, leaving the walls to be filled in afterwards as partitions. What may have been the tentative efforts of Constantine and his immediate successors we know not; the buildings of Justinian's reign already mark the invention of a new style of construction; immense arches, measuring sometimes 5 ft. high, of brickwork in two or three rings, with huge piers and buttresses, are employed in the churches of St. Sophia at Constantinople and Thessalonica, the bricks measuring from 18 in. to 20 in. by 12 in., and $1\frac{1}{2}$ in. to 2 in. thick, with joints of mortar of nearly the same thickness, and at the extrados of the arch still greater. Even in smaller openings, from 3 ft. to 6 ft. span, brick arches of 16 in. or 18 in. depth are used instead of two or three 4½ in. brick ribs which we employ. (In the campanile of St. Apollinare in Classe, Ravenna, I noted a window 6 in. wide with voussoirs 14 in. deep. In this case special voussoirs had been made 1 in. thick at one end and 3 in. at the other, the mortar joints also differing in thickness in the same way.)

In the construction of their vaults there is a much more important change from Roman work, and from the fact that the two great cisterns (already spoken of) in Constantinople were vaulted in the new manner, we may assume that they were built by Eastern workmen, who carried out the traditional method of building donical structures employed by the Assyrians. In these days and here in England, where Baltic timber is to be had in any quantity and at small cost, we do not hesitate to employ centering for every description of arch, centering which afterwards becomes waste timber. In early times, however, they built with-

out centering, and M. de Choisy's book on "L'Art de bâtir chez les Byzantins" illustrates a large number of methods by which this could be done.

The vaulting surfaces were always domical, so that when complete each ring was self-supporting, and by building the rings on an inclined plane with the bricks flat-wise and not end-on, each ring was partially supported by the one beneath. This method allowed of a less thickness being given to the vault, and reduced considerably its thrust.

Geometrically speaking, whilst the surface of a Roman barrel vault is evolved by a semicircular ring travelling along horizontal line, in Byzantine vaulting the line rises and is curved. This is only the elementary form, but in its intersections it follows the same principle.

The Byzantine architects also would seem to have recognised at a very early period the fact that a pier or support of a homogeneous nature such as granite, marble, or stone could carry a greater weight than one built up of bricks; and further, that it might even be of less diameter than the wall carried, provided all lateral thrusts were counteracted. Now in all Roman work the face of the architrave (and in late work, as at Spalato) the face of the arch is in the same plane as that of face of column. In the Church of St. Paul, outside the wall of Rome, built 388—where arches are thrown from column to column, the thickness of the wall and the width of the base or die from which the arches spring is equal to the upper diameter of the column. In Byzantine work, however, both are much greater. Consequently, the Roman capital, with its ordinary abacus, was neither large enough or sufficiently strong to meet the new requirement. They inserted, therefore, a new feature called the *dosseret*, or impost-block, between the capital and the wall above. It has been thought this was a corruption of the old Roman architrave. If so, its earliest examples would recall the mouldings of same, but in the *Eski Djouma*, at Thessalonica, dating from the beginning of the fifth century, it appears as an absolutely new and original feature, designed solely to meet a constructional want, and without reference to precedent. It is not necessarily square, and sometimes two of the sides will project like a bracket. The *dosseret*, therefore, is one of the most characteristic features of the Byzantine style.

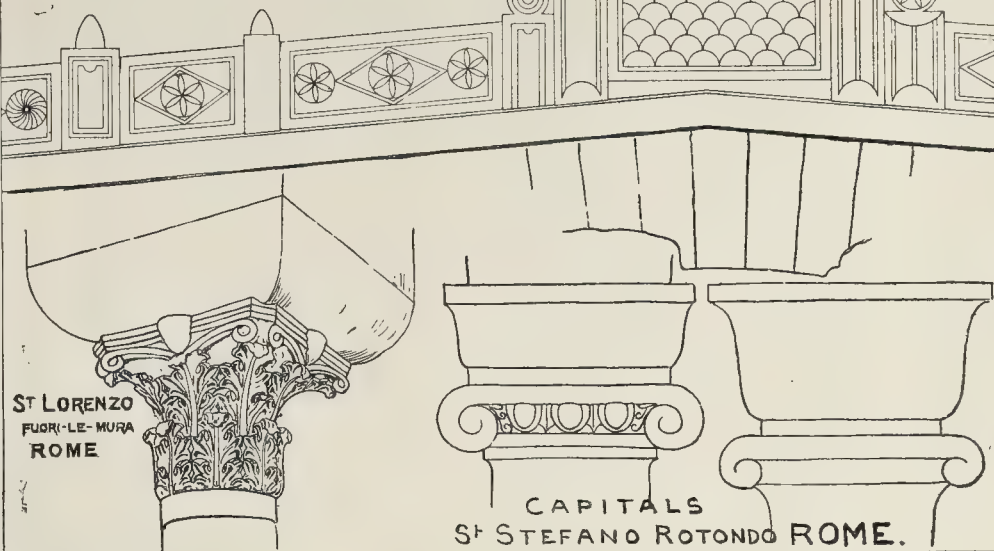
I come now to the third head, decoration.

Of external decoration, beyond that which is afforded by the courses of brickwork or by the brick *voussoirs*, in which variety is given occasionally by difference of tint, and in later work of the eleventh and twelfth century, when patterns of brick or inlaid tiles were employed, there is not much to be said. It was rather in the interior that the Byzantine artist lavished the resources of his art. In the decoration of the lower part of the walls with panellings of the richest marbles, and of the upper portion and of the vaults and soffits of arches with a vast surface of mosaic, the Byzantines carried on the traditions of Roman architecture, but the treatment was new and original. They restricted the carved decorations to those features which had special constructional functions to serve, such as the capitals and bases of the columns, the lintels and jambs of doorways and windows, or such as were required to emphasise certain lines in the buildings, as string-courses or cornices. In all these features they were specially reticent as regards their projection, so as not to clash or form too great a contrast with the large flat surfaces of marble or mosaic. Though many of their capitals were based on those of the Roman Corinthian, or Composite orders, we notice a tendency to change: 1st the contour of the capital, which inclines from the bell towards the form known as the cushion capital, and, 2nd, the leaves, instead of being so much in relief as to suggest that they were in their origin applied to the bell, on the contrary, seem rather to emerge from the solid block. These tendencies become the more apparent when, with a cubical capital (the lower angles of which had been chipped off to merge into the circular annulet of the column), they proceeded to set out a scheme of surface decoration and cutting back from the surface, to evolve a new variety of design, partially geometrical and partially of leaf ornament. It is in this class of capital that we find the greatest originality, and in the play of light and shade considerable beauty. In these examples also they seem to have been very fond of undercutting. Piercing holes with a drill is found in the debased work of most styles, but the Byzantine artists turned its effects to more account, and frequently employed it in conjunction with carved foliage of good character. The influence of Byzantine design, however, is chiefly

* There are actually only 212 columns, and they are said to have been originally quarried for some great building in Rome.—R. P. S.

* The exceptions are the Pantokrator, Constantinople, St. George's, Thessalonica, and the churches in Central Syria.—R. P. S.

PONTESALARO N° ROME C. 566. A.D.



conspicuous in the decoration of the enclosures of choir-screens, parapets of balustrades, episcopal thrones, ambones or pulpits, and baldacchinos or ciboriums. To the results of such influence I will draw your attention later on.

Although the early history of the Byzantine style can be carried back two or three centuries before the foundation of Constantinople, its influence on Italy was not felt till the Empire had become well established; in fact, more than a century elapsed before we find it in the ancient baptistery, the tomb of Galla Placidia, and the Chapel of St. Chrysologus in the Archiepiscopal Palace, all in Ravenna. In these examples it is chiefly shown in the mosaics with which they were decorated, and which were probably executed by Byzantine workmen. The Baptistery at Ravenna is said to have been built by Archbishop Ursus in 380 A.D., but this refers, I think, to the main structure, which probably was originally covered with a wooden roof. When in 451 it was determined to decorate it with mosaics, the vault was probably built to receive them. There is no documentary evidence of this statement, but the internal structure suggests that a change from the original design has taken place. In order to bring the thrust of the cupola well within the walls, it would seem to have been lined with eight arcades of two stories, which project inwards about 16 in. and the pendentives are carried on corbels projecting 10 in. more. Now, whilst the exterior of the Baptistery shows no Byzantine influence in its brickwork and cornice, three of the capitals which carry the lower arcade inside are Byzantine, and all are surmounted with the Byzantine dossieret. The dossieret appears again on the Ionic capital of the upper arcades,, and the width and depth of the springing base of the arches are greater than the diameter of the column. The corbels carrying the main arches and the pendentives are sculptured with Byzantine foliage. Under each arch of the upper story are three arcades, the centre one pierced with large windows of modern date, the side arcades decorated with niches and figures in low relief, all executed in plaster. I noted these at the time as being peculiar, and subsequently in the museum at Bologna. I came across some Byzantine ivory tablets of similar design.

Whilst the mosaics of the tomb of Galla Placidia and probably the dome on pendentives (the earliest example known) are Byzantine, the walls of the building were built by native workmen, and the bricks are much thicker and of less lateral dimensions than those in St. Vitale and other churches in Ravenna of the sixth century.

The next example in date is in Rome, where in the Church of St. Stefano Rotondo, in the outer

ranges of arcades above the capitals we find the Byzantine dossieret and a similar feature is said to exist in St. Angeli at Perugia.

The dossieret is found also in that eastern portion of the Church of St. Lorenzo fuori-le-Mura at Rome, where, in fact, it might have escaped attention except that its capitals are fine Byzantine examples crisply carved, and they support the arches of a triforium gallery which I have referred to as an essentially Byzantine feature. Except in St. Lorenzo (where they were added by Pope Pelagius about A.D. 585), and in St. Agnes in A.D. 630, the dossieret is not found in any other basilica in Rome.

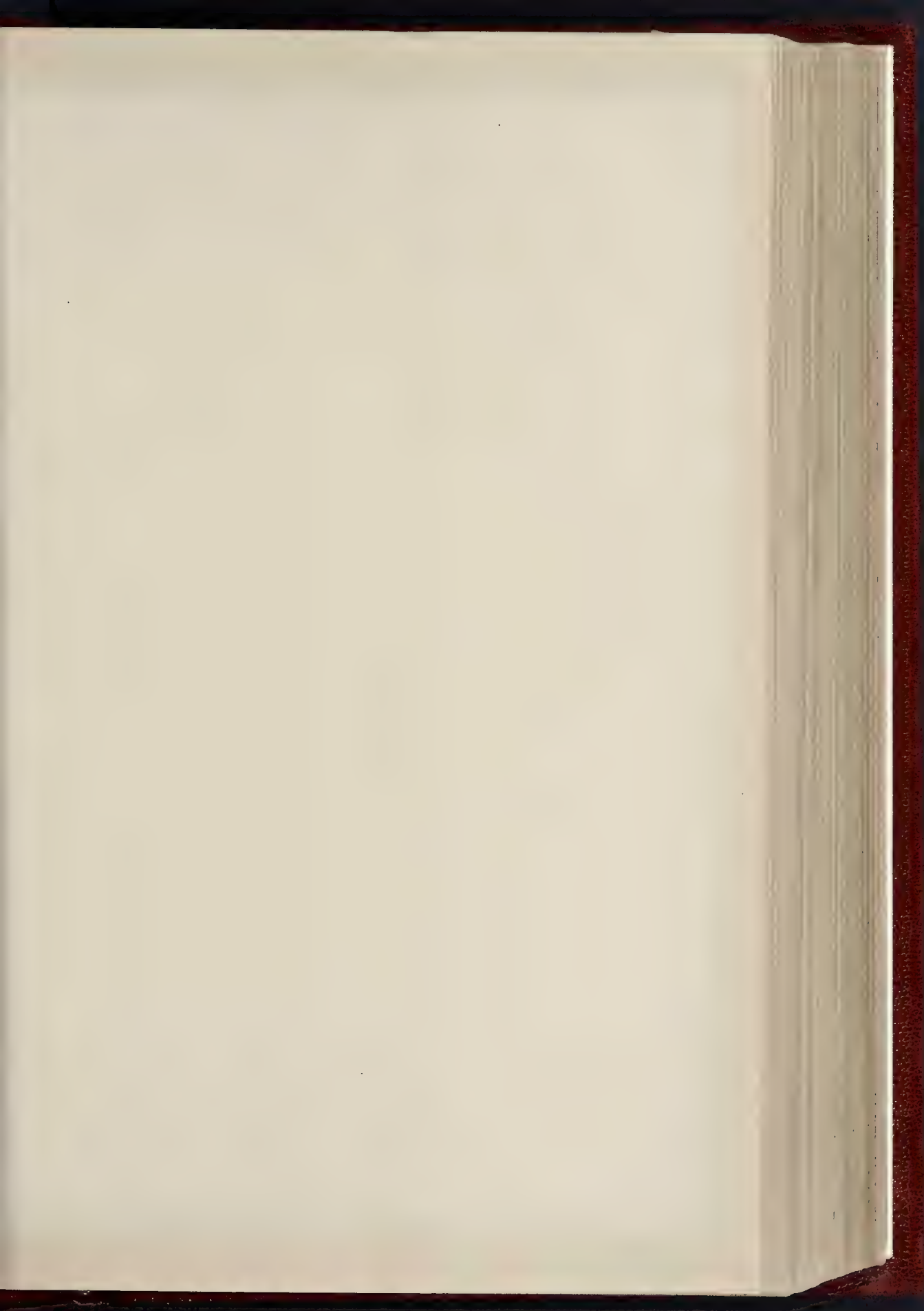
For the next important examples I must now return to Ravenna. Ravenna, I might here point out, was selected in preference to Rome as the capital by Honorius in 396 A.D., and from that time for some centuries it was occupied as such by the reigning sovereigns; hence the importance of its buildings. Theodoric, King of the Ostrogoths, who reigned from 493-525 A.D., would seem, architecturally speaking, to have been a very remarkable man, having erected more monuments than even the later Roman Emperors. As the Goths, however, had formed no style of their own, he employed such artists as were at his service, and in the additions he made to the Baths of Caracalla in Rome, and in the churches he restored there, he insisted on the ancient Roman style being carried out in its integrity. "We owe everything," he said, "to the Roman artists." For the new works, however, which he proposed to build in Ravenna, he imported artists from Constantinople with whose work he was well acquainted, having spent part of his life in the Byzantine capital. The palace which he built, and of which a fragment only remains, is an imitation of the golden gateway by Diocletian at Spalato, but in it we find, perhaps, the earliest instance of the large thin bricks or tiles which are so characteristic of Byzantine construction. Judging by the mosaics on the walls of St. Apollinare Nuovo, in which the palace is represented with columns of two dimensions, the general design was Roman. The principal work of his still exists in the great church of St. Apollinare Nuovo, a fine basilican church with twenty-four marble columns, said to have been brought from Constantinople, but more probably procured from one of the Greek quarries by permission of the Emperor. They carry capitals of debased Byzantine work, and have dossierets carved with crosses; the archivolt mouldings of the arches above them are debased Roman. The entablature which takes the place of the impost mouldings of the responds are so Roman in their execution that they might almost have been taken from some ancient edifice. They are

decorated with console brackets alternating with bull's heads. The existing choir and apse are of later date, though the Byzantine influence is shown in the polygonal exterior of the latter.

We now pass on to the Church of St. Vitale, which was built by St. Ecclesius, Bishop of Ravenna, on his return from Constantinople, A.D. 535, the design of which was based on the Church of St. Sergius in that town. Except that, in accordance with native custom, the vaults of the triforium galleries and the central domes are covered with timber roofs (necessitated probably by the difference in climate, and this constitutes the main distinction between Eastern and European domes), the whole construction is so Byzantine that it must have been designed by Greek workmen. Owing to the timber roofs over the triforium galleries it was necessary to raise the hemispherical dome higher than in St. Sergius, so as not to interfere with the eight windows with which it is pierced. Whilst in St. Sergius the lower story of the eight semicircular recesses has columns carrying architraves, in St. Vitale the story is loftier, and there are arches. The capitals of the lower story are of the same peculiar basket type we shall find in St. Mark's, but they are not so fine in execution, which suggests that they were carved on the spot by second-rate Greek artists; whilst those of the latter were probably imported from the East. The capitals of the upper story and those of the choir are identical in their design with examples at Constantinople and in Thessalonica. The vault is constructed, for the sake of lightness, with earthen pots fitted one into the other. This system was adopted in St. Stefano Rotondo, in the outer aisles, which were vaulted, and in other earlier examples in Rome.

The great basilica of St. Apollinare in Classe, three miles from Ravenna, was being erected about the same time, A.D. 535-45. Its capitals are much more clumsy than those of St. Vitale, and although they are based on examples at Thessalonica, the design and execution are due to inferior Greek sculptors. The responds of the nave arches are decorated with ornament in plaster; though clumsy, they are vigorous in treatment, and may have suggested the design of the capitals of the court of the Town hall at Bologna of the fourteenth century. Here and in St. Apollinare Nuovo the soffits of the arches of the nave are decorated with coffers in plaster, which are, I think, of later date,—in fact, sixteenth century work. The archivolt in both churches are in stone, and close copies of Roman work, which suggests that they were worked by native carvers.

The Church of St. Agata is said to date from the fifth century. It is a basilican church, with

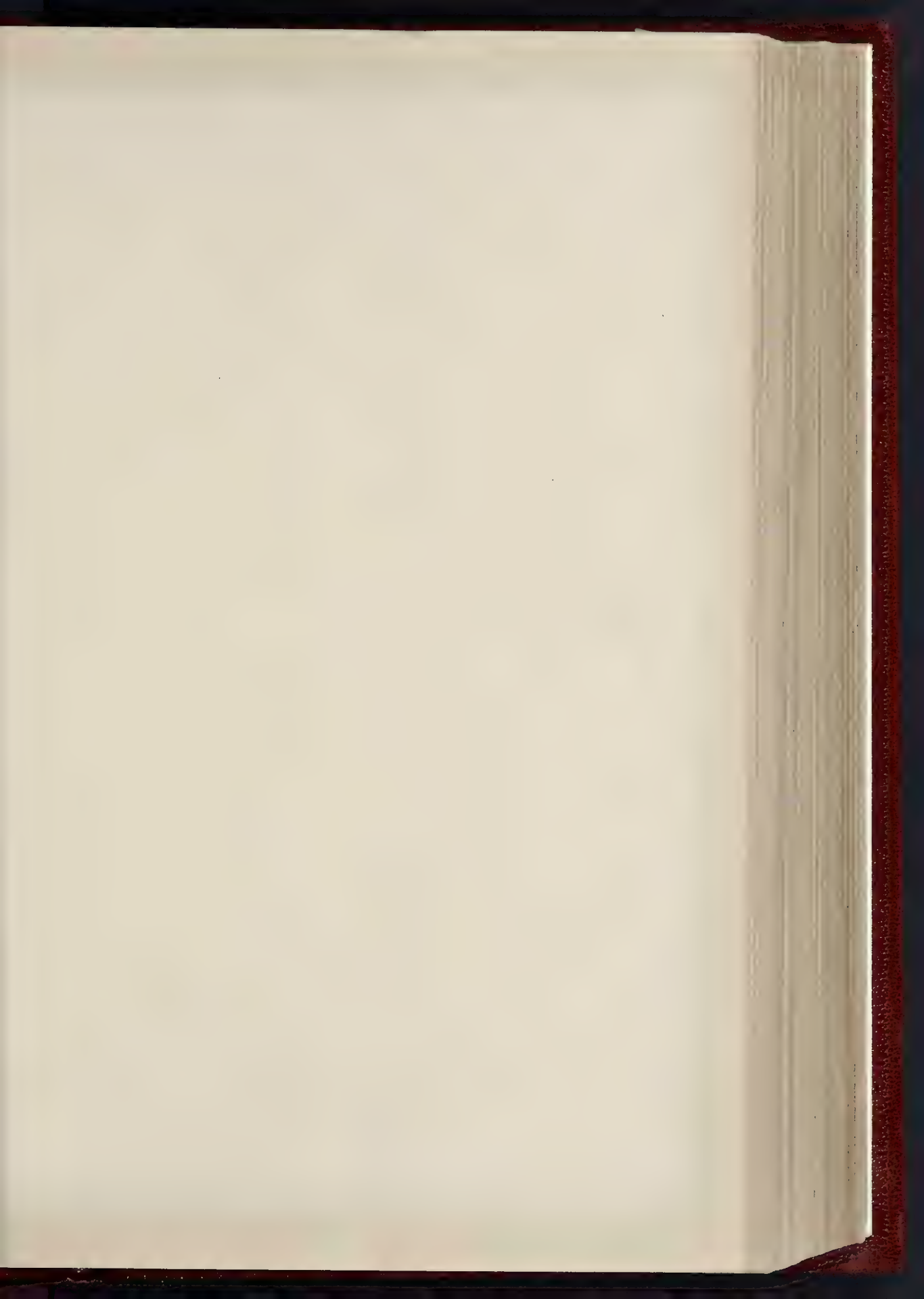


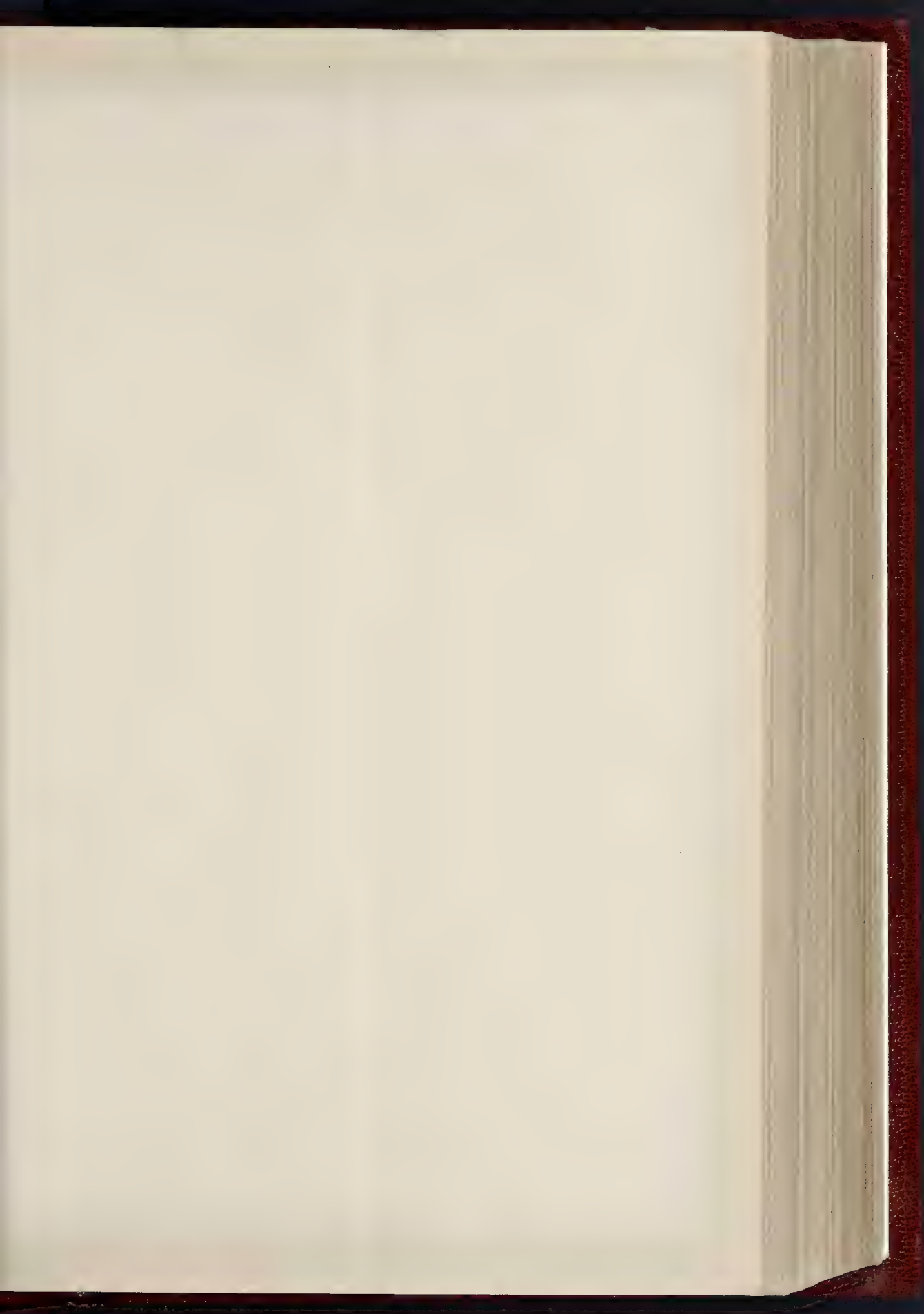
THE BUILDER, JANUARY 21 1893





PRINCIPAL OFFICE, MUTUAL LIFE ASSOCIATION OF AUSTRALASIA, SYDNEY. MESSRS. SELMAN & POWER, ARCHITECTS





PARAPET S' MARK'S VENICE.

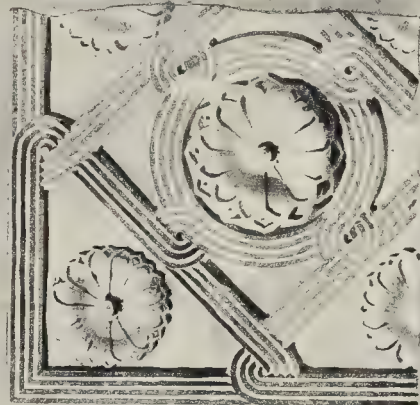
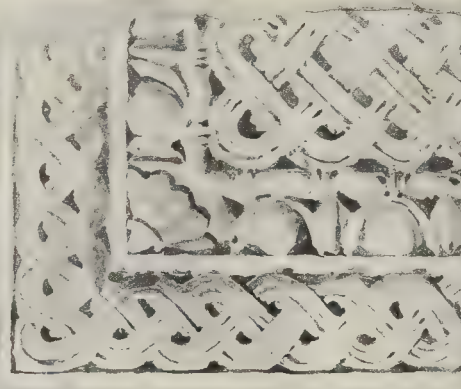


C. 829 A.D.

S' MARK'S VENICE



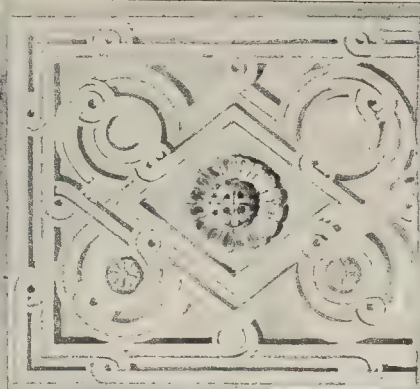
S' CLEMENTE, ROME

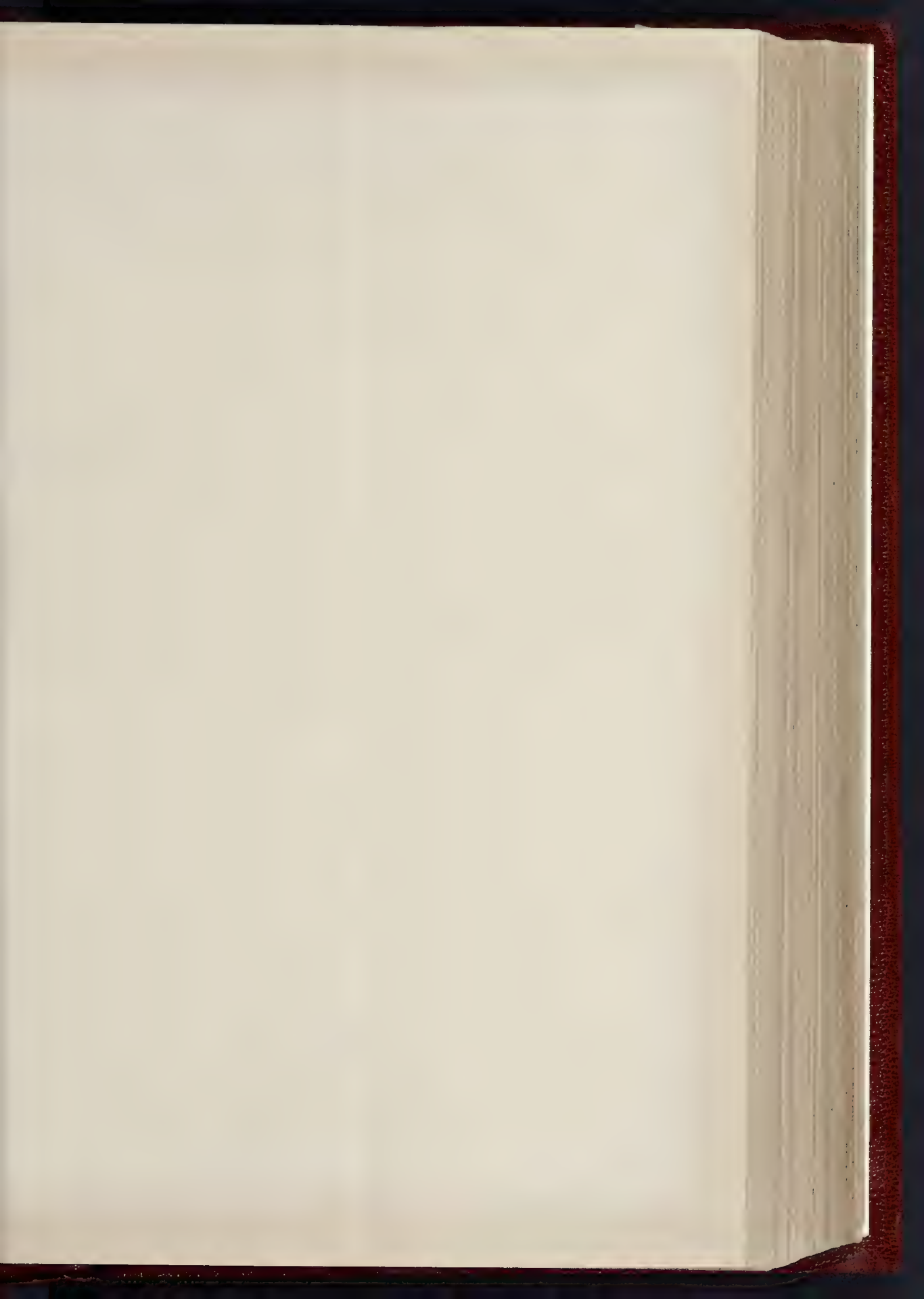


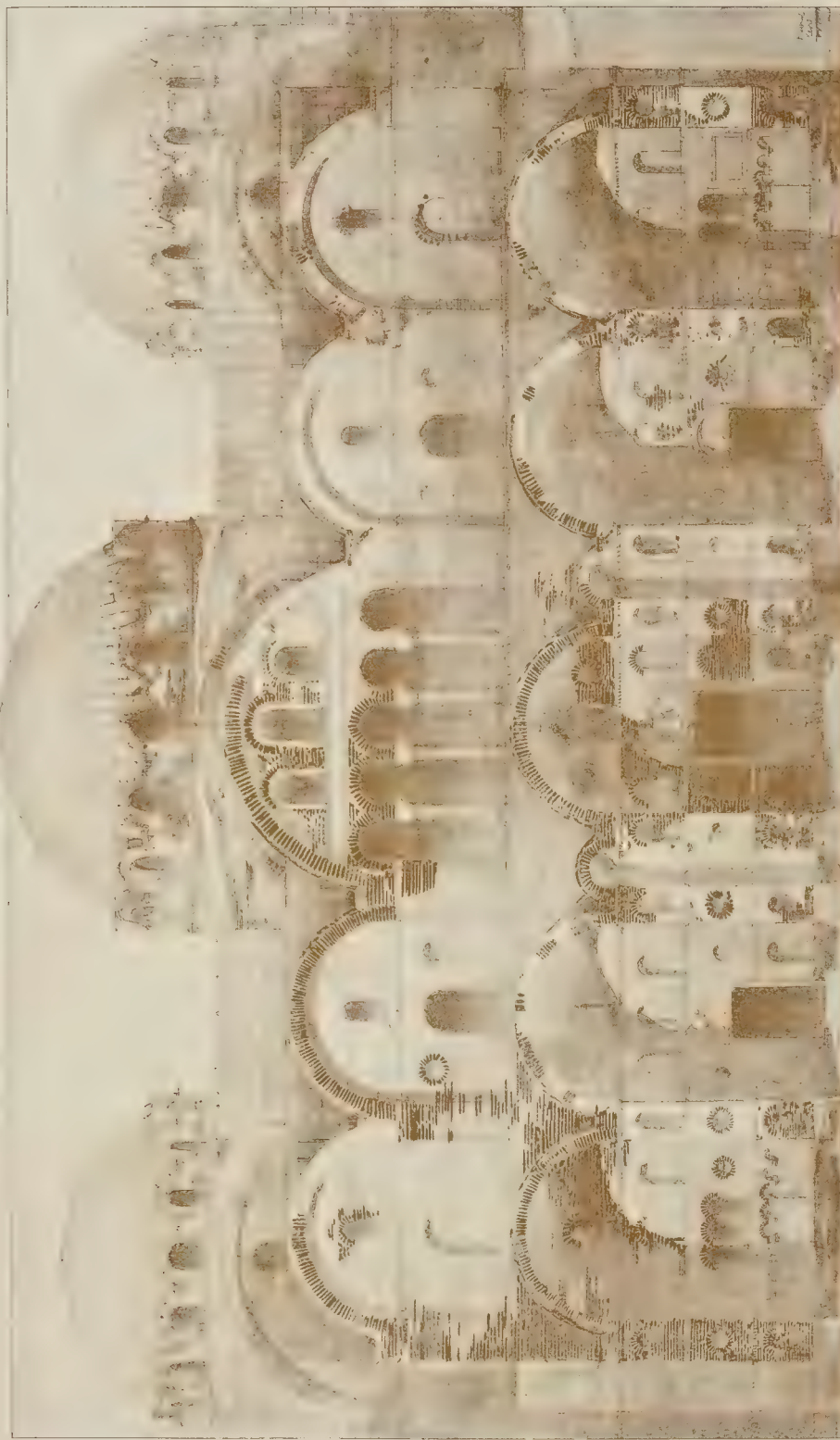
PARAPET. CHURCH OF THEOTOKOS
CONSTANTINOPLE.

CONSTANTINOPLE

ICONOSTASIS S' LUKE'S





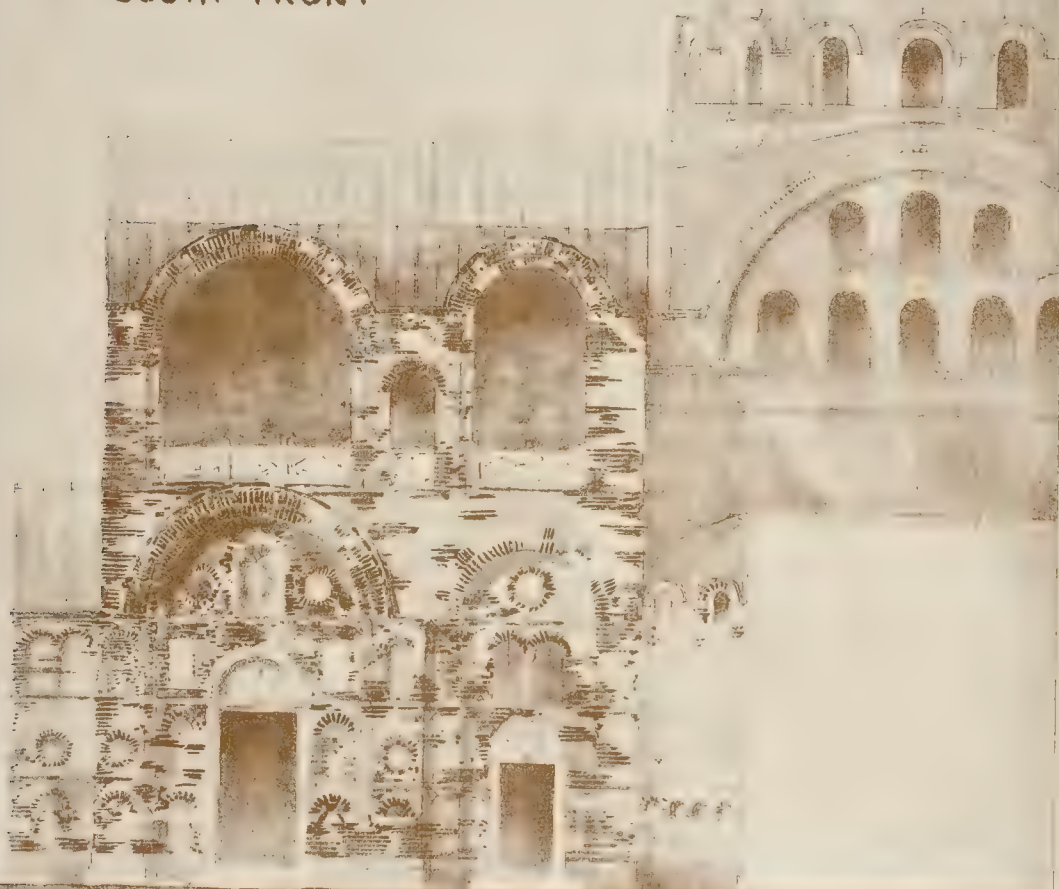


ST MARK'S VENICE. CLOSE OF THE ELEVENTH CENTURY.

ST MARK'S VENICE

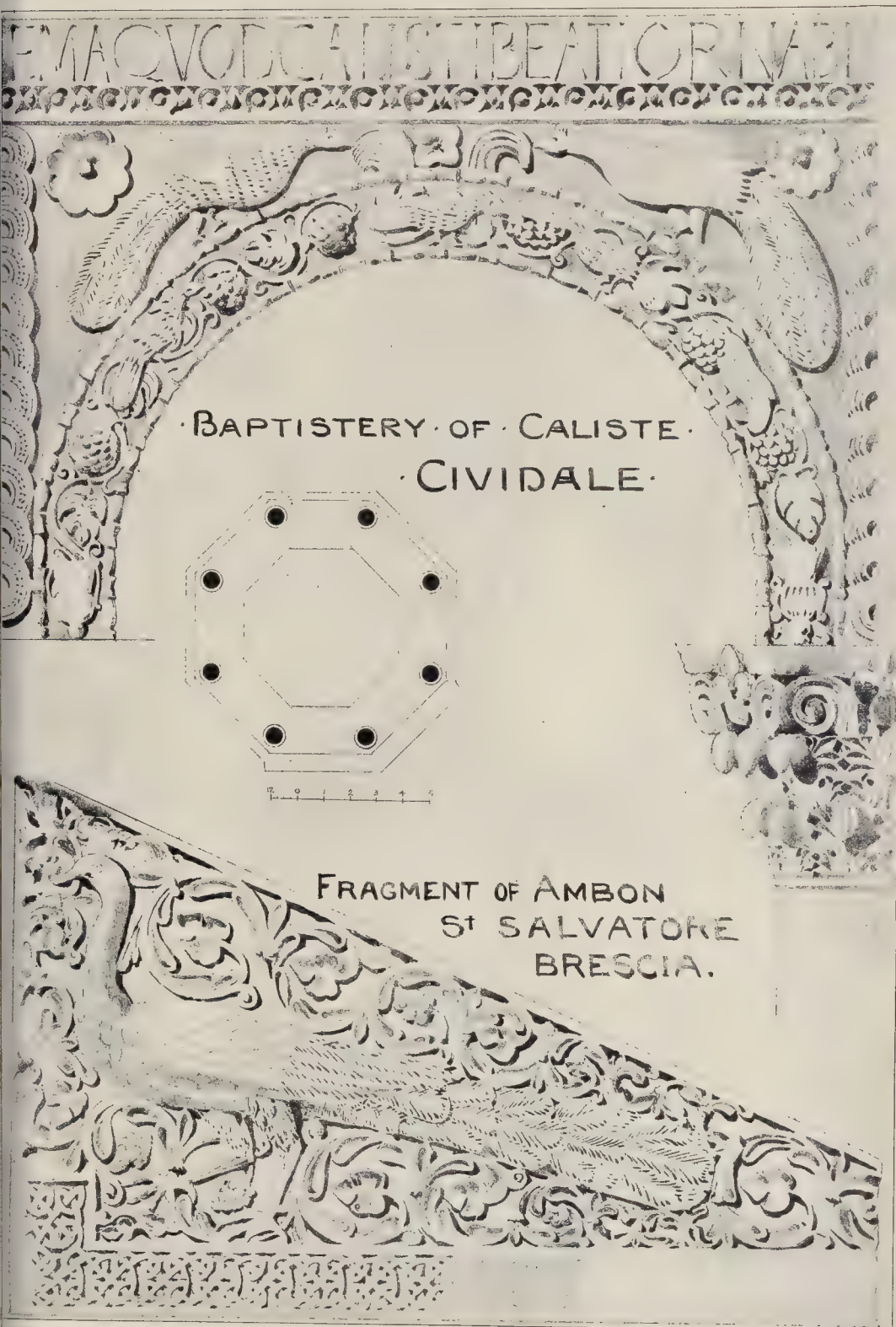
END OF 11TH CENTURY

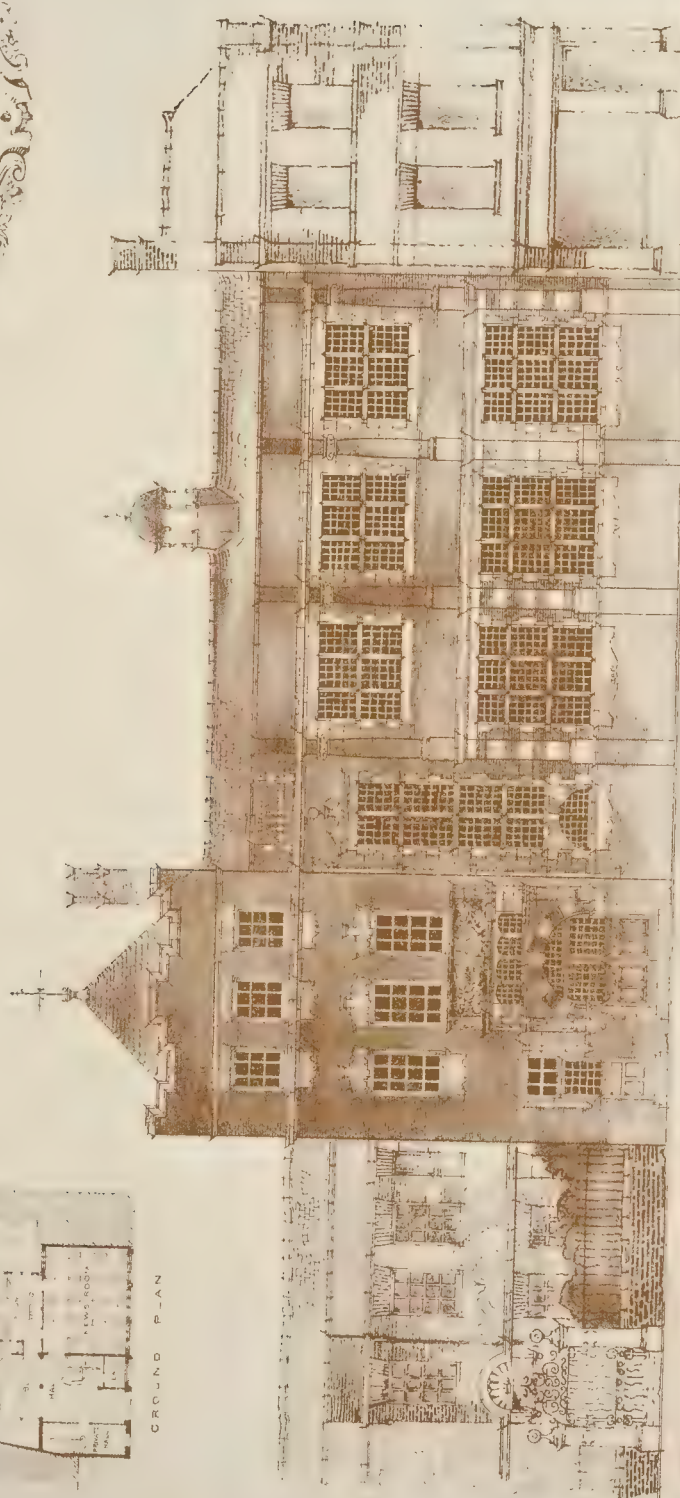
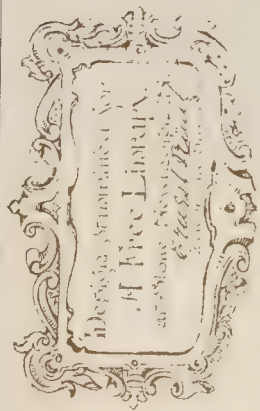
SOUTH FRONT



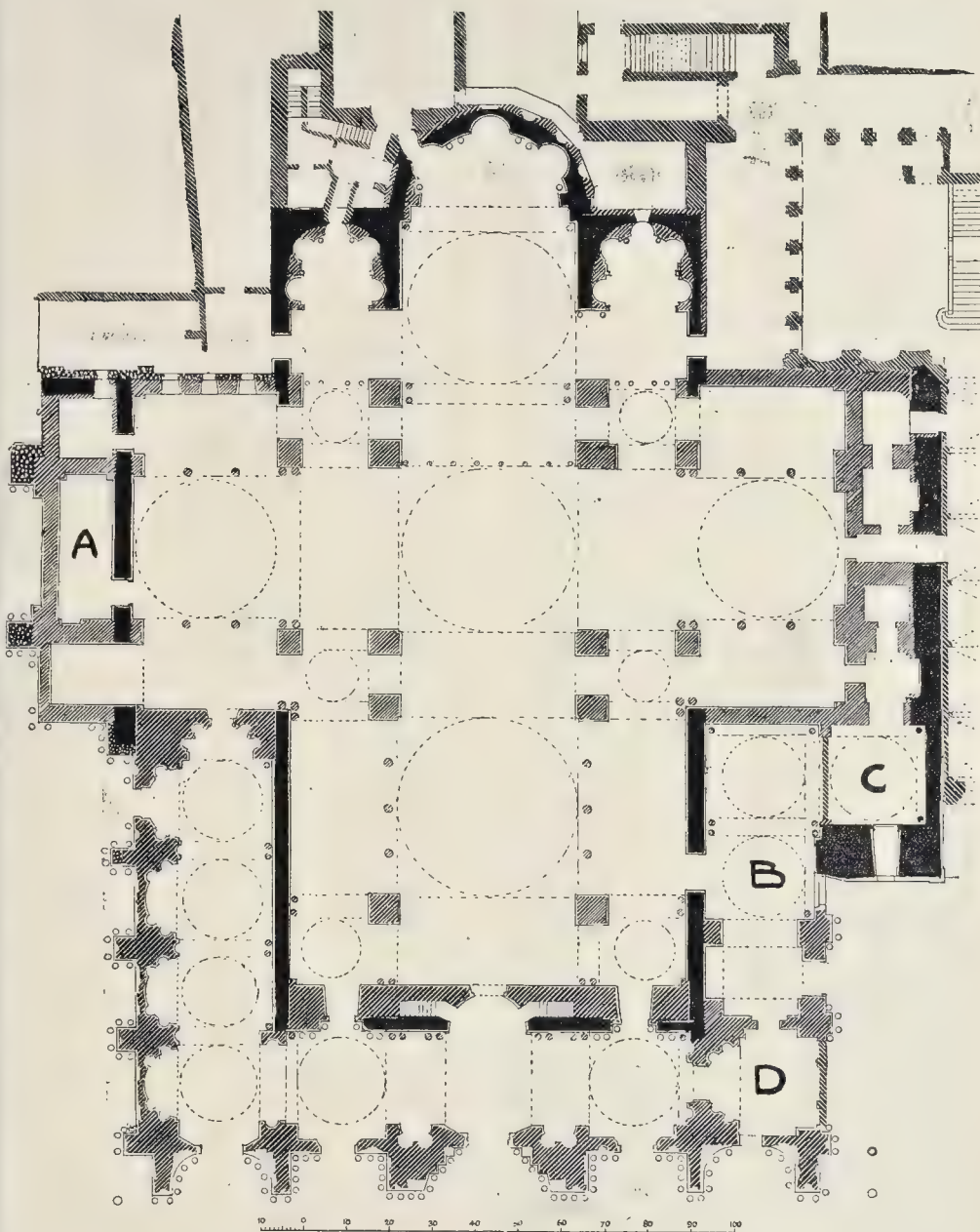
NORTH FRONT OF ATRIUM. ST MARK'S.












Robert Ludlum, F.R.S.E., 1892



Historical Plan of St. Mark's, Venice, distinguishing the different dates of work.—From a Coloured Plan by Mr. R. Phene Spiers.

-  Ancient work prior to 1063.
-  Domenico Contarini, 1063—1071.
-  Decoration (Marbles, Mosaics, &c.), 1100—1330.
-  Work done about 1300.
-  Renaissance.

- A. Chapel of St. Isidore.
- B. Baptistery.
- C. Treasury
- D. Chapel of St. Zeno.

St. Mark's, and partially destroyed it. The new Doge, Pietro Orseolo, commenced at once the restoration of both palace and chapel, but as he retired to a convent within two years, it is scarcely probable that he can have done more than to restore the old church to its primitive form, and there is no record of a continuation of building in succeeding years. It is quite impossible so important a structure as the present St. Mark's could have been erected in so short a space of time, and as long ago as 1859, Selvatico, an Italian antiquary, questioned the accuracy of the tradition, having discovered a document in the archives of Venice stating that Dominico Contarini (1043-71) built the Church of St. Mark's. 1063 is the date accepted by Cattaneo for its commencement, the same year that the rival Republic of Pisa commenced its cathedral. As Contarini became Doge of Venice in 1043, it is probable that long before 1063 the project was in contemplation. For the provision of ways and means there was no difficulty, as the Treasury of Venice was then richly stored, and it was a question of setting forth on some new conquest or building a cathedral; fortunately for us they decided on the latter. Where to place it, however, was another matter. The Church of St. Mark's was built, as I have said, between the Ducal Palace and the Church of St. Theodore, 16 ft. from the former, 32 ft. from the latter. Its west front projected quite as far beyond the Ducal Palace as was thought desirable, and a further extension on the east side would only have increased the church to too great a length. The result of the deliberations would appear to have been—to pull down a portion of the Ducal Palace on one side and the Church of St. Theodore on the other, and to extend the building north and south by the addition of huge transepts. It was here that the Greek architect came in apparently, who showed them, that by following the model of the Church of the Holy Apostles at Constantinople, they would retain portions of the walls, and, without increasing the length, obtain an immense space in the centre. Early records state that the reconstruction was based on the Church of the Apostles at Constantinople; this church, however, was pulled down in 1464 by Mahomed II. to build a mosque on the site, so that we have only the description of this church given by Procopius, the historian of Justinian's time, to go by. Now Procopius states: "In ancient times there was one church dedicated to all the Apostles, but through length of time it had become ruinous and seemed not likely to stand much longer. Justinian took this entirely down, and was careful not only to rebuild it, but to render it more admirable both in size and beauty. He carried out his intention in the following manner: Two lines were drawn in the form of a cross, joining one another in the middle, the upright one pointing to the rising and setting sun, and the cross line towards the north and south wind. These were surrounded by a circuit of walls, and within by columns placed both above and below. About the middle point there is a place set apart, which may not be entered except by the priests, and which is consequently termed the sanctuary. The transepts which lie on each side of this, about the cross-line, are of equal length, but that part of the upright line towards the setting sun is built so much longer than the other part as to form the figure of a cross. That part of the roof which is above the sanctuary is constructed like the middle part of St. Sophia, except that it yields to it in size, for the four arches are suspended and connected with one another in the same fashion; the circular building standing above this is pierced with windows, and the splendid dome which overarches it seems to be suspended in the air. In this manner the middle of the roof is built; but the roof over the four limbs of the church is constructed of the same size as that which I have described over the middle, with this one exception, that the wall underneath the spherical part is not pierced with windows." Now Procopius was not an architect, therefore we must read between the lines of his description, and when he says the church was surrounded within by columns placed both above and below he is evidently referring to the columns of aisles and triforium galleries, as in St. Sophia. If that reading be accepted, then the only differences between St. Mark's and the Church of the Apostles are—first, there is only one range of columns, viz., in the lower story which carries the gallery, and the upper range of column in wall with windows above, as in St. Sophia, is omitted, the windows being in the outer wall above the aisles. Secondly, there are windows at St. Mark's in the four other domes. Thirdly, the galleries were replaced by narrow passages in the thirteenth century. Otherwise, he might have been

describing St. Mark's plan: a Greek cross, with the west end a little longer—dome over the crossing, and four other domes over the limbs, viz., nave, transepts, and choir.

Now I have already pointed out that Participazio's church, restored by Orseolo, was erected between the Church of St. Theodore and the Ducal Palace, 32 ft. from the former, 16 ft. from the latter; and it is here that the late restorations of St. Mark's have been of such value in testing the validity of the new theory. The wall which separates the chapel of St. Isidore from the north transept, when stripped in 1887 of its marble casing, showed a bare surface of bricks, blackened by exposure to the weather, which proved it to be an ancient wall; and, further, a window with stone dressings was found, 9 ft. from the ground, fitted with an interlaced wrought-iron grating on the side of transept, and, on the other side, with the jambs splayed off. This was one of the windows which lighted the south aisle of St. Theodore. The outside of the north wall of nave (now the south side of the north atrium), was exposed in 1885, and it was also found to have been blackened by exposure to the weather, showing it to have been the ancient wall of Participazio's church, 76 ft. long and 26 ft. high. On the south side, the ante of the original narthex were discovered, so that it is fair to assume that the south wall of nave below the baptistery and the south aisle, as also the west wall at back of atrium, are both the ancient walls of the original church. If any further proof were required, I think it would be found in the fact that, where an old wall existed, columns were erected against it to carry the vaulting, as in the atrium and baptistery; whilst on the opposite sides it was carried on the wall.

Cattaneo was of opinion that the early church did not extend to the same length as the present cathedral, basing his theory on the existence of a low crypt on the west side of the present crypt and raised choir. Since his death, however, it has been ascertained that this substructure was not a crypt, but was built to carry the floor of the whole structure, and exists throughout, its object probably being to keep the church dry. It is the sinking in the pockets of the arches of this substructure which has led to the wavy surface of the mosaic floor. I had an opportunity in August last (when portions of the pavement in south transept had been taken up to restore the vaults) of tracing out the lines of the arches crossing the church and of the foundation walls of the original basilica church. The west end of the new crypt, therefore, is the same as that of the old one; how far it extended to the east is still a matter of conjecture, but as Cattaneo himself allows, the length of a chancel, including the apse, usually varies between one-third and two-fifths of that of the central nave, and as that is the actual proportion of the existing chancel, there is fair reason to suppose that the inside walls of the three apses are in the same position as that occupied by the original church.

In the reconstruction of the new church, therefore, there were certain restrictions, firstly, in the width of nave and aisles, the old walls being retained, and, secondly, a limitation in the projection of north and south transepts, as the south wall of St. Theodore and the inner wall of the Ducal Palace were utilised. These limitations have apparently led to a diminution in the diameter of the domes on the north and south transepts, which are 33 ft., as against 42 ft., the diameter of the nave dome, and a similar diminution in the choir dome, so as not to interfere with the central apse. The central dome is egg-shaped, being 42 ft. from north and south, and only 41 ft. from east to west.

Now Contarini died in 1070, and his successor, Domenico Selvo, is said to have commenced the embellishment. It follows that the main structure must have been completed, including the atrium, by that date, and Cattaneo is of opinion that owing to the immense resources they had the task was a possible one; but the structure thus completed bore a very different aspect to the St. Mark's we now see. Externally it was a plain brick building, like the present south transept, its decoration being confined to the brick arches, which with their deep voussours have a certain decorative character,—to small niches with marble shafts and capital to roundels, corbel tables, and stringcourses. I have endeavoured to make a drawing reproducing the original façade, my conception being based, first, on the walls of the existing structure, secondly, on the reproduction given in Ongania's work of those portions of the ancient structure which were exposed and copied by Mr. Scott during the restoration; and on Cattaneo's description. In front of the atrium were five rectangular niches and two small

ones, one on each side of the central niches. The extrados of the arches spanning these niches was exposed and covered with lead, as those of St. Saviour at Constantinople. The piers supporting them were decorated with semi-circular niches with small marble capitals and brick shafts, and roundels and blind niches above. The gables of the upper story, as also of the transepts, were also semi-circular, but at a lower level than those of the existing transept, about 2 ft. 6 in. This accounts for the intended brick circular stringcourse which exists in the south transept, and which originally ran round the coping now raised about 2 ft. 6 in. The existing dome terminals are in timber covered with lead; they were added in the thirteenth century, so that originally the domes were much lower, and the extrados of the arches of the windows were probably exposed, as they are in all Greek churches. I could find no evidence of this, as all the windows have jambs, some of late date, possibly thirteenth century; also the upright portions of the drum have been refaced, and the drums raised. As regards the interior, it is certain that many of the capitals, columns, balustrades, jambs, and hlintels were taken from older structures, and that the original church and that of St. Theodore furnished at least a portion. Examples of all periods are found in the present church, including Roman capitals and those of the fifth century onwards. The decoration of the exterior took two centuries to carry out, not including the fourteenth century florid work of the upper gallery and pinnacles, and every vessel which set out for the East was required to bring back columns, capitals, and marbles of all kinds to enrich the great church, which, in this respect alone, is absolutely unique. There is no example in the East which suggests a precedent for the singular decoration of the exterior of the atrium with rows of columns on two stories, and the only parallel instances I am acquainted with are those of the churches of St. Gilles and of St. Trophime at Arles, of the eleventh century, where columns carrying architraves are set close together with figures between, and here the idea was certainly taken from the Maison Carrée at Nîmes, except that they borrowed the idea of a peristyle for the purposes of a wall decoration. To go through the various portions of the cathedral would be beyond the limits of my paper, and would require two or three evenings instead of one. In 1195 the galleries were reduced in width to give increased light to the aisles and chapels. The great arch outside the chapel of St. Isidore was erected in the thirteenth century. The baptistery was decorated with marbles and mosaics in the fifteenth century, but the columns, capitals, with dossier and vault date from the early structure. The chapel of St. Zeno was originally the entrance to the atrium from the south porch, there being also an entrance in the north porch known as the Porch of Flowers (Porta delle Fiori). The vault of the nave and aisles extends over the west atrium. On the south side two bays project, viz.: over the south porch and the entrance to baptistery, and these formed, according to Cattaneo, open loggias; in the former is a semi-spherical vault intended, doubtless, to be decorated with mosaic. It is an interesting example of brick domical construction of the period. On the north atrium are four chambers all vaulted with domes. All these are parts of Contarini's building.*

Illustrations.

MUTUAL LIFE ASSOCIATION BUILDING, SYDNEY.

THIS is an example of recent street architecture in the capital of New South Wales, but carried out by a firm of whom the leading member is an Englishman, known to many of our readers, who has been practising in Sydney for the last few years. The lithograph is reproduced from a photograph taken from the executed building.

ST. MARK'S, AND BYZANTINE ORNAMENT.

THE elevations of St. Mark's, at Venice, as well as the illustrations of carved ornament, panels, and balustrades on two other plates, form a part of the illustrations to Mr. Spiers's paper at the Architectural Association on the "Influence of Byzantine Art in Italy," and must be taken in

* The remainder of the paper, together with some notes of the discussion and further illustrations, next week.

connexion with that paper, which we are giving in full, with some further illustrations next week.

The elevations of St. Mark, as will be seen, are an attempt to realise the condition of the building before it assumed its resplendent veneer, as one may call it, of marble and mosaic.

DESIGN FOR A SMALL COUNTRY HOUSE.

It was intended to build this house on a site commanding an excellent view. To save expense everything would be simply treated, and, as far as possible, local bricks and tiles would be used.

The design, by Mr. G. C. Horsley, was exhibited at last year's Royal Academy.

STOKE NEWINGTON FREE LIBRARY.

This design was submitted in a limited competition for the above-named building by Mr. Ernest Rüntz, but was not placed, we understand, entirely in consequence of the reference-room being planned upon the first floor. The cost of the building was not to exceed 2,000*l.*, so that great care had to be exercised, considering the large amount of accommodation required at so small a cost. The plan itself is sufficiently explanatory without further description, and the arrangement shown left at the disposal of the Commissioners a large amount of additional ground for future extension.

In designing the elevation an attempt has been made to recall the style of numerous buildings which a generation ago were picturesque features in Church-street, Stoke Newington. It was in this street that Oliver Cromwell once lived; the house he occupied was pulled down some twenty-four years ago. Daniel Defoe also was a resident not far from the site of the library in question, and the house adjoining the main entrance of the library gives some indication of the nature of the buildings which have so rapidly disappeared of late years under the hands of speculative builders.

Simplicity and directness was the aim in the planning as in the elevation; in the latter the disposition of the window openings indicates the portion of the building devoted to the public and that for private purposes.

The drawing from which our illustration was taken was exhibited at the Royal Academy last year.

COMPETITIONS.

NEW CHURCH SCHOOLS, WITTON, NORTH-WICH, CHESHIRE.—About a dozen competitors sent in plans and designs for these schools. The designs were submitted to Mr. Douglas, architect, Chester, as assessor, who found that all of them would exceed in cost the amount named, 2,500*l.* He, however, selected three designs, under the mottoes "Pro Ecclesia," "Cheshire," and "Economy," which he recommended as approaching the nearest to the desired conditions. We understand that the committee have selected the design of "Pro Ecclesia" (by Mr. M. K. Ellerton, architect, Northwich).

ARCHITECTURAL SOCIETIES.

THE ARCHITECTURAL ASSOCIATION (DISCUSSION SECTION).—The fifth meeting for the Session 1892-93 was held at the Rooms of the Association on Wednesday last, when Mr. William Pywell, A.R.I.B.A., read an interesting paper, the subject of which was "The Planning of Hospitals for Infectious Diseases." Mr. P. Gordon Smith, F.R.I.B.A., Architect to the Local Government Board, kindly attended as Special Visitor, amongst others present being Mr. Christopher Harston and Dr. Richards. Mr. S. B. Beale, the Chairman for the Session, occupied the chair; and there was a good attendance of members.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—At a well-attended meeting of this Association a paper was read by Mr. A. T. Bolton, on "Some Elements of Domical Architecture," deduced from a survey of the later churches of the Italian Renaissance. The dome was shown by the author as much the basis of a style of architecture as the vault; the two systems were then compared, and the special qualities of the dome as an architectural element were considered. The lecturer then showed how the dome was modified to suit the existing church plan handed down from the Middle Ages, and illustrated this argument from twelve examples drawn on a uniform scale in plan and section from the cities of Milan, Padua, Ferrara, Venice, &c., the examples

being divided into two types, the domical church and the five dome plan—the former being the result of the use of the dome in a simple plan, and the latter a form complete in itself. Each example was commented upon, and its relative importance explained; and, in conclusion, it was pointed out that domical architecture is not a question of style but of structure in an artistic sense, capable of any treatment in detail, as in Byzantine, Renaissance, and also Romanesque examples as in the new Church of the Sacred Heart at Paris. Attention was also called to the possible use of domical architecture in buildings other than churches.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of the Edinburgh Architectural Association was held on the 11th inst. in the Royal Institution, Princes'-street, Edinburgh, Mr. W. W. Robertson, President, in the chair. After some formal business had been transacted, Professor Baldwin Brown read a paper on "Bronze Doors and their Artistic Treatment." He began with some general remarks upon the subject of design, as illustrated by the principal bronze doors of which art history took account, and in this connexion laid special stress upon the importance of considering the characteristics of different materials and processes as a preliminary to design. Here he described and illustrated, by means of lantern transparencies, a number of famous bronze doors. A classical bronze door he explained to be a copy in bronze of a panelled door in wood. Medieval bronze doors, he showed, fell into three groups—firstly, those found in Saxony; secondly, those found in Southern Italy; and, thirdly, those met with in Tuscany. The first two groups belonged to the eleventh and twelfth centuries; whilst the third group belonged to the centuries from the thirteenth till the sixteenth. Views of characteristic examples of all three groups were afterwards thrown upon the screen, and their salient features pointed out. At the close, Professor Baldwin Brown was cordially thanked for his paper.

GLASGOW ARCHITECTURAL ASSOCIATION.—At a meeting of the Glasgow Architectural Association held on the 16th inst. Mr. H. C. Shelley read a paper on "Some Scottish Castles." Mr. Campbell Douglas, the President, occupied the chair. Mr. Shelley dealt with about twenty of the castellated structures, situated chiefly in the western district of Scotland, which illustrated the various styles of structure which had prevailed since the twelfth century.

LONDON COUNTY COUNCIL.

The first meeting of this Council after the Christmas recess was held on Tuesday afternoon last at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

The Comptrollership.—The General Purposes Committee presented a long report in reference to the office of Comptroller, rendered vacant by the resignation of Mr. Gunn through ill-health.* The report detailed the work at present carried on by the Comptroller's department. As showing the responsibility attached to the office of Comptroller, the report pointed out that the expenditure which he supervised annually amounted to nearly 3,000,000*l.*, that the gross debt of the Council amounted to 30,000,000*l.*, and that the money passing through the Consolidated Loans Fund exceeded 2,000,000*l.* The Committee recommended that the salary of the Comptroller be fixed at 1,500*l.* a year, and that the Council advertise the post.

The Rev. Fleming Williams moved, as an amendment, that the salary offered should be 1,000*l.*, rising by annual increments of 50*l.* to 1,200*l.*

A long discussion followed, and on a division the amendment was rejected by 54 votes to 47.

Mr. Burns, M.P., then moved, as a further amendment,

"That some member of the existing staff be promoted to the office of Comptroller, and that it be referred to the General Purposes Committee to recommend the officer who should be appointed, and the salary which he should receive."

Mr. Torr opposed the amendment, contending that the proper course was to advertise the vacancy, and those engaged in the department being eligible applicants, they would thereby secure the best man.

On a division, the amendment was rejected by 53 to 39, and the report of the Committee was then adopted.

Hackney to Holloway Storm Relief Sewer.—The following paragraph and recommendation

appeared in the Main Drainage Committee's Report:—

"On the 28th of June last the Council directed the preparation of detailed plans of the proposed extension of the Hackney to Holloway storm relief sewer from Hackney station to Sandringham-road. The Engineer has now presented to us the drawings of the proposed extension, and he has further by our direction had the specification and quantities for the work prepared. We are of opinion that this work should be executed with as little delay as possible, and as we understand that the Works Committee are at this moment fully occupied, we recommend—

"That, subject to an estimate being submitted to the Council by the Finance Committee when tenders are received, an advertisement be issued inviting tenders for the work."

The consideration of this matter was postponed for a week.

Dismissal of a District Surveyor.—The Building Act Committee submitted the following special report, dated December 19, 1892:—

"We have to report that Mr. Henry Parsons, District Surveyor for Lambeth (South) and part of Camberwell, was convicted by the magistrate sitting at the Lambeth Police Court on September 9, 1892, of having, with intent to defraud, travelled on the London and South Western Railway on June 28 and 29 last without having previously paid his fare. He was fined 2*l.* and ordered to pay 5*s.* costs in each case." Having carefully considered all the facts laid before us, and seen Mr. Parsons and his solicitor, we regret to feel that we have no other course open to us than to recommend the Council to dismiss Mr. Parsons from his office. We recommend accordingly.

* That Mr. Henry Parsons be dismissed from the office of District Surveyor of the southern division of Lambeth and part of Camberwell."

The recommendation was unanimously agreed to, without discussion.

After transacting other business, the Council adjourned at 7 o'clock.

Correspondence.

To the Editor of THE BUILDER.

THE NEW RAILWAY RATES.

SIR.—You will, we feel sure, permit the pages of your journal to be open for protest against the monstrous charges now imposed upon us in our particular branch of the building trade. As an instance of the unjust and unreasonable advance in these rates, we may refer to a communication from a London customer where the rate has been increased from 8*s.* per ton to 18*s.* 6*d.*

We do not think anything has exceeded this in any of the rates cited by the many correspondents in the daily papers. However, in addition to this we are informed by the railway agent that in future fourteen cubic feet of Portland stone is to be reckoned a ton instead of 16*ft.* as heretofore. This is ruinous and ought not to be tolerated, and everyone interested in the building trade should protest in the strongest manner possible against it. We hope our claims to consideration will be fully represented at the proposed conference shortly to take place at the Mansion House, which we understand is to be held with the view of ascertaining the effect of the new rates on the trade of the country. The rate for Portland stone to London and neighbourhood has always been too high, and the reason of it may be supposed to be the result of one company having well nigh the sole monopoly. However, when large consignments are threatened to go by water they quickly make concessions and quote a special rate. This, Sir, we submit is not fair to London contractors generally, many of whom may be during the same time taking quite as large a quantity though possibly not for one job. Such an arrangement certainly gives the man with the special rate considerable advantage over his less fortunate brethren in the trade.

We had hoped that these new arrangements would have been beneficial to trading and commerce generally. However, we now feel pretty certain that such a storm will be raised in opposition to them as will lead to a much more satisfactory result.

WEBBER & PANGBORNE.

Easton Steam Saw Mills and Masonry Works,
Portland.

ST. GEORGE'S HALL, LIVERPOOL.

SIR.—Let me correct another slight error in Mr. Goodchild's letter. The organ exhibited by Mr. Willis at the Exhibition of 1851 was transferred, not to Liverpool, but to Winchester Cathedral, where it still remains practically unaltered, save by the addition of mechanical blowing.

The magnificent instrument in St. George's Hall is entirely the design of Mr. Willis and the late Dr. Wesley. It has been slightly altered, and re-tuned

* See Builder for October 8 last, p. 285.

* See Builder for October 1, 1892, p. 259.

to the "equal temperament"; and, in the opinion of many competent judges, is still the finest instrument we possess. On my last visit a few months ago, the organ concert seemed as popular as ever.

VIATOR.

*** Mr. Goodchild's statement escaped our notice, or we should have corrected it. We quite concur with our correspondent in his estimate of the instrument, the finest modern large organ in England.—ED.

THE STUDENT'S COLUMN.—Owing to pressure upon our space this week, we are obliged to hold over the third instalment of the "Student's Column." We will give a double instalment next week.

GENERAL BUILDING NEWS.

NEW WING, BOARD SCHOOL, SHEFFIELD.—On the 9th inst. a new wing in connexion with the Derbyshire-lane Board School, Norton, Sheffield, was opened by Mr. E. M. E. Welby. The new wing will seat 250 children, and the whole school has accommodation for 500 scholars. The school was originally a mixed one, but now it has been divided into separate departments for boys, girls, and infants. Building operations were commenced last June. Mr. T. H. Wilson, of Sheffield, was the architect, and the contractors for the building and joinery were respectively Messrs. H. Harrison and J. Benson, of Greenhill. The entire cost of the extension is 2,407l. 15s. 6d.

RESTORATION OF CHACEWATER CHURCH, CORNWALL.—The Church of St. Paul, Chacewater, was re-opened on the 20th ult., after undergoing restoration. The old church was erected, says the *Western Morning News*, sixty-five years ago, and it consisted of a parallelogram 90 ft. long and 53 ft. wide, exclusively of the western tower, and a small eastern projection 15 ft. wide, and only 7 ft. deep, which formed a chancel, whilst a narrow projection of 13 ft. in the middle of the north and south walls did duty as transepts. The tower at the west end opened into the church by a lofty arch, and vestries were formed by two erections of wood at the east-end of the aisles. The new building consists of nave and chancel, with north and south aisles to both, and the old western tower has been retained to do duty until something better can be provided. The nave is 62 ft. long and 24 ft. wide, the total length being 110 ft. and the extreme width 53 ft. The enclosing walls of the old church were no less than 30 ft. high, and were pierced by two tiers of windows with wooden frames above and below the galleries. The north and south walls have been lowered to the height of 14 ft., the window openings being retained and new granite three-light windows with cusped heads inserted. These walls are connected with the new clearstory walls over the new arcades by a lean-to roof, thus forming north and south aisles. New foundations had to be provided for these arcades. The arcades are of local granite, except the shafts of the piers, which are of Polyphant stone. The clearstory walls are built of the old stone from the upper part of the original walls, and are pierced by one light cusped-headed windows of Polyphant stone. Above, at a height of 31 ft. from the floor, the wall plates carry an open barrel roof of the old Cornish type. The fifth bay of the arcades is included in the chancel, and separated from the nave by a low screen of granite and Polyphant stone, the roof above being boarded and panelled. The shallow east end projection has been formed into a sanctuary, and opens into the chancel by a granite and Polyphant arch, the roof being covered within and covered externally with red tiles, the rest of the church being covered with blue slates. The east window is the old east window of the parish church of St. Mary, Truro, and has been given to the parish of Chacewater by the rector and vestry of the new Cathedral Church. It is executed in Portland stone with five lights, and its old stained glass, executed early in the present century by Warrington, has been restored by Messrs. Fermiloe, of London. The rest of the glazing has been carried out by Messrs. Solomon, of Truro. The interior of the church has been pointed throughout. The tower remains in its original state structurally, but the old wooden windows have given place to the new traceried windows of granite or Polyphant stone. The seating throughout is new, the nave seating being of red deal, not stained, with traceried ends. The chancel seats are of oak, and were executed by Ransleigh, Pivwell & Co., of Plymouth. The pulpit is composed of various coloured serpentine marbles. The lectern is of oak, and consists of a large figure of St. Paul. It was executed by Mr. Harry Hems, of Exeter. The new oak altar is divided in front into three panels, of segmental arch enclosing three panels, the middle panel containing a cross. The contractor for the whole work is Mr. W. H. Moyle, of Chacewater. The church has been heated by Messrs. Longbottom. The sub-contractor for the masonry work was Mr. John Odgers, of Redruth. The granite work was supplied by the Granite Company at Carnmarth, and the Polyphant stone by Mr. Nicholls, of Poly-

phant, near Launceston. The architect for the reconstruction was Mr. Edmund Sedding, of Plymouth.

PROPOSED MUNICIPAL BUILDINGS FOR CREWE.—At a meeting of the members of the Crewe Town Council on the 18th inst., it was decided to purchase the Foresters Arms Hotel and an adjoining shop in Earle-street, from the North Cheshire Brewery Company, to provide a site for the erection of new municipal buildings. The acquisition of this property will give the Corporation a complete block of buildings contiguous to the Market Hall, Corn Exchange, and Fire Station; and it is contemplated to provide, besides Corporation offices, a technical school.

PROPOSED NEW POLICE OFFICE AT GLASGOW.—According to the *Scotsman*, operations are about to commence for the erection of a new police station for the southern district of Glasgow. A site has been secured at the corner of Nicholson-street and Oxford-street, and designs for the building have been prepared by Mr. A. B. McDonald, the City Engineer. Outwardly, the Italian style of architecture has been adopted, and the white freestone of Giffnock quarries will be used in the construction of the walls. To Nicholson-street the elevation will be three stories in height, and to Oxford-street two stories; but as the court-room, with a lofty roof, is to be situated on the upper story in the latter street, the height of the exterior of the building will be nearly the same all over. There will be fifty-five cells, giving accommodation for 160 prisoners, and also the usual rooms for the police officials of the district. A part of the building will be utilised as barracks for thirty men, consisting of kitchen, mess-room, and recreation room, and a separate bed-room for each man. In the rear of the buildings there will be a large open quadrangle for drilling the men, with a commodious muster-hall on one side of it. The offices of the Lighting Department and of the collector of police rates for the district will be situated in the building. It is estimated that the total cost will be about 25,000l., and it is expected that the new station will be ready for occupation in two years.

RE-OPENING OF BATHS, EDINBURGH.—On the 18th inst., the re-opening of Drumshugh Baths, Lynedoch-place, took place, the reconstruction of which was rendered necessary by the destruction of the original buildings by fire about a year ago. As originally planned the building was adapted for the purpose in view, and in the work of reconstruction the architect, Mr. Burnett, of Glasgow, followed the design proceeded upon in the first instance. Special attention, it is stated, has been devoted to the planning and fitting up of the part of the establishment devoted to the Turkish bath, and to the ventilation of the heated chambers. The swimming-bath is 70 ft. long and 35 ft. broad, with a depth of water of from 2 ft. 6 in. to 7 ft. The hall in which the bath is constructed is a lofty apartment, and one side of it is fitted up as a gymnasium, with suitable appliances.

NEWPORT (MON.).—On the 8th inst. a large congregation assembled at the Catholic church of St. Michael the Archangel, Pill, to celebrate the erection of the new tower, spire, and belfry. The church itself was opened about five years ago. The new ring of eight tubular bells are on Harrington's patent, and are worked on the keyboard system. The new structures are of Gothic design. The tower stands at the south-west of the church, facing Clarence-street. To the height of 30 ft. the base is of Penryn stone, with Bath stone dressings. The new portion is entirely of Bath stone. Its first tier is formed of moulded strings and traceried panels. At each angle of the tower rises an octagonal turret, the spire is octagonal, and rises on four sides from the embattlements of the tower; on the other side it springs from arches turned over at angles of the tower. Mr. W. B. Gardner was the architect, and Mr. Lewis Hall (Maindee) the contractor.

SANITARY AND ENGINEERING NEWS.

WATER SUPPLY, PENISTONE.—On the 9th inst. a Local Government Board inquiry was held at Penistone by Rensil Walton, Esq., M.L.C.E., to consider an application from the Local Board to borrow 3,000l. for waterworks purposes. The Penistone Local Board have a very good well yielding a large supply of water, but their pumping machinery is insufficient and ineffective. It is proposed to put down an additional boiler with pumping house and pumps to raise 30,000 gallons an hour a lift of 300 feet. The well had been tested and found to yield over 400,000 gallons a day. When the pumps were working there was still 17 ft. of water in the well. The pumps would provide for raising about 100 million gallons of water a year, including 40 million gallons which it is proposed to sell to Darton. Mr. W. H. Radford, of Nottingham, is the engineer to the scheme.

WATER SUPPLY, BROXBORNE AND WORMLEY.—We are informed that Messrs. Bailey-Denton, Son, & North have been instructed by the Guardians of the Ware Union to prepare plans and specifications for the water supply of Broxbourne and Wormley, Herts. The supply of water is to be obtained from the chain of reservoirs in the Forest of Bowland, and a storage reservoir for the use of the combined district is to be made in the parish of Broxbourne.

LEIGHTON BUZZARD WATERWORKS AND SEWERAGE.—An inquiry was conducted at the

Leighton Corn Exchange on Thursday, the 9th inst., by Mr. F. H. Tulloch, one of the Inspectors of the Local Government Board, with regard to the Local Board's application to borrow 20,000l. for the purposes of sewerage, sewage disposal, and water supply. A comprehensive account of the scheme was furnished by the Engineer, Mr. H. Bennett Nichols, C.E., of Birmingham, who gave evidence in support of the application. In the water supply scheme it is proposed to obtain pressure over the town from a water tower. A well and boring has been sunk into the lower greensand and an adequate supply of water has been met with of excellent quality. The sewerage scheme is partly on the "Shone" system, and the sewage purification is proposed to be on the international process, combined with land filtration. The estimate for the water works is 8,000l., and for the sewerage and sewage disposal works, 12,000l. On the termination of the inquiry the Inspector, accompanied by the Chairman and the Engineer, visited the various sites for water supply and sewerage purposes.

STAINED GLASS AND DECORATION.

WINDOW, CONGREGATIONAL CHURCH, OSSETT, YORKSHIRE.—Four large stained-glass windows have been placed in the Congregational Church, Ossett, by Messrs. Paul, of Birmingham, who gave evidence in support of the application. In the water supply scheme it is proposed to obtain pressure over the town from a water tower. A well and boring has been sunk into the lower greensand and an adequate supply of water has been met with of excellent quality. The sewerage scheme is partly on the "Shone" system, and the sewage purification is proposed to be on the international process, combined with land filtration. The estimate for the water works is 8,000l., and for the sewerage and sewage disposal works, 12,000l. On the termination of the inquiry the Inspector, accompanied by the Chairman and the Engineer, visited the various sites for water supply and sewerage purposes.

WINDOW, UPTON PYNE CHURCH, DEVONSHIRE.—A stained-glass window has been unveiled in Upton Pyne Church, near Exeter, to the memory of the late Rev. Charles Stafford Northcote. The subject represented is our Lord blessing little children. The ornamental mounting of the main picture is in accordance with the architectural period of the building. The window is in design and execution the work of Mr. Frederick Drake, of Exeter.

MEMORIAL WINDOW, ST. PAUL'S CHURCH, HEATON MOOR.—A stained two-light memorial window has just been placed in the north nave of St. Paul's Church, Heaton Moor, to the memory of Esther Ann Gough. The subjects treated are Christ's injunction to Peter, "Feed My Lambs," and Christ's appearance to Mary after the Crucifixion. The work has been executed by Messrs. Thomason, of Manchester.

FOREIGN AND COLONIAL.

FRANCE.—The "Société des Femmes Artistes," which must not be confounded with the "Société des Femmes Peintres et Sculpteurs," opens its exhibition on Friday this week, at the Georges Petit Gallery.—M. Emile Soldi, sculptor, has executed a fine medal which has been offered by the Government to the Association of Students of Paris.—A retrospective exhibition of the works of Meissonnier is being organised, which will probably be held after the sale of those of his works which are to be sold. It will include not only the master's well-known works, but a number of studies, sketches, and wax models, which have never been exhibited.—The Minister of Public Instruction has granted the use of the large galleries of the Ecole des Beaux-Arts to the Association of Parisian Journalists, for an exhibition in May next of portraits of eminent writers and journalists of the day.—The new Telephone building in the Rue Gutenberg is finished this week, but will not be furnished and ready for use before July. The building itself has so far cost 800,000fr., and the telephone and other fittings will probably cost a million.—The remains of an ancient Gallo-Roman cemetery have been discovered at Argenteuil; jewels and funeral vases have been found among the remains.—Some fresco-paintings have been discovered in the church at Verneuil (Eure), of the fourteenth century. They represent the legend of the "Trois Morts a Trois Vifs," which figured also on the sculptured portal of the ancient church of the Innocents at Paris. The legend is contained in some old MSS. in the Bibliothèque de l'Arsenal.—M. Trabucchi, the sculptor, is about to bring an action against the corporation of Nice, which accepted his design for a monument to Garibaldi, and has now thrown it over in favour of a model by M. Etex.

BERLIN.—Anton von Werner, who had resigned the presidency of the "Berliner Künstler Verein," has been re-elected with 155 votes, against the 125 which were given to Karl Becker, the President of the Prussian Royal Academy. The "Verein" was to have had the sole management of the future Berlin Art Exhibitions, but, owing to the society having been the scene of much unpleasant controversy, the Emperor will now not vest this responsibility entirely in the society, and will probably have the future exhibitions managed jointly by the Royal Academy and the "Verein."—A German Lutheran church is to be erected at Rome. Voluntary contributions have already brought together about 5,500l., but this sum scarcely covers the cost of the site and the incidental expenses attached to the purchase of the building property, which will cost 17,000l. The Government does not favour the scheme, out of courtesy to the Vatican.—Herr Rudolf Speer, the Master of the Royal Arts and Crafts Museum Schools, died at the early

age of forty-four. As an architect he was known as a member of the firm of high standing. Messrs. Schmieden and Speer, late Gropius and Schmieden. As a master he was much esteemed throughout Germany. After much discussion as to the advisability of having an International Exhibition it has now been apparently decided that Berlin is only to have a National Exhibition of Industries. It is probable that the exhibition will be held in 1896.

BERNE.—The Federal Council of Berne has decided to build a large new central station at Lucerne for the Swiss Central Railway, the St. Gothard Railway, the North Eastern, and the Simplon Railways. The cost of the building is estimated at nine million francs.

BUILDING AFFAIRS IN CHICAGO.—We learn from an American paper (the *Inquirer* of Philadelphia) that for some weeks the sub-committee of Chicago Councils which had that branch of the public business in hand has been consulting with architects and builders with a view to determining the exact height to which buildings could be reared without danger to the occupants. If reports are to be believed, the committee have gone far enough to warrant them in reaching the conclusion that hereafter no buildings shall be erected which shall be higher than twelve stories, or 160 ft. Several other reforms will be embodied in the code which the committee has been at work on the question. No building inspectors will hereafter be appointed who have not served ten years in one of the building trades. They will not be appointed then until after they have passed an examination before a committee of three, representing the Builders and Traders' Exchange, the Institute of Architects, and the Buildings Trades Councils respectively. This committee will serve without pay.

MISCELLANEOUS.

SOCIETY OF ANTIQUARIES.—At the meeting of the Society of Antiquaries on Thursday, January 12th, it was proposed by Sir John Evans, K.C.B., V.P., seconded by Sir J. C. Robinson, and carried *unanimously*: "That having regard to the fact that the window in the north transept of the cathedral church of Lichfield which has been destroyed was one of the most considerable and conspicuous of Bishop Hackett's works, and also the fact, as stated in Mr. Pearson's report issued by the Dean and Chapter, that it is proposed to lay out 5,000l. on raising the roofs put on the church by Bishop Hackett, though it would seem that the timbers are in sound and good condition, and it is only the slate covering that is out of repair, the Society of Antiquaries fails to see on what grounds the Dean of Lichfield asserts 'that there is scarcely any approximation to truth in either' of the statements contained in the resolution passed at the meeting of the Society on December 1st, and this meeting adheres to the opinion the society has already expressed."

ACCRINGTON TECHNICAL SCHOOL.—Mr. Morley, the architect of the design illustrated last week, encloses us a letter from Mr. Ross, of Accrington, requesting the correction of the statement that this is the "accepted" design. The circumstances, which we had forgotten at the moment, were explained in a letter from Messrs. Morley & Woodhouse, printed in our issue of October 15, 1892 (page 204). The assessor selected Messrs. Morley & Woodhouse's plans and they received the first premium, but the Committee threw over the assessor's award and commissioned the winner of the second premium, a local architect, "to prepare new plans for their consideration." The (unintentional) mistake was rather ours than Mr. Morley's; we should have said "First premiated design."

SUSPENSION BRIDGE OVER THE INDUS.—A frontier correspondent says that the most wonderful bridge on the Gilgit-road is the suspension bridge known by Captain Aylmer over the Indus at the mouth of the permanent structure now building. The span is some 350 ft., and the materials used are nothing but telegraph wire, wood, and a few crows. Irons are let into the rock and used to fasten the stays. It is the most startling structure to come across in the gorge of the Indus. The gallant constructor used to ride over it, but less enterprising mortals walk and admire the really extraordinary ingenuity displayed in the construction. Seen from a slight distance it seems to hang suspended in the air like a shomoh's coffin, so delicate do the ropes of telegraph wire which support it seem; when one is close looks, with its numerous stays of wire fastened to stumps up and down the banks, as if it were a giant spider's web.—*The Indian Engineer*.

THE ELECTRIC LIGHTING OF OMNIBUSES.—The Bristol Electric Safety Lamp Company are carrying out the electric lighting of omnibuses for the London General Omnibus Company. The battery weighs about eight pounds, and is placed in a wooden box under one of the seats. The box is provided with a brass spring terminals which make automatic contact with the battery when it is let down into the box. The lamp is of a special manufacture, and is made as small as possible to allow of it being placed in the centre of the roof, and for the same reason is incandescent lamp is suspended horizontally instead of vertically. By this arrangement a maximum amount of light is obtained and risk of damage is avoided. About seventy vehicles have been lighted up to the present time, and one hun-

dred and forty will be finished by the end of the year.

THE BELGIAN DRAUGHT HORSE.—A report, with a number of illustrations, on Belgian draught horses, by the American Consul at Brussels, has (says the *Times*) lately been published by the Department of State at Washington. As builders and contractors are large employers of horses, the subject will be of interest to many of our readers. There are, it seems, two pure breeds of horses in Belgium—the Ardennes horse, from the Valley of the Meuse, and the Frisian, from the sea coast. The Brabant horse is the issue of the two. These form the three main breeds of draught horses, and great care has been given to their breeding, and, with the exception of the English Shire horse, they are the largest draught horses in the world, being fine proportioned and with excellent legs and feet. The Ardennes horse is an excellent type of a light draught horse, and is perfectly adapted for mountainous regions. It is, however, rapidly disappearing, as the Luxemburg farmers prefer the heavy draught horse, and the introduction of large heavy stallions from Brabant and Hainaut has almost completely transformed the breed. For some years much attention has been devoted to the improvement of the Brabant horse. The line of the back is now much straighter, the hind part longer, the neck and shoulders more proportionate, and the legs large and clean. Harnessed to the heavy carts of the country, which weigh about 3,000 lbs., it will pull on the level a weight of from 6,000 lbs. to 10,000 lbs., and will work from eight to ten hours daily. It is considered the best draught breed in the kingdom, and is absorbing all the others. The recent exhibitions prove that there are now no distinctly pure breeds in sufficient numbers to form classes by themselves, and that for practical purposes there are only heavy and light draught horses. The special characteristics of the former are stature, form, strength, and breed. They have less bulk and strength than the Clydesdale or Shire horse, but they are better bred and have more energy. They have more bulk and strength than either the Percheron or Boulonnais horse, with quite as much energy. At one time the Government maintained a number of stallions, but the system did not prove successful, and now horse-breeding is left to private enterprise, encouraged by a system of registration and prizes. A list of the chief breeders in Belgium is appended to the report.

LEAD-LINED IRON WATER PIPES.—Our New York contemporary, *Engineering News*, describes a lead-lined iron service pipe, which has recently been devised by Mr. J. W. Harrington, Superintendent of the Wakefield Waterworks in the State of Massachusetts. The object is to give all the advantages of lead pipe without using the large amount of lead necessary for pipe under heavy pressure. Ordinary iron pipe is used, and in this, thin lead pipe of smaller diameter is inserted, and then expanded to fit. The most interesting part of the arrangement is that which refers to the method of protecting the end of the iron pipe when cut. A special tool is used, which is inserted in the end of the pipe to press the lead against the iron. A thimble is then inserted and driven home by the tool, which trims off all the surplus lead and forms a lead bead at the end of the pipe. When a thread has been cut and the pipe screwed into a fitting, the thread which is on the fitting is made to screw against a beaded end on the thimble. In this way no part of the pipe is exposed to the action of the water. A company has been formed at Wakefield (Mass.) to manufacture this pipe.

ASPHALTE FOR RESERVOIR LININGS.—In a paper read before a recent meeting of the American Society of Civil Engineers by Mr. James D. Schuyler, the use of asphaltum for reservoir linings is advocated, and some interesting particulars are given in support of the principle. The material is said to be elastic, and not to crack; it is insoluble in water and acids, imparts no taste to water, and is easily kept in repair. A circular reservoir was partly excavated in light sandy soil and part in embankment. The slopes were 1 in 1, and it was paved at bottom and sides with cobble stones laid in mud. Over this a sheet of hot liquid asphalt from $\frac{1}{8}$ to $\frac{1}{2}$ in. thick was spread with brooms. After filling with water, one part of the bank settled 2 ft., but there was no leakage. In another case a first coat was laid in vertical sections 2 ft. wide, the mixture being 15 per cent. of asphalt and 85 per cent. of beach sand heated to 300 deg. Fahr., spread with rakes and tamped with hot irons. The neglect to paint the raw edge of previously laid sections caused cracks to appear a year after use. Strips of iron were driven into the slope at frequent intervals to attach the asphalt to the slope, and a second coat about $\frac{1}{2}$ in. thick of asphalt fluxed with 10 per cent. of mineral tar, heated to a temperature of about 250 deg. Fahr., was applied to the entire surface and smoothed with hot irons.

A "HALLADAY" WINDMILL has recently been erected at Ryde, Isle of Wight, for Lieut.-Gen. Somerset G. Calthorpe. It is pumping water from a dug well 130 ft. deep, and forcing it into an elevated tank, situated about 40 ft. above the ground, from which the mansion, bailiff's house, stables, farm and surrounding property are supplied. The work was carried out by Messrs. Alfred Williams & Co., of London.

THE ENGLISH IRON TRADE.—Although practically little change has taken place in the English iron and steel trades, there is a slight hardening tendency in prices of crude material in one or two districts. The Glasgow warrant market is more animated; but the business done is generally on account of the cornering of the "bears." Scotch makers' iron is somewhat irregular in price, and quiet; and Cleveland pig is a shade lower. Finished iron is still in limited request; but a slightly brisker demand is experienced for tin-plates, and in steel rather more activity is reported. Old materials are, however, depressed. Shipbuilders and engineers do not exhibit much change. The coal trade is fairly active.—*Iron*.

AMALGAMATION OF DISTRICTS UNDER THE BUILDING ACT.—Mr. Henry Lovegrove, District Surveyor of South Islington, Shoreditch, and Norton Folgate, asks us to state that the office for the amalgamated districts is at No. 314, Old-street, E.C.1., which has been the Shoreditch district office for nearly fifty years.

"N. A. A." STUDENTS' ARCHITECTURAL SKETCHING CLUB.—This club, called the "Northern Architectural Association" club, whose headquarters are at Newcastle-on-Tyne, is holding an exhibition of architectural drawings at its meeting on Tuesday the 24th.

LEGAL.

ACTION BY A CONTRACTOR:

DICKINSON v. THE RICHMOND MAIN SEWERAGE BOARD.

THIS was an action (tried in the Queen's Bench Division before Mr. Justice Wills and an Assessor) for work and labour done and material provided and money expended in the construction of the Richmond Main Drainage Works, also for damages for breach of contract. According to the *Times* report, the hearing of the case took place in June last, before the learned Judge, assisted by Sir Douglas Fox, as Assessor, when judgment was reserved. The plaintiff, since deceased, was a contractor, and on August 4, 1888, contracted with the defendants to construct certain sewers in the parishes of Richmond and Mortlake, for the sum of 40,666l., according to specifications annexed to the agreement, which provided that the sewers were to be constructed according to the orders and directions of the defendants' engineer, and completed in eighteen months. On August 28, 1888, the defendants' engineer gave the plaintiff notice to commence the works, which he accordingly did. On September 28 the defendants' engineer ordered the line of sewers on the drawing to be altered, the altered line going through private property belonging to Mr. Poupart. The plaintiff's case was that, although he repeatedly asked the defendants and their engineer to procure for him liberty to enter upon Mr. Poupart's land, he was stopped by Mr. Poupart and prevented from proceeding with the altered works. It was further alleged that it was agreed that between Gipsy Criner and manhole No. 97 the plaintiff should proceed by open trench work instead of tunnel work, that additional land was necessary for such work on either side of the proposed line of sewer, that the defendants neglected to procure him possession of such land, and he was prevented from completing the said line of sewers. On November 14, 1889, the defendants informed the plaintiff that they had given their engineer instructions to make arrangements for the construction of the works by another contractor.

Mr. Justice Wills, in delivering a lengthy judgment for the defendants, said that the plaintiff wished to get out of the expensive part of the contract, not having sufficient pumping power, and the defendants were within their rights in taking the work out of his hands. With regard to the sewer under Mr. Poupart's land, the engineer was within his rights in ordering it to be tunnelled, and Mr. Poupart's consent was not necessary, because the plaintiff could have proceeded by giving a notice under the Public Health Act. He was of opinion that the plaintiff had no intention of performing that part of the contract. Sir Douglas Fox had read his judgment and concurred in it.

CAPITAL AND LABOUR.

NOTTINGHAM MASTER BUILDERS' ASSOCIATION.—A largely-attended meeting of this Association was held at the Mechanics' Institution on the 13th inst. Mr. J. W. Woodsend presiding. In the annual report the Committee expressed regret that the year just passed had been one marked by general slackness of trade; and the difficulties connected therewith had been further increased by the demands of the operatives for higher wages. The latter gave considerable trouble to the Committee, but ultimately a compromise was effected, and an amicable settlement arrived at. The Committee stated that they had under consideration the revision of the schedule of day-work prices, and they recommended that the general contract form sanctioned by the Royal Institute of British Architects should in future be the only approved basis of contracts for the district. A copy of this document has been handed to each member. The number of members is steadily increasing. The report and statement of accounts were adopted.

The Builder.

VOL. LXIV. NO. 262.

JANUARY 28, 1893.

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The Hall, near Eton Avenue, Hampstead.—Mr. E. R. Robson, F.R.I.B.A., Architect.....	Double-Page Photo-Litho.
Proposed Houses, Ledbury.—Mr. G. H. Crocock, Architect.....	Single-Page Photo-Litho.
Staircase of the Palazzo Minelli, Venice.—Drawn by Mr. R. S. Balfour	Single-Page Photo-Litho.
Drawing-Room, "Warialda," Eastbourne.—Mr. Louis Ambler, A.R.I.B.A., Architect	Single-Page Ink-Photo.
House and Offices, Battle, Sussex.—Mr. Philip H. Tree, F.R.I.B.A., Architect	Single-Page Ink-Photo.

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English Cathedrals from an American Point of View.



IMES are changed since, as Kingsley recorded, Americans who arrived at Liverpool would go straight to Chester and remain a disproportionate time there, although told of better Mediaeval monuments in store for them, unable to tear themselves away from "the first old things we have ever seen." American visitors are becoming captious and critical now, and the difficulty seems to be to find any "old things" in their mother country good enough to satisfy them. They have cast in their lot with the French, and think it *spirituel* to rail at English art, whether in the shape of painting or architecture, until one of them the other day let the cat of prejudice out of the bag of ignorance by praising up Turner's "Dido Building Carthage" under the impression that it was the Claude, and that the Claude next it was the Turner; a blunder never acknowledged or rectified, though the writer must inevitably have heard of it. The same spirit is apparent in Mrs. Van Rensselaer's book on the English Cathedrals,* which made its first appearance as a series of articles in the *Century Magazine*, and is now collected into a handsome volume along with Mr. Pennell's pretty but in an architectural sense very inadequate illustrations.

Mrs. Van Rensselaer writes very well and with a good deal of enthusiasm for and interest in her subject, but one gets rather weary of the perpetual carping against English Gothic because it is not like French Gothic; as if, even supposing French were in every way superior to English (which is not the case), it were not clearly an advantage to the world, as well as a credit to English builders, that a separate type should have been developed here, instead of a mere repetition of the French type. This tone is

hardly surprising when we find the writer, after confessing to only being able to regard the subject as an amateur, mentioning Mr. Moore's book on Gothic architecture, with its paradoxical views and absolutely French standpoint, as "the only one book in the English language" (the American language?) "which to me seems really good for beginners' use." It is still more amusing to read further on that probably no one but an American will ever write a complete and impartial history of Gothic architecture, because national prejudices are so strong, while Americans "have no inborn ineradicable preference for any given form of Mediaeval art." No inborn one, naturally; but they have taken up the French prejudices to such an extent that it seems almost their pride to be more French than the French themselves. On the contrary we believe that anything like an impartial examination of the mass of English critical writing on Mediaeval architecture would absolutely justify the statement that we are the only nation which so far has gone into the subject in anything like a spirit of impartiality. English writers on the subject are the only ones who have shown the capacity for perceiving and admitting that the Mediaeval architecture of another country is superior to their own in many of the most important qualities, as we have admitted in regard to French Gothic ever since we began seriously to study it. It is not on this ground that we complain of French critics and their American shadows. It is simply that they are absolutely and ludicrously devoid of that very impartiality about which they prate, to the length of refusing for the most part to admit any special or distinctive merit in English architecture at all, giving it a grudging and condescending recognition only in the few instances in which it appears to follow French models. It is ridiculous for people who write thus to talk of impartiality. As for the Germans, they seem never to have recognised the fact that there is any Gothic architecture except their own, any more than the French, and with at all events much less excuse.

We do not say that Mrs. Van Rensselaer goes to the extreme Gallic views of some of

her countrymen. She has evidently a great interest in the English cathedrals, and appreciates some of their beauties, though we are continually finding this disparaging comparison with French work thrust upon us in her pages, in cases where the merits and qualities of the two schools of architecture are quite distinct and will hardly bear comparison; and her best praises for English work are frequently bestowed exactly on those buildings or portions of buildings which in England we consider the most defective. It will be a surprise to most English readers (except, we suppose, Yorkshiremen) to be told that the west front of York is "unquestionably the best cathedral façade in England." Most of us think it one of the worst; commonplace in detail and very defective in the design of its towers; but we presume the secret of Mrs. Van Rensselaer's admiration for it is that it is a version, though an "imperfect and unimpressive" one, of the "logical and beautiful French type" of cathedral façade. There could scarcely be a more naïve confession of want of critical eye and of blind adherence to an arbitrarily chosen critical standard. The French type of façade is the one perfect one, and the English is to be judged according as it does or does not conform to that standard. And what are we to think of a critical judgment which would put the façade of York, in architectural genius and interest, above those of Peterborough, Wells, and Ely (taking Ely as it would be if it were complete)? We find the same bondage to a hard-and-fast rule in the comparison set up between the fronts of Wells and Notre Dame. It is quite true that there is a good deal that is architecturally defective in the façade of Wells, and that its effect is to a great extent owing to its crowd of sculpture: but the writer seems perfectly blind to the real poetry and picturesqueness which crowns this work, in spite of some defects of design. She says, "Put this beside the front of Notre Dame in Paris, and we see merely effective arrangement contrasted with a true architectural conception where all parts are beautiful in themselves, yet where each is admirably related to all others—where the design truthfully expresses the building behind it, and

* "English Cathedrals": By Mrs. Schuyler Van Rensselaer. Illustrated with 150 drawings by Joseph Pennell. London: T. Fisher Unwin.

unity of effect co-exists with great variety." True that Notre Dame is a much more logically designed front, but it is a tame and commonplace one in comparison with Wells, and if France had nothing finer than that to show among her "logically designed" cathedral façades, England would be *facile princeps*. That this is not the case, taking the architecture of the two countries as a whole, does not alter the fact that this particular criticism is a very narrow and partial one, born of prepossession rather than perception.

The twelve English cathedrals selected for illustration (the original articles having been limited to twelve) were Canterbury, Peterborough, Durham, Salisbury, Lichfield, Lincoln, Ely, Wells, Winchester, Gloucester, York, and London: and we do know that a better selection could have been made. Among these the author seems inclined to give the highest admiration to Lincoln as a whole. In her remarks on the front of Lincoln she appears to have let her hard-and-fast rules of criticism go for a moment, and admits that while the front of Lincoln is not an organic composition, "it is a splendid stretch of wall, and gives the observer such an emotion as seldom stirs him when he views an English cathedral from the west." The fact is that the question whether a façade of this kind should entirely represent the building behind it, or should rather act as a grand screen, is one which has always been more or less an open one in architecture; and though Mrs. Van Rensselaer objects to the front of Wells as exaggerating the width of the building, she admits that on going round to the side of the nave some of the advantage of this arrangement, in giving force to the grouping, is quite apparent. She finds fault with the Salisbury front for the same reason of illogicality. We should have thought it more reasonable to find fault with it for its inherent weakness of design. In Peterborough façade the author can see only "an irrational piece of work, which lacks not only structural connexion with the church, but structural affinity with the design." Of course it lacks structural connexion with the church, for a reason which is one of the most interesting facts in the history of the building, viz.: that it was not the originally designed façade, but was thrown out in front of the intended line of the façade, as an effort of ambition to out-do the new façade of Ely. For any one who cannot see in this front a grand architectural conception—one of the grandest in the world, we can only say that we pity him or her. Then Mrs. Van Rensselaer moralises upon the destructive force of the arch, and seems to think that the partial failure of the central piers, which necessitated the intrusion of the later porch to strengthen them, was owing to this vicious and dangerous employment of these enormous arches. That is all nonsense. Those piers as designed, with the flanking towers as abutments, are amply sufficient to carry the arches for as many ages as stone would remain undisintegrated, in an engineering sense, and are amply sufficient to the eye also, as a matter of architectural design. The failure of the piers was due to the same cause as the failure of the crossing-piers, which have had to be rebuilt; viz., bad and scamped building, and bad foundations, to which latter cause is owing the fact also that the façade is leaning out from the church. If the piers had been built as they ought to have been built, in the mere matter of masonry work, the design is perfectly stable.

In her conclusion that it was an essential timidity of hand or timidity of imagination, one or the other, which led the English builders to be content with much more moderate proportions in height than the French ones, the author is very probably right: either that they dared not build as boldly, with flying buttresses of such span as the French did, or that they preferred a sober and quiet proportion in their buildings. In either case, as she observes, it is timidity

of one kind or another; a less soaring genius; and that it was timidity in regard to execution seems probable when we consider how often timber roofs or wooden vaults are found where in France we should find a stone vault. On the other hand it must not be forgotten that the unrestricted and bold use of flying buttresses in many French buildings destroys architectural breadth and repose, and gives them too much the air of a system of stone scaffolding; and that something is to be said for the architectural breadth and repose of line of our English examples, to whatever motive this more simple and unassuming manner of building is to be attributed.

In dealing with St. Paul's, which closes the series, the author is fully just to Wren and to the great qualities of his building; perhaps more than just, for she maintains that the provision of an inner and outer dome, so as to preserve a good proportion both internally and externally, is one of the best points in the design; and this contention might be quite justified if it were not for the stone lantern, which externally appears to rest on the timber dome, which could not possibly carry it; whereas in reality it is a piece of masonry structure protruding from below a construction in another material and totally unconnected with it, like a piece of rock protruding above the water. That is the weak point to an architect; just one of the points, perhaps, which an amateur writer could not be expected to perceive.

In general, however, Mrs. Van Rensselaer writes on Gothic architecture with more knowledge and critical faculty than is usual with amateurs, and she would perhaps have done still better in this respect had she relied more on her own original lights instead of putting herself under the bondage of French-American prejudices. She has also got up the history of her cathedrals carefully, and therefore gives to the general reader a good deal of information, while her style of writing is, in a literary sense, always picturesque and interesting.

Of the illustrations it may be said that they looked much better and more adequate when they appeared as sketches to illustrate a set of magazine articles, than they do as illustrations to a book in a more permanent form. From this point of view they are very inadequate. In a picturesque sense they are always pleasing, but in a large and important-looking volume on an architectural subject one requires something more than that; and the truth is that while Mr. Pennell's sketches make very pretty pictures, they are for the most part totally valueless as architectural illustrations, though they are very pleasant additions to a volume which may take rank as a charming drawing-room book, relieved by a literary style and artistic knowledge beyond what we generally expect to find in that class of publication.

THE LIGHTING OF THE NON-HYPÆTHRAL TEMPLES OF THE GREEKS.

BY W. WATKISS LLOYD.



THE excavations of the Society of Dilettanti have certainly put beyond question that the temple of Jupiter Olympius at Athens, which Hadrian completed, endowed with a chryselephantine statue of the god, and dedicated, was certainly octastyle, not, as so long believed, decastyle. It is not clear, however, in what way, according to Dr. Dörpfeld, this discovery throws a new light upon the description of hypæthral temples given by Vitruvius, or bears upon the question whether the nave of either this temple or the Parthenon received light from above or exclusively through the doorway. Considerable confusion has been introduced into the discussion, as also into Dr. Dörpfeld's paper, by the application of the term "hypæthral temples" to temples assumed to have received some light through an opening in the roof. Vitruvius is quite explicit as to his

meaning of the term; an hypæthral temple had a cella without a roof; it was fully open to the sky. So Josephus adverts to the courts which surrounded the sanctuary of the temple at Jerusalem as "the hypæthral temple." Stonehenge may be called an hypæthral temple. There is no more authority for applying the term to a roofed temple having an opening for a skylight, than there has been for coining the word *hypæthron* to signify such an opening for illumination.

There can be no doubt that Vitruvius represented the Olympieion to himself as a true hypæthral temple; but it is quite uncertain what condition it was in when he wrote, which was after Sulla had carried off some of the columns to Rome, from what was itself an unfinished structure. His pillage was intended to be applied to the temple of Jupiter Capitolinus, but whether he laid hands on columns of the peristyle as worthless on account of their magnitude, or any others, it is impossible to say and futile to conjecture. It is, therefore, absolutely uncertain what was the extent of the work done by Hadrian, and how far his completed temple, which in any case was not a Greek but a Romano-Greek work, conformed in plan to what was already in existence when Vitruvius wrote, or to his conception of what it was intended to be.

It appears that editors and critics have arrived at an agreement as to the reading of the paragraph of Vitruvius bearing on our question, which is best approved by collation of the best manuscripts. But this is a process which, even when most successful, often only brings us part of our way towards the intelligible. Scholars know too well how manuscripts, which are not only the best available, but are even comparatively excellent, will constantly only provide them after all with a text which is nonsense, and still clamorous for the sagacious correction of an Elmsley or a Porson. What but a gross self-contradiction is put before us by such an approved reading as,—"The Hypæthros is indeed decastyle in the pronaos and posticum; it has all the rest like the dipteros . . . of this, however, there is no example at Rome, but an octastyle at Athens in the Olympian Temple."

There is very strong presumption that "octastylus" is a gloss which either crept in from the margin or was boldly inserted in the text, by one who knew Hadrian's temple and nothing at all of its antecedents. Such sense-confusing—however honestly meant—insertions are among the noted sources of corruption which the true critic is ever on his guard against and prepared to have to make allowance for.

Munificent, extravagant as Hadrian was in his architectural operations from one end of his empire to the other, it is quite conceivable that in taking over what Sulla may have left of the temple begun as decastyle and properly hypæthral, he may willingly have entertained the more moderate and speedier scheme of completion as an octastyle. This would economise at least sixteen of these colossal columns and reduce the span of the cella, at whatever expense of reducing the form of the general temple to very ungainly proportions. The account of the contents of the cella given by Pausanias proves that in this final form at least it could not have been fully open to the sky,—hypæthral; and the mode of lighting it falls into the general inquiry of the scheme applied to the Parthenon and other Greek temples of considerable size.

What difficulties there are in these cases are not to be evaded by exaggerating the value of the illumination, which, passing through a portico and pronaos to reach the door, had to penetrate thence almost a hundred feet to display the beauties of a chryselephantine statue; nor is it reasonable to seek help by extenuating the interest of the Greeks in contemplating such delicate enrichments as the designs on the exterior and interior of the shield of Athene, or even along the edges of her sandal-soles. In one of Plautus's adaptations of Athenian plays, is it the "Bacchides"?—some of

the characters are absent from the scene; it is a day when the Acropolis is open, and they have gone up sight-seeing. As regards orientation, it seems scarcely a point to be refined upon. The religious festivals of Greece, like our own, were arranged coincidentally with the epochs of the year; and as the temples, like our own cathedrals, were laid out pretty accurately east and west, the relation of both to the solar-rays could not but have been,—intentionally or not,—from time to time in conspicuous agreement. The temple at Bassæ, which fronted north and south, is the great exception; when this is accounted for, other slight divergences may possibly be worth attention.

Apparently Dr. Dörpfeld holds that those Greek temples, even of the magnitude of the Parthenon and the Olympieion, which were not entirely open to the sky, received no light whatever from above, but exclusively through the great doorway. There are, however, architects and archaeologists enough who will demur to the notion of such illumination being sufficient or satisfactory, and, on the assumption that light was admitted from above, will regard the true problem to be,—In what manner was this contrived?

The problem is of admitted difficulty; the greater is the reason that confusion should not be introduced into the subject by admitting pure conjecture into what is put forward as a deliberate conclusion. We all remember how James Fergusson was somewhat given to this self-indulgence, and a friend who most admired and was most attached to him was sometimes, when hard pressed, put to straits to make it understood that his assent to a theory did not amount to—"So the Parthenon must have been lighted"; but only to—"It would have been quite possible so to light the Parthenon." It may be perhaps possible to go as far as far conscientiously with respect to the schemes of Mr. Falkener and Mr. Penrose,—and indeed of Mr. Cockerell in the case of Bassæ; and so for any number of other arbitrary suggestions which might exercise the invention and genuity of architects,—but that is all, and amounts to very little indeed.

Pleasant as such divergencies into the open fields of imagination may be, they are utterly adverse to the sober-minded cultivation of scientific archaeology. This demands at no definite limit of evidence which bars upon the question should be neglected, and that neither should it be pressed beyond its due significance, and that conjectures could be employed as instruments of analysis, not adopted as elements of an explanation. Finally, it is imperative on the querier to have the courage to stay his foot on the line beyond which he cannot recognise firm ground, and to plainly say so.

Mr. Wyatt Papworth very justly called attention in the course of the recent discussion to his brother's paper, read in 1866, titled "Suggestions respecting the Roofs of Temples called Hypæthral,"—"mis-called hypæthral" would have been the true name. In this certain tiles were engraved from the sketch book," not of Mr. Cockerell, but of Baron Haller, in the possession of Mr. Cockerell, who was not himself personally concerned in the excavations at Bassæ. The drawings in the book—the tiles of Mr. Cockerell's noble work—are executed with admirable precision and detail, and the forms of the exceptional tiles in question are such as to indicate absolutely the border of an opening in the system of marble tiling—itsself a marvel of elaboration and ingenuity.

Mr. Papworth rightly drew attention to the size of the ordinary marble tiles (3 ft. by 2 ft. 1 in.) of the Phigælian temple, and there is no reason why the tile for a special application, of which we have only a fragment, should not have been even much larger. In itself it gives no information how corresponding opening in the ceiling was treated, but it is valuable pre-emptive evidence so far as it goes. Of

course, it is quite possible that the assumed opening in the tiling may have been managed differently in different—in earlier or later instances, in larger or smaller examples.

Nor is it prudent to treat as of no significance the numerous stone and marble tombs which are manifest models of small temples, and exhibit roofs of which the ridge lines are interrupted by square frames which lie saddle-wise across them. Dr. Murray described one such in the British Museum, "a very large marble tomb with a roof," having at each end a small square opening near the ridge covered with small panels, which fitted and rested on ledges. These seemed to Mr. Murray to look a little like some process of lighting from the roof, but he thought they might have served for putting in customary offerings on the anniversary of death. But, we ask, Why, then, were there two? A stronger presumption is that they represent orifices lighting two separate apartments,—a naos and an opisthodomus. But such tombs are very numerous, and usually with only a single central horizontal,—we had almost said—sash-frame. Mr. Cockerell engraves one in his great work, and gives references to others. It will be observed that from the low angle of the temple roofs, the slight elevation of the sides of such a frame above the tiling would quite obviate any appearance of an unsightly notch in the ridge line; the interruption of this would be quite out of sight.

Again, there is a suggestive indication which should not be neglected in Dr. Murray's remark as to the traditional treatment of the lacunaria. There is no reason to doubt that the coffered ceilings, of not only the peristyles but the pronaos and posticum of a temple, are only continuations of the same scheme of enrichment of the general ceiling of the large apartment. We may accept it as an imitation in marble of elaborate timber panelling. Dr. Murray puts the question "Why should the lacunaria be pierced with a square hole in the centre and then elaborately covered over on the top with a slab on which is painted a star or something of that sort, unless there had been a previous time at which all these lacunaria had been pierced with square holes through which to let light into the colonnade?" He adds, "Then archaeologists thought that something of the same sort might well have extended itself into the cella." The archaeologists seem to be on the true scent but to be hunting counter. The natural extension would be from the cella to the peristyle,—from the principal to the subordinate. That the central square of the lacunaria is frequently pierced and then covered by a separate piece of marble, may probably have been done to facilitate carving the mouldings. No colonnade or peristyle could have required additional light, and that an apartment could have been made dependent for light on such a set of orifices, seems out of the question. But there are many ancient representations of ancient coffered ceilings—see especially the ruins of Baalbek and Palmyra—in which a large central space, usually square, sometimes polygonal, is represented as open to the sky and giving the model of a coffered opening which is repeated in the smaller surrounding subdivisions of the ceiling. The traditional star on a blue ground is significant as a reminiscence.

The coffered ceiling, so to call it, of the Pantheon at Rome, with its central opening to the sky, is nothing less than the same scheme modified for adjustment to a domical surface. So again in the arch of Titus, we pass under a semi-cylindrical representation of a coffered ceiling with a large central opening through which the emperor is seen ascending to his apotheosis in the sky.

So far the presumption appears to be that the naos of such a temple as the Parthenon had a horizontal ceiling of elaborately coffered timber work, pierced by one larger and more elaborately coffered opening to the sky—sufficient by its size and position to illuminate statue and interior with daylight in a flood, or moderated easily to any degree

that seasons or circumstances might require, and capable of being securely closed.

A coffered timber ceiling harmonises with the general trabeative principle of the architecture, and the presumption in its favour must hold its ground, until it is positively disproved, against any counter theory that leans at best upon a mere fanciful supposition of what could, would, should or might have been.

NOTES.

It appears that the "Hope of English Architecture" is not extinct in the *Quarterly Review*, and that the same gentleman who made himself and the *Quarterly* a laughing-stock by the article under that title a good many years ago is still an accredited contributor on that subject, or else that he has left behind him a worthy successor. At all events the same method and the same delicate hand is discernible in the article in the current number of that review on "Architecture, a Business, a Profession, or an Art?" There is the same wholesale abuse of architects, the same laudation of the artisan, and the same method of misleading ignorant readers by false representations, statements which are true in the letter of the fact and entirely false in the suggestion intended to be conveyed. In order to show the weakness of the modern draughtsman's tracery window in comparison with the working mason's window of the middle ages, we are given two windows side by side, the modern example not being selected from the work of one of the best architects of the day, but from some of the tracery devised by the amateur bungler who is defacing St. Albans. The author could have found windows among the churches of Scott, Street, Pearson, and others, quite as well designed as the Mediaeval example, as he knows perfectly well, but that would not have suited his purpose. Of course he ignores the fact (or perhaps is ignorant of it) that a design in the shape of a drawing must have been made for what he chooses to call the "artisan's" window, for the tracery could not have been set out and worked without it. But this is a mild example compared with the impudent travesty of the truth conveyed by the engraving of the recent hideous addition to the end of Somerset House, with the title "additions as designed by Fellows of the Institute." Who is really responsible for that piece of vandalism we have never clearly understood; what we do know is that the Institute of Architects protested in the strongest manner against this disfigurement of Somerset House, and memorialised the Office of Works on the subject, and that Department showed every disposition to have compelled the removal of the work, at the instance of the Institute of Architects, had it possessed the power to interfere, which unfortunately it had not. All this is carefully concealed from the lay reader, who is left to infer, as the author intended he should, that this represents the standard of taste of the Institute of Architects. A more discreditable misuse of the pages of a periodical for the defaming of a body against which the writer has a grudge we do not remember to have met with. The late Mr. John Murray, after the absurdities of the article on the "Hope of English Architecture" had been exposed, wrote to the then editor of this journal expressing his annoyance and regret that such an article should have appeared in the *Review* of which he was the publisher. Whether the present bearer of the name is equally enlightened on the subject we know not, but it is clear that the editor is no wiser in these matters than the editor of twenty years ago, and it is a significant instance of the ignorance of literary editors on subjects of this class that such a piece of captious and dishonest rhodomontade should be offered to the public as architectural criticism.

At last London is likely to have something substantial done for technical education. The Special Committee of the London County Council recommends that a sum not exceeding 80,000*l.* a year should be given in grants to existing institutions. Polytechnic institutions are to receive 16,000*l.*; secondary and higher grade in day-schools for elementary scholars, 22,000*l.*; art teaching, 10,000*l.*; and smaller sums, such as 4,000*l.*, go to technical museums. It is also suggested that hereafter the Council shall not only aid existing institutions, but also supply new ones. Certain conditions are to be made in return for these grants, as in the case of polytechnic institutions, the representation of the Council on the governing body, audit of account, and so forth. At present this is only a report; it remains to be seen whether the Council will adopt it wholly or in part, and it is to be hoped that after due deliberation and discussion this body will see its way to give the residue of the wine and spirit duties which are available for the promotion of technical education to the purpose to which the Legislature intended that the money should be devoted. No doubt this report cannot be adopted without careful consideration: thus the creation of a municipal school of architecture is hinted at rather than suggested. This will open a wide field for discussion. Again, it is proposed that out of the scholarship grant of 8,000*l.*, one thousand "minor" scholarships should be endowed with 5*l.* each. This appears to be a ridiculously small sum. When the report is discussed by the Council we shall doubtless have occasion to return to this important subject.

THERE have of late been rumours that the President of the Board of Trade intended to enlarge the Labour Bureau, which was established in 1886. This week that Minister gave information on the subject to a deputation, and also issued a memorandum for the benefit of all concerned. It is proposed to constitute a separate Department of the Board of Trade under the general control of Mr. Giffen, and with a Commissioner of Labour, a Chief Labour Correspondent, three additional similar officials, and a number of local correspondents. It is also proposed to publish a *Labour Gazette* at frequent intervals and various other information of a useful kind. The home of the Department will be at 43, Parliament-street. These changes have received much laudation or notice from the party press, but though we have no desire to minimise their usefulness nor to deny merit to the Minister responsible for them, yet to exaggerate their scope is only to cause disappointment. The collection and publication of truthful information is very valuable, but it will not enlarge the field of labour, though it will make the obtaining of employment easier, and will benefit employers and employed.

THERE is no doubt that the success or non-success of the new departure of the London County Council in proposing to be, as far as possible, "its own builder," will be largely dependent upon the holder of the important post of "Manager of Works and Stores," which was filled up, at the meeting of the Council on Tuesday, by the appointment of Mr. Thomas Holloway, on the terms mentioned in our report on another page. We may congratulate the Council on having appointed a very able practical man, experienced in carrying out large works and in the direction of large numbers of workmen. Mr. Thomas Holloway will be known to many of our readers as having built the Hôtel Métropole at Brighton, not as a contractor, but as master of works, under conditions somewhat analogous to those now proposed to be adopted by the London County Council. He was also associated with his brother, Mr. G. H. Holloway, in building the Holborn Restaurant, the Grand Hotel, the

Hôtel Métropole, and other large buildings which have been erected in London by the proprietors without the intervention of a general contractor. For the sake of the ratepayers we wish success to Mr. Holloway in his new work, but it is not to be denied that he has a difficult office to fill.

JUDGING by the continuous stream of complaints concerning the hardship inflicted by the revised railway rates, there will be no lack of material for the Mansion House meeting on Monday next. What will be lacking, are details of the reductions which, the railways companies contend, have necessitated the advances. There were plenty of statements published during the late inquiries, showing the enormous amounts which the companies estimated they were going to lose; but we have only seen one detailed table of estimated loss which has appeared since the new rates came into operation. This appears in the current number of the *Railway Official Gazette*, and reads—"The following table shows how the railways (the italics are ours) will suffer under Class A (coal and iron ore):—

	Old Rates.		New Rates.	
	s. d.	s. d.	s. d.	s. d.
10 miles	0 10	1 3	0 10	1 3
30 "	2 6	2 10	2 4	2 4
50 "	4 2	4 9	3 9	3 9
100 "	9 4	9 5	5 10	5 10

There are several reasons why this estimate should be regarded with suspicion. The first thing which strikes one upon glancing at it is that, while there are variations indicated in the old rates, the new ones are represented as being uniform for all lines. Such, however, is not the case. The figures quoted to prove how "the railways" will suffer only apply to five lines,—the London and North Western and four other mineral-carrying lines, neither of which, we may safely assert, ever charged 9*s.* 4*d.* (over a penny per ton per mile) for a hundred-mile haul of coal. Some of the smaller lines may have done so, but, to render the comparison fair, the rates which these latter are now empowered to charge should appear in the table also. The Midland and Great Eastern, even, may charge more than the sum named, their figure being 1*s.* for ten miles, and 6*s.* 1*d.* for 100 miles, while the South-Eastern, London and South-Western, &c., may demand 1*s.* 3*d.* and 8*s.* Omitting all special *maxima* authorised, lest we should, in turn, make an unfair comparison, we present the following substitute for the table of new rates given in the *Railway Official Gazette*:—

	s. d.		s. d.	
" 10 miles, new rate	0 10	1 6	0 10	1 6
30 "	2 4	3 5	2 4	3 5
50 "	3 9	4 11	3 9	4 11
100 "	5 10	8 0	5 10	8 0

It should be remarked that these figures include no terminal charge for either end, although the companies are empowered to charge 3*d.* per ton at each end when they provide this accommodation. It will have been noticed that a correspondent from Portland gave particulars in a letter, published in our columns last week, of a rate advanced from 8*s.* to 18*s.* 6*d.*; but we doubt very much if anyone has been fortunate enough to secure anything like a corresponding reduction. It appears that the tradesmen of the Isle of Thanet have combined for the purpose of chartering barges for running backwards and forwards to London, while in certain Midland districts, where relief is found impracticable, the indignant agriculturists talk of retaliating by agitation for increased assessment of railway property.

THE subject of Professor Thompson's second lecture on electric lighting was "Electric Lamps," and the Theatre of the London Institution was, appropriately, lighted by electricity for the first time, if we except the occasion, referred to by the lecturer, when Sir George Grove illuminated it with spirals of incandescent platinum. After exhibiting some dynamo-armatures

lent by the Brush Company, which arrived too late for the preceding lecture, the professor showed how an arc, which would burn under water, or even under paraffin oil, could be formed between two slightly separated carbons. He then passed in review the various devices to keep the length of the arc constant, and exhibited a lamp regulated by a small motor mechanism which lengthened or shortened the arc as required. The mechanism, however, failed on this occasion to work, which gave the lecturer an opportunity of pointing out the great advantage of a lamp with no mechanism in it at all. The only example of an arc-lamp of this kind was the Jablochkoff candle, which was next shown; its chief disadvantages being that it was not silent, since it must be worked with alternating currents; and that, if blown out, it could not relight itself. By way of introduction to the subject of glow-lamps, the lecturer caused much amusement by a diagram showing the fall in gas shares on the announcement of Edison's discovery of an incandescent lamp; amusement, which was increased when a representation of that exceedingly primitive lamp was thrown on the screen. The various improvements were then successively shown, and the astuteness of Mr. Edison in adopting and patenting each as it appeared humourously noted. In conclusion, Professor Thompson burst a glow-lamp by greatly over-running it, and discussed the question of most economical running. He stated that it had been calculated, as the rule of greatest economy, that the annual cost of new lamps should be 17 per cent. of the annual cost of the whole installation, including interest on capital.

IN connexion with the subject of open spaces in London, we may call attention to the fact that the Board of Agriculture, acting under provisions of the Metropolitan Commons Acts, 1866-78, have certified a scheme with respect to Broomhill, Darrick, Gumping and Sparrow commons in Orpington parish, Kent, and a scheme for Banstead Downs, Banstead Heath, Park Downs, and Burgh Heath, Surrey. Banstead Downs, intersected by the Sutton and Epsom Downs branch of the London, Brighton and South Coast Railway Company, lie about 550 ft. above sea level, and belong to the Surrey range of chalk hills. Dyer sang their praises in his "Fleece": the

"Are health's gay walks to shepherd and to sheep."

By this name were originally known the present Epsom Downs also, as mentioned by Pepys in his Diary for July 25, 1663, and July 14, 1667. Evelyn records (September 27, 1658), that "riding over these downs and discoursing with the shepherds," he heard some Roman remains had been discovered "neere Sir Christopher Buckle's neere Banstead"—a house standing by the Roman road from South Sussex, which, it is believed, traversed Dorking parish churchyard and Ockley; vestiges of a Roman building have been found at Walton-on-the-Hill, close by, where also are tumuli and ancient camps. Trel de Maniers gave the parish church, circa Henry I., to St. Mary Overeye's, Southwark; of its curiously crooked shingled spire a woodcut will be found in Honey's "Year Book," col. 548 (1845). The church was repaired and reseated in 1867 at the cost of 3,000*l.* Burgh, or Burrow Heath, stands between Walton-on-the-Hill and Ewel (detached) parishes. Banstead Manor, which once belonged to the Carews, of Beddington by grant from Henry VIII., extends, as we read in Manning and Bray's "Surrey," to Leigh and Horley. It is stated in Mr. Walford's "Greater London" that Thomas Maudslay, the engineer, died at Banstead House in 1864. It was in Henry Maudslay's workshops, in Westminster Bridge-road, Lambeth, that Nasmyth found employment on coming to London, as his master's "private workman," he says, at the wages he asked for—10*s.* per week. In Banstead

parish Lord Derby bought (1788) an estate known as the Oaks, which gave its name to the well-known stakes. On the other hand, we notice that on the 30th inst. will be offered for sale, at the Mart, for building purposes, a large plot of land in Paddington. It is the Pineapple Nursery ground, on the high road to Kilburn, having a frontage of 254 ft. to Maida Vale, with a return frontage of 178 ft. along Hall-road, leading up to Hamilton-terrace. The ground belongs to the governors of Harrow School, and is let for a long term at a low rent.

IN the same week as that in which Fanny Kemble's death was announced, the last home of her aunt, Mrs. Siddons, was in the market. At the sale by auction on the 18th instant, at the Mart, the remainder of the lease of No. 27, Upper Baker-street, was "bought in" after a bid of 600*l*. Until lately occupied as the Portman Estate Office, the house stands opposite the opening by Clarence Gate, which, as it is said, was so left by the Prince Regent's desire in order that Mrs. Siddons might continue to enjoy the prospect across the park. She removed to that house from the Farm, by Westbourne-green, in 1817, having taken leave of the stage, professionally, at Covent Garden Theatre on June 29, 1812. Here, as at Westbourne Farm, she built a modelling room, forming the northern wing, with windows overlooking the garden. Amongst her visitors in Baker-street were Mrs. Baillie and Joanna Baillie, Sidney Smith, Mrs. Piozzi, Dean Milman and Dr. Holland. Mrs. Siddons had lived for some while with Miss Wilkinson at a house, No. 49, in Great Marlborough-street, where—unless the postal numbers have been meanwhile changed—now stands St. John the Baptist Church; we find her mentioned as residing there in 1797. In the autumn, 1804, she removed to lodgings in Prince's-street, Hanover-square, and thence, in the following April, to Westbourne-green. When at the height of her powers, and receiving a salary of 25*l*. a week, she lived, circa 1790, in Gower-street, near Bedford-square. Born at the "Shoulder of Mutton" Inn, in the High-street, Brecon,* she died in Baker-street on June 8, 1831, and was buried in the "New Ground," north-east end, behind St. Mary's, Paddington-green, which was at that time the parish church: her grave, covered by a large flat stone, is near that of Haydon (1846), and the memorial to Collins, R.A. (1847). The churchyard, with an area of about 3½ acres, and containing the site of the old parish church of St. James, was laid out and opened to the public on May 23, 1885.

THE tenth Annual Report of the Metropolitan Public Gardens Association shows a great amount of work done and proposed for the benefit of the London public, in securing the maintenance of open spaces and the admission of the public to some from which they have been unnecessarily excluded. The association is doing an excellent work with much vigour and discrimination, and merits the support of all who are interested in promoting and increasing the best sanitary and pleasurable conditions attainable in London life.

WE are glad to learn that Mr. Wyatt Papworth has been appointed Curator of the Soane Museum. The announcement was made at the meeting of the Royal Institute of British Architects on the 9th inst., during the early portion of the proceedings, to which reporters for the Press were not admitted, and hence the matter had escaped our notice until we saw it mentioned in the *R. I. B. A. Journal* for Jan. 19. In making the announcement of Mr. Wyatt Papworth's appointment, the President of the Institute said:—

"Of all men in our profession I can think of no one so thoroughly equipped and so well qualified

for this office as he is. The President and Council of the Royal Academy have conferred honour on themselves in having thus honoured one who, in the opinion of his colleagues here, so truly deserves all the consideration that can be bestowed upon him."

We cordially endorse Mr. Macvicar Anderson's remarks, and join him in offering congratulations to Mr. Papworth.

THE *Semaine des Constructeurs*, in its issue for January 21, devotes an article to "l'architecture Anglaise depuis cinquante ans," founded on our article and Mr. Brewer's drawing of January 7. Our contemporary concludes with the remark that perhaps it would be as true in France as in England to say that the street houses showed the most real advance in recent architecture: "est-il bien sûr que nos petits hôtels de la plaine Monceau ne sont pas aussi ce que nous avons fait de mieux en architecture, depuis cinquante ans? Et, s'il en est ainsi, du fait vrai en deçà comme en delà de la manche, n'y aurait-il pas quelque conclusion générale à en tirer?" But what that general conclusion is our contemporary, perhaps wisely, leaves to its readers to consider.

WHAT IS ARCHITECTURE, AND HOW CAN IT BE ADVANCED?*

BY PROFESSOR AITCHISON, A.R.A.

I THINK this age is foolishly ungrateful to the fine arts. This ingratitude is mainly due to ignorance, though partly to the low ideal standard of the age, and to its enrichment through scientific discoveries. If the bulk of people were asked the uses of the fine arts, they would probably say they were innocent recreations, to be classed with cards, billiards, and dominoes; yet if they would take the trouble of examining the furniture of their own minds, they would find that nearly all they know, and nearly all they feel, is due to the teaching of the fine arts. If men of science were excluded, and if it were possible to extinguish in the rest of Christendom all that it has learned from poetry, eloquence, the drama, dancing, music, painting, sculpture, and architecture, in what would the human race differ from its ancestors, the monkeys, except by having clothes, money, and the multiplication table? Painting, sculpture, and architecture present finished pictures of some beauty, act, or emotion, which it is important for mankind to be acquainted with, and they convey this lesson at once; and the other fine arts do the same in a short space of time. It is, too, the chief method that Nature herself adopts for our delight and instruction; the sublimity, the beauty, the solemnity, or the ugliness Nature presents us with in her works, strikes us at once. We are equally moved by the howling of the winds, the crash of the thunderstorm, the fury of the sea, the rumbling of the earthquake, or the explosion of the volcano. No laborious investigations are wanted to produce our emotions from these causes; and this is necessary, for man has to get his living by work, and must lose the emotions of delight or horror and the lessons they convey, if they could only be got by the laborious discovery of Nature's laws, or by the patient following of her procedure. Far be it from me to depreciate science, which has in Astronomy acquainted us with the marvels of Nature's sublimest work,—has given us as well new views of the Creator's procedure, and has discovered innumerable laws that are applied to our use. But while we are astounded at "yonder hundred million spheres," we should not be ungrateful for "all the silvery gossamers that twinkle into green and gold." It is neither my part nor my wish to depreciate anyone, much less the great men who have devoted themselves to science, and have conferred such benefits upon us; but I certainly do wish to make artists and their arts appreciated, and to show the inestimable gifts they have conferred and do confer on mankind. It is only when we know that it is mainly through the fine arts that Christendom is in the van of civilisation that we can appreciate the gross ignorance of those who overlook them, and the black ingratitude of those who depreciate and decry them. Mr. Eidlitz, in his "Nature and Function of Art," truly says: "The true artist . . . becomes a teacher and prophet to his race, whether he knows it or not. Poetry and painting, music, the drama, sculpture, and

architecture depict emotions, which, by a process of mental contagion, generate sympathetically other emotions, and thus teach men to feel ideas which they could not comprehend in their abstract form." We can spare no art, and no science, for each science reveals to us that particular mystery it studies; while each fine art not only has its own particular expression, but is lord of that country that no other fine art can invade; so that, if one could be lost, mankind would be deprived of that part of instruction and delight that it conveys, and that all the rest of the fine arts together could not supply.

The first inception of almost all works of the fine arts is under some strong emotion; and, when the artist deals in words, these words naturally flow in a rhythmical form. When the poem is long, the poet has, by the vividness of the picture in his mind, and by his art, to sustain that emotion in his finished work; his emotion is twofold,—that caused by the conception itself, and that caused by his desire to excite the same emotion in his hearers. Until lately the words of poetry were enforced by music. Burns spoiled his most exquisite song, "Ye flowering banks o' bonnie Doon," because no composer he knew could fit it with a suitable tune.

The subjects of poetry were written in verse,—not only because it is the form that impassioned language takes, but because verse is more easily remembered than prose, and for the latter reason brevity is a merit; hence the poet not only compressed his sentences, but used happy words that suggested much, like "The starry Galileo, with his woes." The more vivid utterances and pregnant sentences of the poet were impressed on the minds of the hearers, so that language is very much of a mosaic, made up of the striking phrases of the poets.

In the days of antiquity, Homer's poem was the bible of the Greeks; soul-stirring strife and tragic episodes abound in it; while the avenging of wrongs, the defending one's country, the contempt of pain and death, the exercise of hospitality, and the due worship of and reverence for the gods, formed a moral code; and the incidental pictures of life, both at home and in a far off country, made it delightful. It may be remarked that the faith of antiquity was mainly gathered from the poets, each poet was looked on as inspired by the divinities.

"For he on honey dew hath fed,
And drunk the milk of Paradise,"

The real poet is inspired by the age in which he lives, but we may say that his poetic temperament has been bequeathed to him by his parents, who mostly lived in times when every fibre was in tension from wild hopes and desperate fears. The Trojan war, the invasion of Greece by the Persians, the Roman struggle with Carthage and its Civil Wars, the Crusades, the emergence of Florence, the change to Protestantism, the defeat of the Armada, the defeat of the Royalists, the wars of the end of the eighteenth century, and the French Revolution, were each followed by a galaxy of poets. The great poet, too, reacts on his age as its seer and prophet. We see an example of this in the late Poet Laureate, in whose works all the mental conflict of the age between the old and new faith, between knowledge and wisdom, are depicted, and a fair hope of progress is held out to humanity, through the increase of knowledge, wisdom, courage, and goodness; these lessons and incitements, combined with the accurate portrayal of inanimate nature, of the great passions of mankind, of pageants and battles, of the mysterious dreams and ecstasies of saintly warriors and anchorites, and his wise worship of freedom, made him the great poet of his age, whose words are on everyone's lips; and truly he treated our language as a skilful engraver treats a gem. Lawgivers, warriors, statesmen, and even philosophers, had learnt long before Horace's time that for their gifts or victories to be kept alive, it was necessary to be sung by a poet, and for the same reason the winners of the Olympic games were allowed to dedicate a statue or painting of themselves, or a poem in their honour. We see how splendid literature gives to mortal things the nearest approach to immortality.

Many, many have lived who were valiant in fight,
Before Agamemnon; but all have gone down
Unwept and unknown in the darkness of night,
For lack of a poet to hymn their renown.

I must not devote too much time to this most fascinating subject, but to take only the novel of the day, how vividly we remember the striking scenes, the unravelling of characters both good and evil, and how much of our current cultivation and morals is due to them! But Literature deals with words and time alone, if we except the melody of verse and prose.

* See a vignette in her "Life," by Campbell, the poet.

* Being the first Royal Academy Lecture on Architecture this Session. Delivered on Monday evening last, Jan. 23.

It can therefore only perfectly depict the words we speak and hear, what we think, and what we feel; all else that it does is to suggest by words what we see.

Dancing, like singing, is a spontaneous manifestation of high spirits and joy, which naturally express themselves in rhythmical movements or sounds, and have been enlisted in the service of religion. We have all read of David dancing before the Ark. The mountaineers who come to Rome at Christmas to sing carols not only enforce the words by the sounds of the bagpipe, but dance at the same time; and if asked to cease their dancing, which is not particularly graceful, they say that the act of adoration is not complete without the dancing. Some of the most beautiful bas-reliefs, of antiquity represent the frantic dancing of the Mænads.

The drama shows us the action and expression of each person in the play, lets us not only hear the language proper to each, but the tone of the voice, with its accent and cadences under emotion; and consequently we are more readily moved by it to tears or laughter, to hatred, indignation, or contempt, than by any other fine art: but it is as perishable as a dream.

The twin arts of sculpture and painting gave rise to their overmastering rival, written literature; but in combination they were the books of remote antiquity, and as there is no reason why sculpture should be white, they are but different developments of the same art; but the modern liking for sculpture in the white has perhaps caused it to be more exquisite in form, for if the colour of a picture be unpleasant we do not look at it, but fine sculpture does rivet our attention on its perfections, in spite of its whiteness.

It is difficult to restrain oneself within proper bounds when speaking of the divine and entrancing art of painting, which preserves for us all the power and loveliness of the present, and conjures up for us all the glories of the past. In the mind's eye we see the roll of painters and their work, like Banquo's line of kings, from Giotto to Reynolds, from the seraphic visions of Raffaele and the majestic picturing of Michelangelo, through the divine harmonies of Giorgione, Titian, Schiavone, and Paris Bordone, to the grand composition of Tintoretto and Paul Veronese, till we come to the depiction of the noble bearing and stately beauty of the lords and ladies of their day by Moroni, Vandyck, Gainsborough, and Reynolds, and those superb representations of the houses of the Netherlands by Peter de Hooze, and the episodes of its life in his peers. To speak only of Italian religious pictures, they may be said to have given its current theology to Italy, as Milton's "Paradise Lost" is said to have given it to England. I may say that it is through the absence of pictures that so little is known in England of its history and achievements. In addition to these we have the whole range of landscape painting, from Peter Paul Rubens to Turner.

As we have two kinds of figure-painting, so we have two kinds of landscape painting, the one which depicts for us some particular piece or phase of loveliness or sublimity, and the other which calls up the emotion produced on the painter by some scene, beautiful, mysterious, or terrible. The limitation of painting as compared with literature is that time does not come within its range, and I fear we are not now intimately acquainted with expression, while from the necessity in this climate of clothes, the ignobleness of their forms, and the absence of artistic grouping, the depiction of contemporary life, when it is without beauty or sentiment, is scarcely fine-art. Men in their natural state would probably group themselves as artistically as sheep in a field; but even sheep cease to be artistically grouped in a pen; and since artistic grouping has ceased, except on the stage, artists are driven to isolated instances of beauty or power, and to the portrayal of the past.

Musie, I am informed, is subject to mathematical rules in its composition; and to ears cultivated to comprehend it, it raises high and vivid emotions, and it does in some degree affect most of us. I have grouped architecture with music, partly because it has been called "frozen music," and partly because much of its beauty is owing to mathematical proportion. It is that one of the visual fine arts that is not directly imitative, so I think we must first ask ourselves how it affects the completely ignorant; and I think it does so by its imposing mass. Ammianus Marcellinus says that Constantius, when he visited Rome, admired "the vast mass of the Amphitheatre . . . and the Pantheon, with its vast extent, its imposing height, and the solid magnificence of its arches." Beholders judge of

the nation by the objects for which vast buildings have been erected. The emotions of the less ignorant are, I think, mostly produced by the inhibition of work; in the case of Gothic, by finely pierced work; we hear,—in France at least,—workmen and their wives admiring it, and declaring it looks like lace; these emotions are mingled in the educated, and there is, besides, a delight in beautiful shapes, harmonious proportions, and light and shade; but, according to their cultivation, some more admire mysteriousness and exaggeration, while others more admire the grace and subtlety of proportion, and both admire beauty of outline. In most architecture, there is an inside as well as an outside, but except in religious monuments the inside can only be seen by the owner or by a select few. In some religious monuments the most impressive internal feature is the lighting, and this is especially so in Hadrian's Pantheon at Rome, whose lighting has a magical and weird effect,—and it is only after several visits that attention is given to anything but the dome. Externally its size is by no means so apparent; the vast dome on its circular walls is more appreciable inside, and more sublime; and at last we perceive the charm of its composition and its general finish. Sta. Sophia is perhaps the next most striking interior; its vastness is overwhelming, while the diffusion of light from hidden sources is marvellous, and afterwards we are awed by the great dome seemingly supported on nothing. St. Mark's, I think, strikes us most by its richness, and there is at least a feeling of satisfaction that everything looks secure. Most of the Gothic cathedrals produce admiration by their height and length, and, when seen from the west end, by the endless repetition of vertical lines, and the diffusion of light from unseen windows.

In a few cathedrals, such as Strasbourg, where the nave is very light, the gloom of the apse, with its masculine Romanesque pillars, is impressive. At Seville and at Durham the massiveness of the piers is most noticeable; they look as if they had been built by Titans, and these cathedrals look like the halls of Eblis. Milan is not striking inside or out, unless you see the outside by moonlight, or the inside at dawn on a winter's morning, when the interior is nearly dark, with a faint star of light from some altar, the piers looming darkly in the surrounding gloom, their capitals concealed by rolling mist, while the ambos form two black masses. Yet for all this, many churches and cathedrals look imposing enough at Vespers in the winter, with but one small chapel lit up which glows within the gloom. I recollect being struck with Sta. Maria Maggiore on such an occasion, and with many of the French cathedrals.

Secular buildings are naturally much less striking, though this is scarcely true of the vast halls of the Roman baths. The Loggia dei Lanzi is one of the most striking, and of modern ones the old Schloss at Berlin with its plastered front and rococo details. To an architect the first impression of the Ducal Palace is the apparent want of support for the heavy-looking upper mass, just as in Gothic cathedrals, one asks oneself how is it that the vault stands?

It is not surprising that architectural monuments, being so obtrusive, so gigantic, and sometimes so beautiful, should have forcibly impressed themselves on the minds of great poets and writers, so that literature is full of allusion to them, from "the cloud-capped towers" of Shakespeare to "the cloisters, branch'd like mighty woods," of the late Poet Laureate. It is superfluous to speak of Satan's classical palace in Milton, of which he says:

"Not Babylon
Nor great Alcara such magnificence
Equalled in all their glories."

De Quincey tells us that in his opiate dreams, architectural visions haunted him; and Wordsworth, in his description of some clouds, saw nothing but architecture.

"The appearance, instantaneously disclosed,
Was of a mighty city—boldly say
A witness of building, sinking far
And self-withdrawn into a wondrous depth,
Far sinking into splendour without end!
Fabric it seem'd of diamond and of gold,
With alabaster domes and silver spires,
And blaring terrace upon terrace, high
Uplifted: here, serene pavilions bright,
In avenues disposed: there towers begirt
With battlements that on their crests fronts
Bore stars—illumination of all gems."

Think what architecture has done for the dumb nations of the past, for Egypt, Assyria, Persia, and Mexico, who without it would be lost in oblivion! It points out, with a force second only to poetry itself, the grandeur and importance that a nation once enjoyed, and the point of civilisation it had reached.

Mr. Ruskin is even more eloquent than usual on the effect of architecture in recalling memories.

It is as the centralisation and protectress of this sacred influence, that architecture is to be regarded by us with the most serious thought. We may live without her, and worship without her, but we cannot remember without her. How cold is all history, how lifeless all imagery, compared to that which the living nation writes, and the uncorrupted marble bears. How many pages of doubtful record might be so often spare, for a few stones left one upon another! The ambition of the old Babel builders was well directed for this world: there are but two strong conquerors of the forgetfulness of men—Poetry and Architecture; and the latter in some sort includes the former, and is mightier in its reality. It is well to have, not only what men have thought and felt, but what their hands have handled, and their strength wrought, and their eyes beheld, all the days of their life. The age of Homer is surrounded with darkness, his very personality with doubt. Not so that of Pericles! And the day is coming when we shall confess that we have learned more of Greece out of the crumbled fragments of her sculpture than ever from her sweet singer or soldier historian. And if, indeed, there be any profit in our knowledge of the past, or any joy in the thought of being remembered hereafter, which can give strength to present exertion, or patience to present endurance, there are two duties respecting national architecture whose importance it is impossible to overrate: the first to render the architecture of the day historical, and the second, to preserve, as the most precious of inheritances, that of past ages.

Again, like poetry, the remains of architecture help to raise barbarous nations to civilisation; for as Virgil inspired Dante, so did the remains of Roman and Byzantine architecture inspire the savages and barbarians that overran Europe and the East. They first imitated and then improved on what they found. Architecture ran a continuous course, with some gaps, from Greek to Mediæval days, through Roman, Byzantine, Saracenic, Romanesque, and Gothic, and though in most cases it lost some of its refinements, it must be called a progressive art up to the end of the Gothic period; for it not only embodied the thoughts and aspirations of various nations at various epochs, but it made continuous progress in construction, if we consider that at certain epochs it was taken up by savages and barbarians, who naturally knew nothing; and in the most civilised times, after the fall of Rome, the means at the disposal of the various nations were but slender. Gothic architecture attained mastery of construction that has only been equalled by the engineering works of to-day, and a new æsthetic expression in tendency, outline, and detail that is only to be compared with Saracenic though Gothic surpassed it. For though the Renaissance did something to improve the appearance of architecture, it was by the adoption of exotic art, and it stopped both its constructive improvement and its æsthetic propretty.

It is unnecessary to ask what are the models of Nature of figure sculpture and painting; but we may well ask what are those of architecture. It is true that some hints may be got from Nature from the forms of mountains and rocks—near Amalfi a stretch of isolated rocks looks like a Mediæval town—but these hints can but rarely be used, so I think we may fairly ask, What is Architecture? and I think we may say it is an effort of man to produce an organism, so far resembling one of Nature's that it answers its purpose completely; and like hers occasionally causes emotion in the beholder, but always has a distinct character. Nature, as far as we know, not only does her work completely and perfectly, while man does his in a bungling way, but she makes her works answer other ends by means of the first, and, if we may say so, without effort; while man must use great effort to accomplish the two. We can scarcely doubt that the shapes of leaves affect plants electrically, and thus enable their roots to assimilate different qualities of the soil in which they grow—some assimilate the which becomes food for man, and some poison,—while at the same time the forms affect us by their beauty or ugliness; but be they beautiful or be they ugly, they have a marked character.

The only comparison we can make between architecture and any of Nature's organisms is in the case of animals with shells; but it is merely a superficial resemblance, for although the snail is said to carry his house on his head, it is merely a figure of speech; it is not its house, but a part of the creature, for the shell, I believe, acts as the fulcrum for its muscles.

Some shells and some shell-fish strike us as peculiarly beautiful, some as common-place, some as quaint or repulsive, but we have no reason to believe that one is less perfectly fitted for its purpose than another. The common crab is a quaint looking creature, if not an ugly one; while the king crab looks as if it were designed by a Greek artist. Perhaps the simplest shell man ever made for a living man was an *Anker*, but in this the Anchorite ate, drank, slept and prayed, and though this cell had no door, it must have had an opening for breathing, for the introduction of food, and the admission of light. I think, then, we may affirm two things, that except in the case of the Anker, the poorest shell we make is originally for a group of two, for the human unit is a man and a woman, and secondly that it will have a marked character if it be made to suit its use thoroughly, and be built properly. This character must mainly be got by making the proper arrangements for what the human unit does in its habitation, by the requirements in putting it together, and by the materials employed; consequently we must know how these materials act, and how they can be properly put together. All matter acts according to laws, and the law which makes ponderous substances stand, is statics; so we must at least understand this science either by theory or practice. Some philosopher has said that, "Ornament is more natural to man than clothing," for naked savages have been found who have stained, coloured, or tattooed themselves in patterns.

I think, however, that what is now mostly called architecture did not arise directly from the gradual desire of man to improve his dwelling, but from a desire to appease or propitiate his chief Deity; and as the savage had no model but his cave or his hut, most early temples are but glorified caves, huts, or houses.

The Greek temple, which is undoubtedly the most perfect architectural work of early civilised man, and which has in certain respects never been equalled, was palpably a glorified hut; for though Fergusson insists most strongly that it had a different origin, we must believe Pausanias, who saw one of the original oak columns of the Temple of Heræ, at Elis (Pausanias, lib. v., cap. 16), and the wooden pillar of the house of Cnœmus was kept in his time as a sacred relic; and, besides this, every part of the Greek temple points to its wooden prototype. Man hungers for immortality, and the child as the type of the savage, hungers for it too, but rather for those he loves, and respects than for himself; so large stones, or heaps of stones, and mounds of earth have been raised by savage or half-civilised man to those who have benefited him, and they have also been used to mark great events.

It would be something for us all to know what architecture is, and very much for the student, for without knowing this he may follow a will-o'-the-wisp all his life and find himself in a quagmire at last.

Architecture, from the first written record of it that has come down to us in Vitruvius, was treated as the art of building properly; and in a book of much more importance than Vitruvius, and nearly as old, the New Testament, the architect is called "a wise master builder," and it was not, I think, till 1849 that we were informed that it had nothing to do with building. In the "Seven Lamps of Architecture" we are told: "Architecture is the art which so disposes and adorns the edifices raised by man, for whatsoever use, that the sight of them contributes to his mental health, power, and pleasure. It is very necessary, in the outset of all inquiry, to distinguish carefully between architecture and building. To build, literally to confirm, is by common understanding, to put together and adjust the several pieces of any edifice or receptacle of a considerable size. Thus we have church-building, house-building, ship-building, and coach-building. That one edifice stands, another floats, and another is suspended on iron springs, makes no difference in the nature of the art, if so it may be called, of building or edification. The persons who profess that art are severally builders, ecclesiastical, naval, or of whatever other name their work may justify; but building does not become architecture merely by the stability of what it erects; and it is no more architecture which raises a church, or which fits it to receive and contain within its roof a required number of persons occupied in certain religious offices, than it is architecture which makes a carriage commodious, or a ship swift. I do not, of course, mean that the word is not often, or even may not be legitimately, applied in such a sense (as we speak of naval architecture); but in that sense architecture ceases to be one of the fine arts, and it is therefore better not to run the risk, by loose nomenclature, of the con-

fusion which would arise, and has often arisen, from extending principles which belong altogether to building, into the sphere of architecture proper. Let us, therefore, at once confine the name to that art which, taking up and admitting as conditions of its working, the necessities and common uses of the building, impresses on its form certain characters venerable or beautiful, but otherwise unnecessary. Thus, I suppose, no one would call the laws architectural which determine the height of a breastwork or the position of a bastion. But if to the stone facing of that bastion be added an unnecessary feature, as a cable moulding, *that* is architecture." By which we see that the architect is only a decorator of walls. Fergusson, though he did not state it so crudely, had much the same idea, for the gross building should, according to him, be so super-abundantly strong that it could be cut away where wanted for aesthetic reasons. He no doubt was thinking of rock-cut temples; but I think, without wasting our time on refutation, we may cast all such whims and oddities to the winds. You might safely incise a stone wall or a column, or put on either a slightly raised pattern, or cover a wall with plaster for painting, or for mosaic, or you might veneer it with marble, but if you wished to enrich any part by deep carving without knowing anything about building, you would put the building in jeopardy and probably cause it to fall, not to speak of losing the pride and boast of architecture—that she has created an organism in imitation of Nature's own work, and not merely copied one. To show the paramount importance of constructive knowledge, I may say that even such masters of practical construction as the Mediæval architects were not always fully equipped. The abutments of vaults were generally not quite strong enough for the thrusts, as may be seen in the deformation of the angle piers of the transept in most cathedrals, and absolute failures were not unknown; the central tower at Beauvais is said to have been built twice, and to have twice fallen.

I think we now know that to be architectural each building must be exactly fitted for the purpose to which it is to be put; that its materials must be properly used; and that the whole must be put together according to the law of statics, which will give us the proper sizes and shapes of the parts; and that if we do this thoroughly, even in a hut or cabin, it will have a distinct character of its own. But you must not think that because this is easily said that it is easily done. Those things, however, we now call buildings are mostly groups of buildings. I think, too, that the common definition of architecture as building to obtain beauty is wrong—it is building properly so that the true character of the building may be expressed. We certainly do not want to build a prison so that it may look beautiful, but so that it may convey repulsion and horror. The gloomy grimness of Newgate is most appropriate. We do not want to make a court of law beautiful, but to endow it with awe and respect; for though law is said to be the perfection of reason, most of us pray to be delivered from the law, the world, the flesh, and the devil.

Before we can properly sub-divide architecture, we must consider life a little. We all must eat and drink, and I suppose in this climate be clothed; and, if our occupation is not hard out-of-door work, we must be warmed, and all of us want to have our food cooked—man has been defined as "an animal who cooks his food,"—and to be protected from the inclemency of the weather, at night at least. These things are absolute necessities, without which we die. The stores or warehouses that keep these necessities, or the shops that sell them, do not raise high or deep emotions in us, except, perhaps, when we feel we shall die without the necessities they contain. We hardly ask for beauty in a coal-store, a wool warehouse, an oyster, tobacco, drinking, or boot shop; but on the other hand, we ask for a certain amount of comeliness in all buildings, except where it would be improper; for buildings are obtrusive things, and take from us the view at least, often both light and air, and they always add to the pollution of a town. We want the highest sublimity we can attain in temples to the Deity, to whom we desire to express our thankfulness and submission; the utmost stateliness and dignity in buildings for Parliament, as the laws made there ought to add to our happiness, and, good or bad, greatly help in moulding the character of a people, and there the measures are decided which give us peace or war; grandeur in the mansions of great men who guide, instruct, or defend the people, and also in the monuments to those who have preserved or improved the nation; and some degree of beauty in every house, for it always contains some joy or some sorrow, and the education of the

nation is carried on there, for though children may get their schooling elsewhere, most of them get their education at home.

It would be wearisome work, if I could do it, to enumerate the different aspects that each sort of building in a large city should exhibit; but I think we may thus roughly divide buildings into the common-place, for those only containing the necessities for the continuance of life; the monumental, for those mainly devoted to the higher aspects of human feeling and intelligence; and the mixed, for those which combine both.

If man were as capable of making his buildings as perfectly fitted to their uses as Nature is we should want no more instruction, for she succeeds in making most of her works beautiful, and when she does not, it is probable that their repulsiveness is a warning against them, and is thus useful to man. She endows us with our senses, and these senses have their likes and dislikes; but this was not enough, for when the neglect of these instincts produces illness or death, she usually supplements the lesson by making the filth we accumulate, or the unhealthy site we choose for a habitation, a breeding place for annoying or poisonous insects, to again warn us of the risks we run. The capacity of making the purely useful agreeable, without further effort, is far from being given to man.

We see engineering structures as perfectly fitted for their uses as very clever and skilful men can make them, but we cannot say that the general result is beauty; on the contrary, the beautiful ones are most rare, the bulk of them are ugly, and some are hideous nightmares. We have seen that it is an injury to mankind to put up eye-sores, but this is by no means the strongest case in architecture. Engineering works are mostly for commonplace purposes, that is to say, directly or indirectly, for the creation of more food, clothing, and warmth; but the highest class of architectural works,—temples, monuments, and tombs—are mainly for emotional ends, and their object is to create or intensify such emotions, and not to diminish or destroy them.

We have only two masters to go to, Nature and former works, and we must recollect that the future is but the unknown quantity, evolved from the present and the past. A celebrated writer says: "The true men of progress are those whose point of departure is a deep respect for the past."

It may be said, for it has certainly been done, that we have but to copy what produced such emotions in the past, and does still produce other emotions now; but it must be borne in mind that some of our emotions are not those of antiquity, nor of the middle ages, nor of the East, nor even precisely those of our immediate predecessors; that there is a certain meaning attached to certain architectural forms, from their being associated with certain uses; as well as beauty attributed to forms, from their constant association with the higher sentiments. The Romans associated the pediment with a temple, and were proportionately shocked and disgusted when Julius Cæsar was allowed to put one on his mansion. From the same association Cicero thought pediments so beautiful that he expected to find them in the Elysian Fields. We associate a steeple with a church, a dome and minarets with a mosque, and the Mediævals of Italy a tower with a free town. The vast groined halls of the Roman baths suggest to us a Christian church; this must have struck Michelangelo or the Pope, when the Tepidarium of Diocletian's Baths was turned into Sta. Maria degli Angeli.

We ask in all structures built for us, that our material wants may be satisfied, and our emotions excited, when the building is for a use to excite emotion; and our neighbours and all beholders ask that it may not be an eyesore. This is, in fact, what the craving for novelty means,—improvements to suit the wants and tastes of the present time.

This at once raises the question that is all-important to this part of the subject: Have we got an architect that does fulfil all the wants, satisfies the taste, and expresses all the emotions of the day? For, if we have, nothing further need be said.

But can we, as architects, truly say that the buildings of the present day give us the exact and perfect arrangement that is wanted, that they exhibit the use of the materials in the precise way in which they are most fitted to their purpose, and that the construction is perfectly adapted to the end in view, and to the materials we employ? If we cannot affirm this, we must admit we have failed; and this mainly applies to the building part: the æsthetic and the emotional effect will require a fuller analysis. Yet this may be said,—that, so long as we hear the world

"styles" in architects' mouths, we may be sure we have not succeeded; for what is a style in this sense? It is the expression in building of the wants, the knowledge, the skill, and the taste of a people or a nation in a different, and in most respects a lower, position than our own, whether that people were Greek, Roman, Byzantine, Saracen, or Medieval.

The Greeks and Romans were pagans. Jupiter struck with his thunderbolts people that were impious, or buildings or towns that were accursed. This is hardly our view of the cause of lightning. The captains of ships that sailed or rowed without a chart or a compass, and got out of their course in a storm on a starless night, attributed it to the anger of the gods for some sacrifice committed or some sacrifice forgotten; but this is not our interpretation. Socrates pronounced virtue to be incommunicable. Because Pericles' son had been taught to ride on two horses, and yet could not govern Athens, an English prime minister would hardly send his son to learn riding at Astley's to fit him for the post! Infanticide was not only practised, but was not even strongly reprobated; the Romans were slaveholders, and believed in witchcraft and the evil eye, and sacrificed living animals. This last we have abandoned, at least since the old gentleman died in this century, who sacrificed a ram to Jupiter in his back parlour at Stoke Newington.

The Byzantines were orthodox Christians, industrious, turbulent, cowardly, and cruel, besides being rotten to the core with corruption. The Saracens were fanatical Mahomedans, fierce and turbulent, torn to pieces by tribal hatreds, without much inventive genius, but with a passion for geometry and mathematics, and were also slaveholders. The Medievals were at first little better than savages, but after the early Crusades they made a good deal of progress in the arts, and particularly in architecture. The bulk of the people were serfs, few but the clergy could read and write, and all classes were bigoted Roman Catholics, as we see by the crusade against the Albigenses. Science had scarcely begun to be studied, for the very suspicion of it was heresy. It was a time when, as has been said, "the highest result, at least on this planet our earth, was a choir of priests chanting psalms." Compare these separate stages with our own, in which science has completely revolutionised our views of our own position in the universe and of its government, in which time and space on this earth have, to a great extent, been annihilated, in which the most important events in the whole world that happened yesterday, are brought to our breakfast-table in the *Times*, when the sun makes pictures for us, and the powers of the air light up our houses of a night. Now in England, almost everyone can read, write, and cipher; and the masterpieces of literature can be bought for the price of a pot of beer. The whole world is better fed, clothed, and taught than it ever was; new materials are to our hand, to which marble and granite, for their resisting power, are almost nothing; and we have advanced the science of statics to a height unknown before. When we can prevent some pestilences, and unravel the processes of vitality, surely we have something else to say in architecture than they had in the sixteenth century, not to speak of the thirteenth?

Taking the culminating point of the Middle Ages as having produced the greatest architectural works the world has seen, for the combination of constructive skill with emotional expression, what visions do we see before us of a future architecture if we can make the one step forward! An architecture that will so completely overshadow these masterpieces of the Middle Ages, that we shall look upon them as mere antique curiosities, kept only as landmarks to show our progress.

Think of the future temples to truth, to religion; of the buildings where the mysteries of nature are unravelled; where wisdom, virtue, and courage are taught; where strength and beauty compete for the prizes; where the last triumphs of science and art are exhibited to the people; the temples where the people are purified, instructed, and exhorted before giving their votes; of the tombs or cenotaphs to the benefactors of their country or the world, that will make the tomb of Mausolus seem but a wart.

CHICAGO EXHIBITION, 1893.—We are informed that Her Majesty has accepted a drawing of the design for the Victoria House at Chicago, which has been presented to her by Colonel Edis, the Honorary Architect to the Royal Commission for the Chicago Exhibition.

M. CÉSAR DALY ON THE FUTURE DEVELOPMENT OF ARCHITECTURE.

We have been asked to publish the following letter recently addressed by M. César Daly to Professor Aitchison:—

"Dear Mr. Aitchison
I am generally a bad correspondent, but some people—very few—seem to put the pen between my fingers, because I have always some answer to make to those who *think*, like cultivated minds enriched by observation and reflection—you shine amongst these, and you are also a hard worker of course, you will leave a long trail behind you and supply crutches to many. I am at the outward portal of life, and I feel very sorry to have spent so many years in addressing myself, with such trifling results, to people who do not like to read. French architects speak with their pencil: it is, in fact, the architect's tongue. But, in our days particularly, it is not sufficient. All the old sectarian formations, the "schools," in architecture, are broken through. Who is in the right, who is in the wrong? Every school has, or had, and ought to have, its aesthetic doctrine, as each religion has its theology; but our schools are all verging actually into one another, forming a general eclecticism; and eclecticism is not and cannot be a philosophical doctrine. And why? Because the principle of eclecticism is individual choice, and is all contrary to *collectivism*, or any general principle. It is individualism, that is, segregation. Now *society* means union and harmony, and *style* is also union and harmony, between the mental and æsthetic powers, between constructive science and æsthetic expression. Actually, architecture is becoming dust. From the dust must arise a splendid statue, as Adam (in Biblical language) arose from the mud of the earth under the influence of divine power. How is this to be prepared? By the organisation of the Higher Studies of our art.

By the ordinary process of teaching you form capital students. By the higher studies you would form teachers and leaders in art. Nowhere in matters of architecture have the higher studies been organised. The architectural language itself is held back. All the principal vocables are under discussion. "Grammatica certant," says Horace. There are two forms of language; the *phonetic*, which embraces literature, speaking, and music; and the *plastic*, which embraces architecture, sculpture painting, and declamation by gesture (pantomime). The first speaks to the ear, the second to the eye. The first is addressed particularly—not *only*—to the mind; the second more particularly to the senses and the emotions. Now Society offers in its history two grand phases; the first, while the religious faith is the same for all; the second, when religious discussion breaks up the social and moral unity. Society, during the period of religious unity, has a style in architecture; whilst all harmony of style disappears in architecture as soon as the religious segregation supervenes.

I speak here so concisely, giving no examples (they are striking), that I have every reason to fear that I hardly make myself understood. But these observations may show—even if they are to be rejected—the necessity of preparing the future of our art otherwise than by simply copying and observing and studying all the forms of historical art and the resources and wants of the present times. *Conclusions must be drawn from the past to guide us in the road of the future.* The past then must be thoroughly known, and conclusions drawn therefrom, as well as we must thoroughly study construction, science, and modern technical progress on one side, as well as physical wants and moral tendencies on the other; for architecture is at the same time, as well as the revelation of the individual tendencies of the architect, the expression of modern society considered in its wants, its feelings and its architectural resources, physical and mental. Do think of *organising* the higher studies of architecture.

Individual efforts are useful, but insufficient. Frenchmen do not like to read; English and American, and I think German architects, read much more than the French. The French are too exclusively plastic. Periods of transition claim the double assistance of philosophical analysis and æsthetic synthesis; they claim the *pen* and the *pencil*, *thought* and *inspiration*.

I think England and America better prepared to follow up the higher studies than my own dear country. If any other country takes up the mental side, Frenchmen will promptly blaze up with their plastic power.—Yours always

CÉSAR DALY.

Wissous, Seine-et-Oise, France,
December, 1892.

BYZANTINE ART IN ITALY.*

It is only necessary for me to draw your attention to the photographs on the walls (which illustrate a portion only of the treasures of St. Mark's) and you will be able to judge for yourselves of the enormous influence which such work was likely to exercise on the development of the Lombard style, and that not only in Venice herself, but in all those towns with which by sea or land she was in constant communication. Mr. Jackson's work on Dalmatia and Istra will show you how great an influence was exercised in Venice by the Byzantine churches in those countries, a debt which was repaid afterwards when in succeeding centuries they were ruled by Venice. If I have not mentioned Dalmatia and Istra specifically before it is because I have included them generally with Eastern countries. But as to the influence of St. Mark's, so enamoured were the Venetian artists with Byzantine work that down to the Renaissance period they frequently copied it with such accuracy as to deceive all but experts, and many of the wells reported to be eleventh or twelfth century work are, according to Cattaneo, reproductions of the fourteenth and fifteenth centuries. There is a favourite string-course with leaves turned over, the design of which comes originally from Constantinople. Menas-tes-Koras (Kakriyah Djami) which is found throughout St. Mark's, in St. Donato Murano, in the early palaces of the Grand Canal, which I came across in a palace at Ancona, and I have no doubt could be found elsewhere, which testifies to the general favour with which it met in the cities of North Italy.

The Cathedral of Torcello, an island about eight miles to the north of Venice, was founded in the seventh century, and although reconstructed since, still possesses some of the Byzantine capitals which were used up in the first church. Of this church the central apse and fragments of the baptistry still exist. In 864 the external walls would seem to have been rebuilt, and two minor apses added, one on each side of the central apse. A crypt was then formed under the latter, the floor of the apse raised, and the range of marble steps and the bishop's throne erected. To this period also belongs the rich interlaced work of the west door-way. In 1008, when the son of Doge Orscolio became Bishop of Torcello, the nave arcade was rebuilt, and thirteen of the eighteen capitals dated from this period, as also the marble enclosure to the choir, the panels of which are Byzantine in treatment if not actually carved by Greek artists.

By the side of the cathedral is the Church of St. Fosca, originally a basilican church of the ninth century, but modified and partly rebuilt in 1008. There is a special interest attached to the changes which then took place, because they may possibly have suggested the rebuilding of St. Mark's on a Byzantine plan. The model, however, on which it is based is one of the later type of Greek churches, in which the central dome is carried on detached columns. They had, however, a very vague idea how to build pendentives, and still less conception of what the thrust of a dome was likely to be, and I should doubt if it was ever attempted. By throwing small arches across the angles they managed to arrive at the circular base for the dome, and then probably left off, the church now being covered with a timber roof, the exterior of which has the appearance of being the original covering. The capitals of the interior are fine examples of Byzantine Corinthian. Those of the octagonal arcade are barbarous attempts to invent new forms with Byzantine ornament.

The central apse, which was rebuilt in 1008, is polygonal externally, which shows its Byzantine origin. Underneath the cornice we find the earliest example of these triangular panels, which were afterwards adopted in the Church of St. Donato, in the Island of Murano, two miles from Venice, with this exception, that in St. Fosca the triangular recesses are filled with decorations in stucco, whilst at Murano, being much closer to the eye, they are filled with marble incised panels. There is no doubt that these panels, which are only incised and of simple execution, were produced to fit the panels, and not the converse, as is suggested by Fergusson. The church at Murano was built towards the close of the eleventh or beginning of the twelfth century, and possesses many fragments of interlaced pattern slabs of the eighth and ninth centuries. The two large slabs which stand between the upper arcade at each end of the west part bear so great a resemblance to the panels of the choir at Torcello that they

* By Mr. R. Phénix Spiers, F.S.A., being the concluding portion of a paper read by him before the Architectural Association on the 13th inst. (Continued from p. 52, ante.)

may have been carved by the same Greek artists. The apse of Murano is also polygonal.

The position of Ancona opposite the Dalmatian coast, and its facilities of communication with Venice by sea, would naturally bring it within the sphere of Byzantine influence. I have been quite unable to get any information as to the history of the churches here, so that it is difficult to decide their dates. The three churches of interest, so far as my subject is concerned, are the Duomo, dedicated to St. Ciriaco, Sta. Maria in Piazza, and Sta. Maria Misericordia. The latter is a square church on the plan of a Greek cross with dome in centre carried on four piers. There is no Byzantine detail except a pulpit of the eighth century; evidently carved by native artists who attempted to copy Byzantine work.

St. Maria in Piazza possesses an extremely rich west façade, with an unusual screen of arches one above the other, carried by small shafts. The wall behind these has been panelled with marble slabs carved with interlacing Byzantine ornament, which comes irregularly behind the shafts. I came to the conclusion on the spot that in imitation of St. Mark's at Venice the architect of the first church inlaid the upper portion of his façade with marble slabs from some more ancient building. At a subsequent date, finding that they were being outdone by St. Mark's, and being unable to command the supply of marble columns and capitals enjoyed by the Venetian Republic, they employed a Lombardic artist to decorate the front in his own way, and we have in this remarkable decoration the result of his efforts. The Byzantine leaf cornice is found both inside and outside of the church, which I should assign to the end of the eleventh century or beginning of the twelfth, and the arading fifty to seventy years later. Subsequent additions have much altered the upper part of the façade, and the aisles have been raised and partially rebuilt.

The Duomo or cathedral is variously ascribed to the tenth or eleventh century, but it contains Byzantine capitals and other treasures of much earlier date. I should ascribe it to the end of the eleventh century, and the plan seems to me to have been taken from St. Mark's at Venice. It is in the form of a Greek cross (not including the extension of choir at a later date), and it consists of nave, transepts, and choir, all with side aisles, and a central ribbed dome of twelve sides, carried on a drum and pendentives of the twelfth century. The nave, transepts, and choir are all covered with timber roofs, and there are crypts under both transepts and choir. The capitals are all Byzantine, with dosserets, and in the balustrade of the parapet to south transept there are eight marble slabs with incised work, originally, I think, inlaid with mosaic, four of which must, I think, be of Greek workmanship, as they are carved with birds and animals which have their prototypes in Greece. The inscriptions, however, on other examples stored in the crypt are in Latin, as also those on the figures or face of the slabs or parapet to south transept and others encased in the façade rebuilt in the thirteenth century. The inlaid ground of those in the transept had all been taken out, but in the crypt one of the slabs still retains its cement inlay, with three or four pieces of glass, which suggested that they were tesserae from which the gold surface had been chipped off. I have tried in various ways to obtain more information respecting these slabs, but in vain, and as I unfortunately arrived in Ancona two days before some *fiesta*, and before I left the whole church was enveloped in red drapery and the windows covered with veils, I was unable to copy any of the inscriptions.

Owing to the paucity of examples in Lombardy prior to the eleventh century, we are unable to trace the earlier developments of what is termed the *Italo-Byzantine* style to distinguish it from the *Romano-Byzantine* and the *Lombardo-Byzantine* phases. The few churches which remain, and to which I have already referred, of the ninth and tenth centuries, still retain the simple basilican form with timber roofs. Early in the eleventh century, however, a new and important element is introduced in the desire to erect churches, the construction of which should be fire-proof, in other words, to vault the nave and aisles of their churches. This had for centuries been done in the East: in fact, after the erection of Sta. Sophia, all the churches were vaulted. De Dartein does not recognise any Eastern influence in this respect; at the same time, he is bound to allow that it may have inclined the architects of the West to make an attempt in the same way. The domical form given to the webs of all the Italian examples is so marked, and is so widely different from the early Roman vaulting, which at that time still remained throughout the country, that it is only fair to suppose that the early Italian builders may

have profited by the lesson set them in the East. Be that as it may, it is quite certain that with the introduction of vaulted naves, altogether different plan of pier or support was required in the place of the ordinary basilican column, and the favourite Byzantine Composite or Corinthian cap could not be used up again. They were obliged, therefore, to invent and carve a new combination of capital which should meet the requirements of the compound or clustered pier.

The dosseret was given up, or rather its place was taken by an abacus of less height, decorated with interlaced work or scrolls, or leaf ornament of various kinds. It had no longer the same great projection, for here we return again to the old Roman system, in which the arch or archivolt or wall above is in the same plane as the pier or shaft below the capital.

In the Byzantine capital animals or birds are rarely carved; the eagle, the lion, the lamb, and the ram's head occasionally take the place of the volute, and support the angles of the abacus, but are probably not found in more examples than from 3 to 5 per cent. In the Italo-Byzantine capital it is almost the reverse. Animals, and monsters, and figures of all kinds decorate their capitals, relieved with interlaced work of various patterns. Though bold and vigorous, the carving of these animals is very barbaric, and it is only when they reproduce those animals or bird forms which occur occasionally in Byzantine capitals that the treatment is properly conventionalized and good. In fact, the finest capitals of the eleventh and twelfth centuries are those in which the artists have felt the influence of Eastern work and tried to reproduce it.

In the Church of St. Michele, at Pavia, carved work of three periods may be traced: 1st. The early Lombardic work of the eighth or ninth century, animals of barbaric type taken from an earlier building and built into the eleventh century façade; 2nd. Lombardo-Byzantine panels, which are utilised in the jambs of the portals; and, 3rd, the mingling of these two elements in the carved work specially executed for the church. The same is observable in the Church of St. Ambrogio at Milan, where the lamb and arch-moulds of the west doorway would seem to have been taken from the earlier ninth century church. Some of the carving in this church seems to be of earlier date than St. Michele, but I am inclined to think that is due to the existence of much Roman work in the town. In St. Eustorgio and St. Celso, also in Milan; in St. Pietro-in-Cielo-d'Oro at Pavia, St. Pietro and Paolo, Bologna, St. Savino at Piacenza, the Cathedral of Parma, and other churches of the twelfth century, we find a magnificent series of capitals, showing a wonderful fertility of design, and, as time progressed, of knowledge and finish of execution. One of these churches, St. Pietro-in-Cielo-d'Oro, is dated 1132, and in allowing fifty years earlier for the first developments of the style in St. Ambrogio, Milan, and St. Michele, Pavia, and, perhaps, twenty to thirty years later for St. Celso at Milan, we should probably not be far wrong, though some authorities, among them M. de Dartein, are inclined to give a much earlier period. Towards the close of the twelfth century the Byzantine influence dies out, and in the baptistry of Parma there is scarcely any trace; the concave sections given to the leaves and tendrils are replaced by convex, and interlaced work is seldom employed.

The Byzantine influence in Venice, Padua, Vicenza, and Verona lasted a much longer period. The Church of St. Antonio, at Padua, built between 1232 and 1307, is the most notable example, but only in the plan and the main features of the building in which they have attempted to reproduce a new version of St. Mark's. It is in the form of a Latin cross, and is crowned with eight domes.

Along the Grand Canal in Venice are the remains of seven or eight Byzantine palaces of the eleventh, twelfth, and thirteenth centuries. The most remarkable of these is the Fondaco dei Turchi, a building which has lately been entirely restored, I might say rebuilt, none of the ancient marbles being retained. I fortunately purchased on my first visit to Venice two photographs of the building in its original decayed condition, but of which there remained sufficient sound material to have been embodied in the restoration. The Venetians, however, wanted to have a new building, and allowed their architect to exercise his ingenuity in the design of an upper story or series of gables, which I am sure never existed in the old building. In the Casa Loredan, Casa Farsetti, and other palaces we find the original arcade and fenestration which formed the foundation of what is known as the Venetian Gothic style, such as is found in the Ca d'Oro, the Foscari,

and other palaces. The arches of these Byzantine palaces are all stilted, and in their hood-moulds they employ always what is known as the Venetian dentil, but which is first found in Sta. Sophia at Constantinople. This dentil is found in all the Venetian palaces down to the end of the fifteenth century, and also at Padua, Vicenza, and Verona. All the capitals which carry these arches are of Byzantine character, doubtless copied by the Venetian artist from those of the models in St. Mark's, and the leaf cornice to which I have directed your attention reigns throughout.

The Byzantine influence in Lombardy, I have said, dies out towards the end of the twelfth century. This, however, is not the case in Venice and in the towns which came within her influence. To go further, however, would take me beyond the period I have selected, and would certainly put too great a strain on the indulgence with which you have listened to my long paper.

I can only express the hope, in conclusion, that I have been able to lay before you clearly, 1st, the essential characteristics of the Byzantine style; 2nd, the sources through which the influence of that style penetrated into Italy, and 3rd, the principal results of that influence. If, beyond these three objects, I have been able to awaken your interest in the high decorative qualities of the Byzantine style, in the variety and beauty of its carved capitals and screens, and last, but not least, in the reticence and simplicity of its masses, I shall not altogether have failed in the object of my paper, although I have not gone to the headquarters of the style. For our immediate purpose as revivalists of principle in architectural design, the unconscious adaptation by a nation of a foreign style may possibly teach us lessons which the study of the originals would at first fail to impart to us.

The President said that they had had a very interesting paper from Mr. Spiers, and he hoped that there would be an interesting discussion upon it. Of course, it was a very difficult question to discuss for those who had not had an opportunity of seeing Byzantine work; but at any rate there might be some questions which they might desire to ask Mr. Spiers.

Mr. Edmund Woodthorpe said he had very much pleasure in proposing a hearty vote of thanks to Mr. Spiers for his most interesting paper. There was little he could say on the subject of the paper, and he should prefer, no doubt in common with many other members, to have time to examine the beautiful and large collection of drawings and photographs with which Mr. Spiers had so fully illustrated his subject. There was just one point, however, which occurred to him. He had lately seen the Church of St. Trophime at Arles, in which to his mind there was a very great deal of Greek feeling. The museum at Arles, he might say also, was one of the finest in France in respect of its Greek remains; and the thought had occurred to him while Mr. Spiers was speaking, whether some of the Greek artists, when turned out of Italy, had gone to Arles.

Mr. Bernard Dicksee said he had much pleasure in seconding the vote of thanks to Mr. Spiers. He only regretted that there was not a larger attendance of members to hear so valuable a paper—a paper from which many of the senior members, even, might have derived advantage had they been present. Mr. Spiers had referred to interlaced ornament, which was so general almost all over the world; did he think that that ornament originated solely in Byzantium or whether it might not have originated spontaneously in various parts of the world? He had always understood that such ornament was to be found in the Polynesian Islands, in New Zealand, and in Ireland.

Mr. C. Fitzroy Doll, in supporting the vote of thanks, said that the paper had been a most interesting one. He was afraid that very few of them when they were travelling about from building to building did so with the earnestness which characterised Mr. Spiers. He ventured to hope that Mr. Spiers would on some future occasion write them a paper tracing the influence of the Byzantine style in other countries of Europe. There was no doubt that its influence was very marked along the great northern waterways of Europe, the Rhine, for instance, and that it penetrated even as far north as the Hartz Mountains.

Mr. A. T. Bolton, in supporting the vote of thanks, regretted that members better informed than himself on the subject of Byzantine art had not addressed the meeting. He had been struck with the analogy that Mr. Spiers had detected between certain fourteenth-century and Byzantine panels in two churches which, as he had told

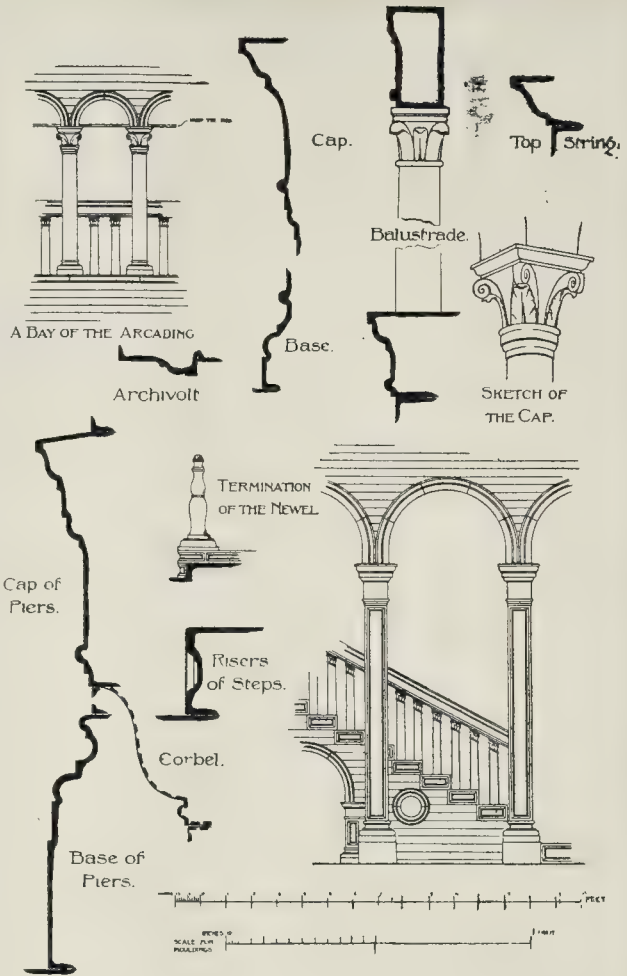
them, he had visited in rapid succession. It was the best excuse for the fast travel of the present day that such analogies were forced upon the student, which, by further study on some future tour to the same places, might be made useful. In this way he had been impressed and had studied the subsequent effects of Byzantine influence in Italy; for if they compared St. Mark's and St. Salvatore, at Venice with St. Giustina at Padua, and with certain other churches of the same or later dates, they would find that they were, in fact, examples of Renaissance treatment applied to the same problems of domical architecture. He had had the opportunity of drawing out sufficient examples of these late churches to a uniform scale to be able, he thought, to establish a certain sequence of development in the problem of adapting the dome to church architecture. This was a problem of the most interesting character, for it was still incompletely worked out. St. Paul's Cathedral presented a series of attempts at its solution, and anyone familiar, as most of them would be, with the interior, must have often thought over the difficulties and beauties that it presented. If Wren had been familiar with the examples displayed before them to-night, he would possibly have attempted certain other features in the interior. The use of galleries as structural parts of the edifice was one of the great lessons to be learnt from these Byzantine examples. It might be seen largely in the Greek churches at Athens, both old and new. The difficulties of the upper story of St. Paul's would be got over by such an upper aisle, which would have lent itself to a domical treatment. They must have noticed that in the last bay of the nave there was a slight balcony over the cornice due to the setting back of the clearstory wall, and that this bay was set out square, which suited its domed covering better than the other oblong bays of the nave. The way in which these latter bays were domed was well worthy of their attention, being extremely clever. He suggested these remarks as showing the interest of the problems of dome treatment. Though such domed interiors were rare in England, in Italy they would find hundreds of interesting examples, for the dome had become in Italy what the tower is in England. Mr. Spiers' paper had been prepared with a thought and labour not too common in Association annals, and he thought they owed him a special recognition of the fact.

The President, in putting the vote of thanks to the meeting, said that the interest and value of the paper had been immensely enhanced by the numerous illustrations which Mr. Spiers had exhibited, and by the care which he had taken to point them all out. He had seen a few of these Byzantine buildings, and had been particularly interested in the paper. The subject was an interesting one, inasmuch as Byzantine architecture was what might be called the first Christian style, and undoubtedly it was a connecting link between Classic work and Gothic work. If they would look at some of the drawings exhibited, they would see that some of the earlier forms of Byzantine detail were scarcely distinguishable from the late Classic details, whilst some of the later forms of Byzantine capitals, for instance, closely resembled Anglo-Norman capitals. It was very interesting, too, for them to see what St. Mark's must have been like before its decorations were placed upon it—to see the bare bones, so to speak. One could hardly recognise that it had ever existed, except in the form in which they now saw it.

The vote of thanks having been carried with acclamation, Mr. Phené Spiers said a few words in reply, and concluded by again explaining the points of a great many of the drawings exhibited.

ARCHITECTURAL PARTNERSHIP.—A partnership has been entered into between Mr. Reginald G. Pinder, F.R.I.B.A., of Bournemouth (of the late firm of Kemp-Welch and Pinder), and Mr. J. F. Fogerty, B.E., son of the late William Fogerty, F.R.I.B.A., of Dublin. The "style" of the firm is "Pinder & Fogerty."

STREET IMPROVEMENTS, BRADFORD.—Mr. R. Walton, C.E., one of the inspectors of the Local Government Board, held an inquiry on the 17th inst., at the Bradford Town Hall, into an application by the Town Council of the Borough for sanction to borrow 33,763*l.*, money expended on the purchase of premises for street improvements already effected, and for sanction to borrow 15,000*l.*, the estimated cost of other purchases during the next three years. After evidence had been given as to the manner in which the 33,763*l.* had been expended, the inquiry concluded.



Details of Staircase, Palazzo Minelli, Venice.—Drawn by Mr. R. Shekleton Balfour.

Illustrations.

TYPES OF BYZANTINE CAPITALS IN ITALY.

THESE illustrations of capitals of the Byzantine type in Italy are published in connexion with Mr. R. Phené Spiers' paper on The Influence of Byzantine Art in Italy, the concluding portion of which is given in the present number. They illustrate various instances of the Byzantine form of capital, or of obvious Byzantine influence, in work executed in Italy.

The capitals from San Vitale are from the choir, and are purely Byzantine in form, the celebrated church at Ravenna being in fact to all intents and purposes a Byzantine building on Italian soil. The two capitals from the nave of St. Mark (the two on the left hand in the plate) are examples in which the general form of Classic capital is retained, but modified in detail by Byzantine influence. That on the right, from the west front of St. Mark, is more distinctly Byzantine in form.

"THE HALL," HAMPSTEAD.

This building, planned for the purpose of a residential mansion, but adapted to the uses of a ladies' high school, has been erected by Mr. Watson, builder, of Ascot, from plans and designs by Mr. E. R. Robson, F.S.A.

The building possesses a fine central hall, from which it derives its name.

The illustration shows the front towards Crossfield-road, near Eton-avenue.

Owing to the levels of the land in relation to the street, the school entrance, the central hall, and the lower class-rooms are placed on what is termed the basement, but which is, in reality, a ground floor. The central hall—lighted principally from the top—extends through two stories, and has a gallery on one side, giving access to three class-rooms. There are also rooms for piano practice, ample cloak-rooms, lavatories, and a large tennis court. The class-rooms and hall floors are laid with oak parquetry. The whole is warmed by means of low pressure radiators in conjunction with open fires.

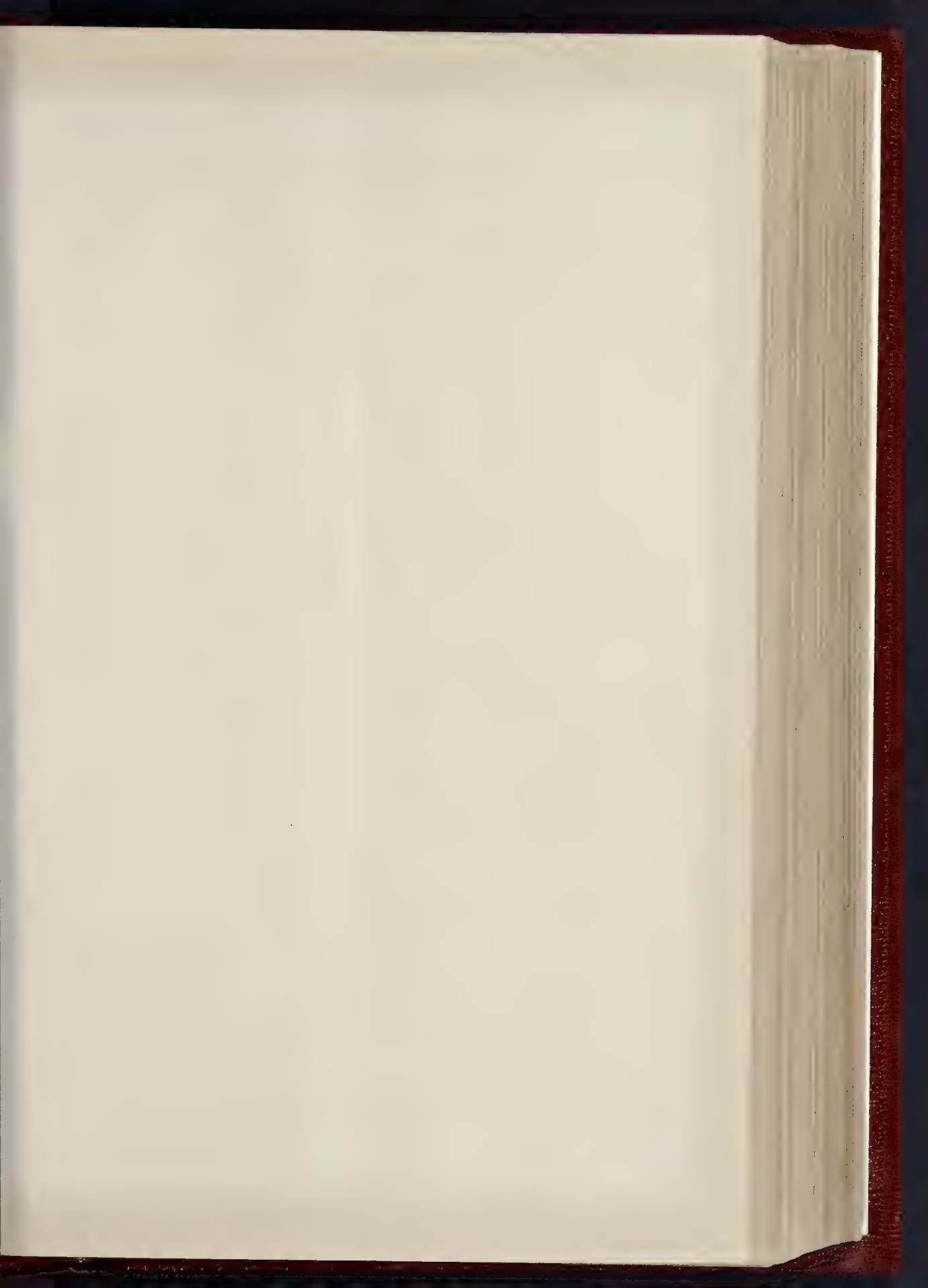
PROPOSED HOUSES, LEDBURY.

THESE houses have been designed for an elevated site near the picturesque town of Ledbury.

Ruabon bricks, with red stone dressing (the latter being quarried near the site) are to be used in the lower part, with stucco and half timbered work in the upper part and gables. The roof to be covered with Broseley tiles. The woodwork in the interior will be chiefly of oak. The estimated cost of the two houses is 1,150*l.*

The drawing was exhibited at the Royal Academy of last year.

G. H. G.



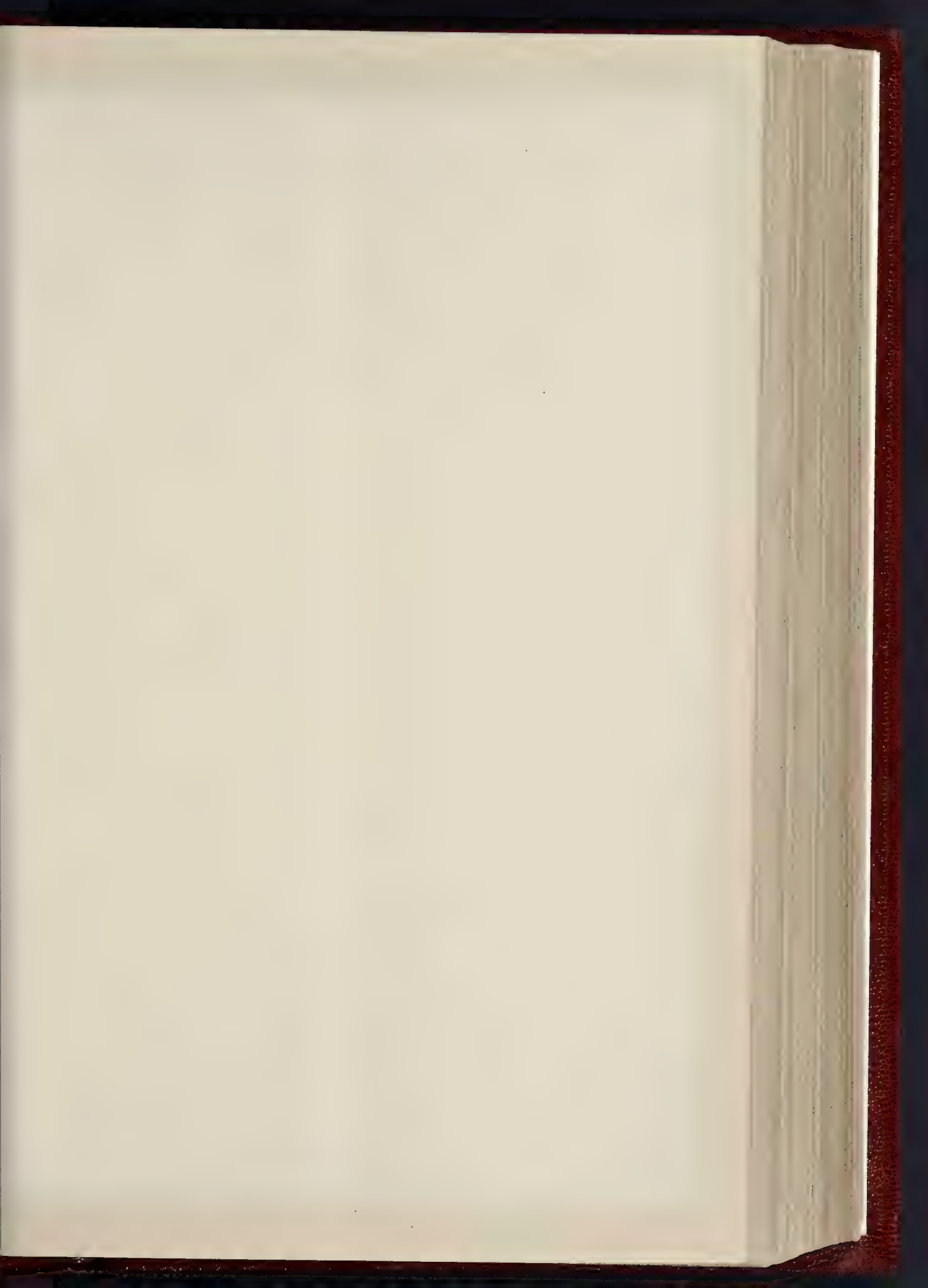


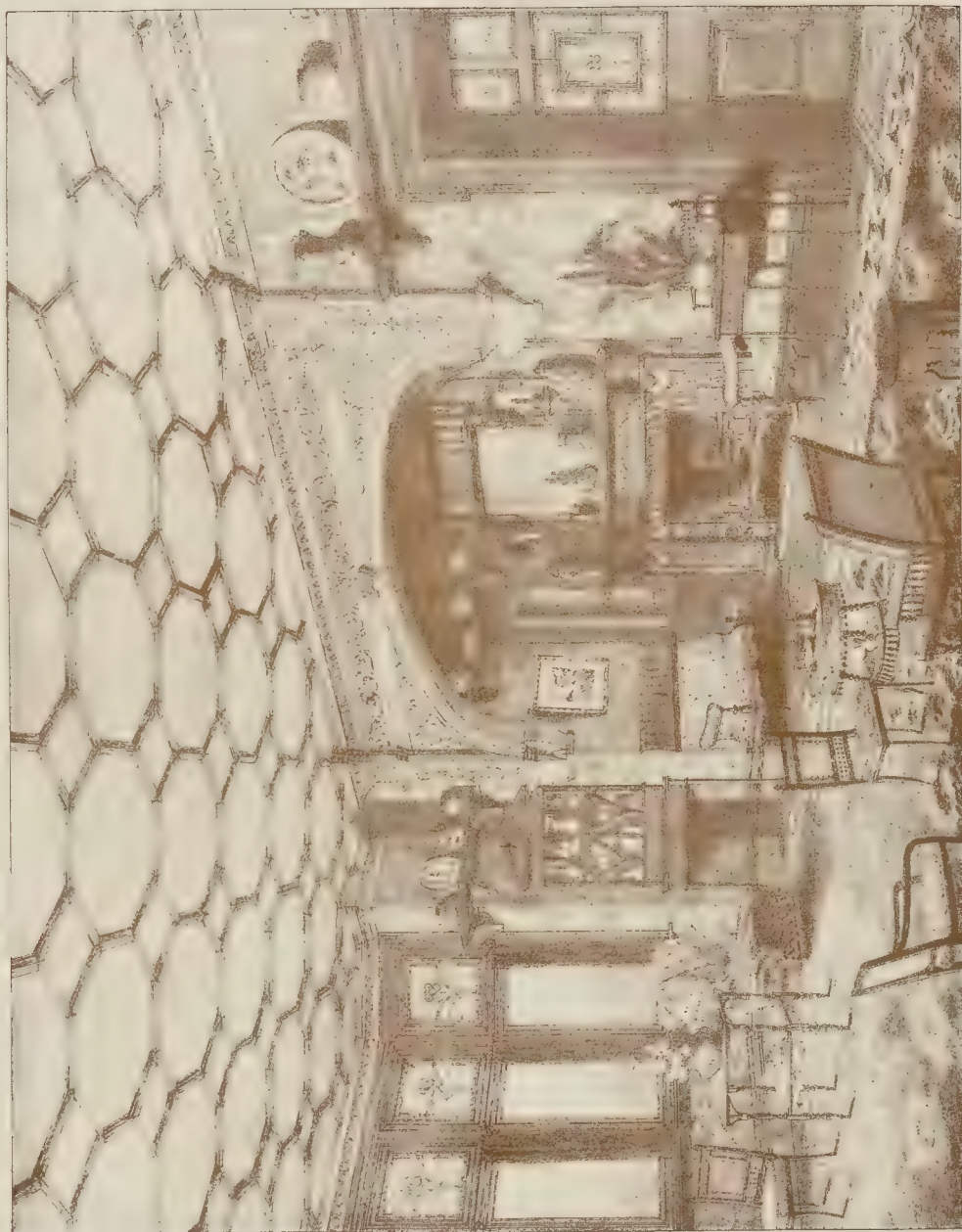
THE HALL. NEAR ETON AVENUE

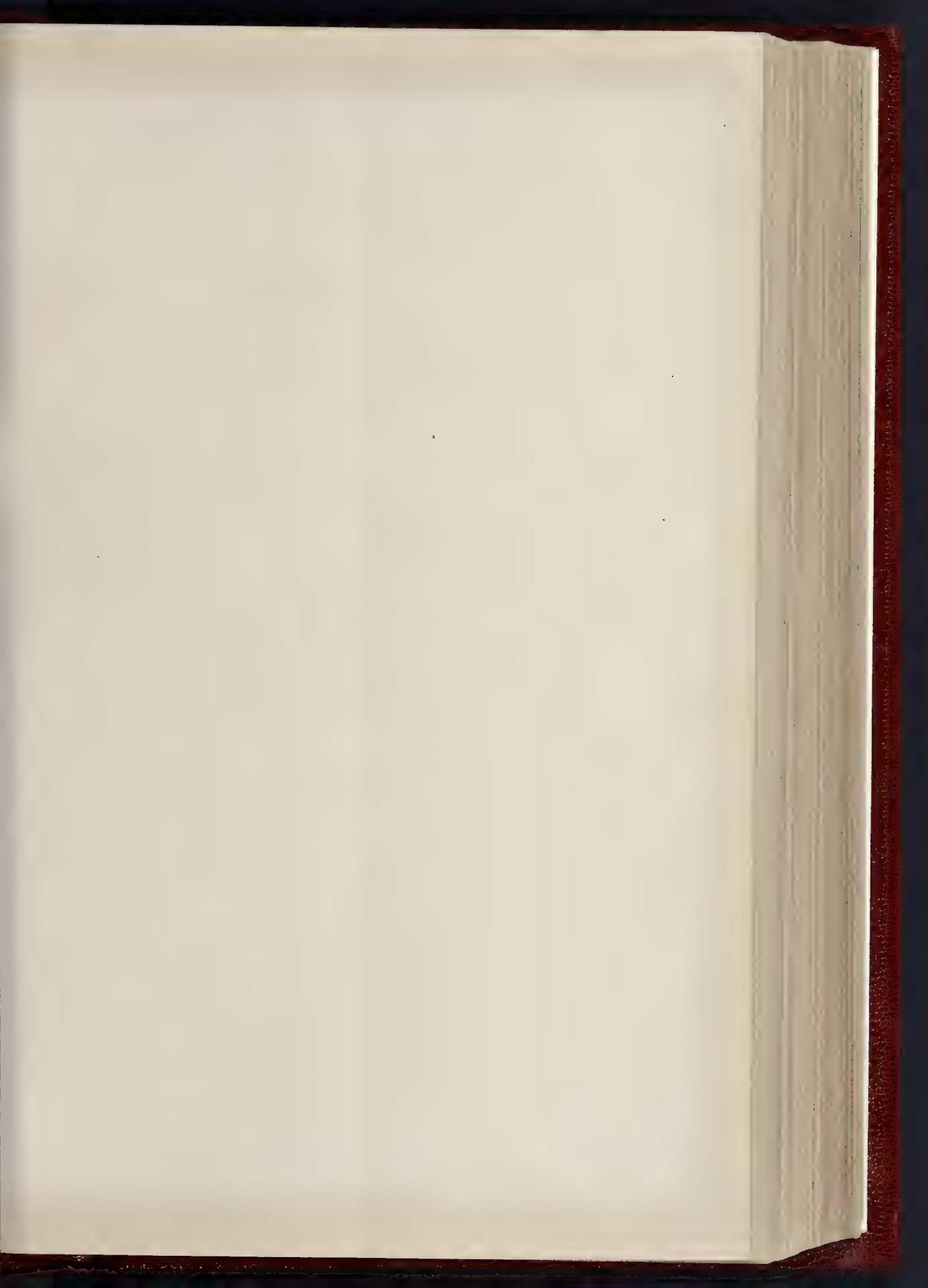


PHOTO LITHO SPRAGUE & CO 445 EAST HAWKINS STREET PITTSBURGH P. A. C.

R. ROBSON, F.R.I.B.A., ARCHITECT.







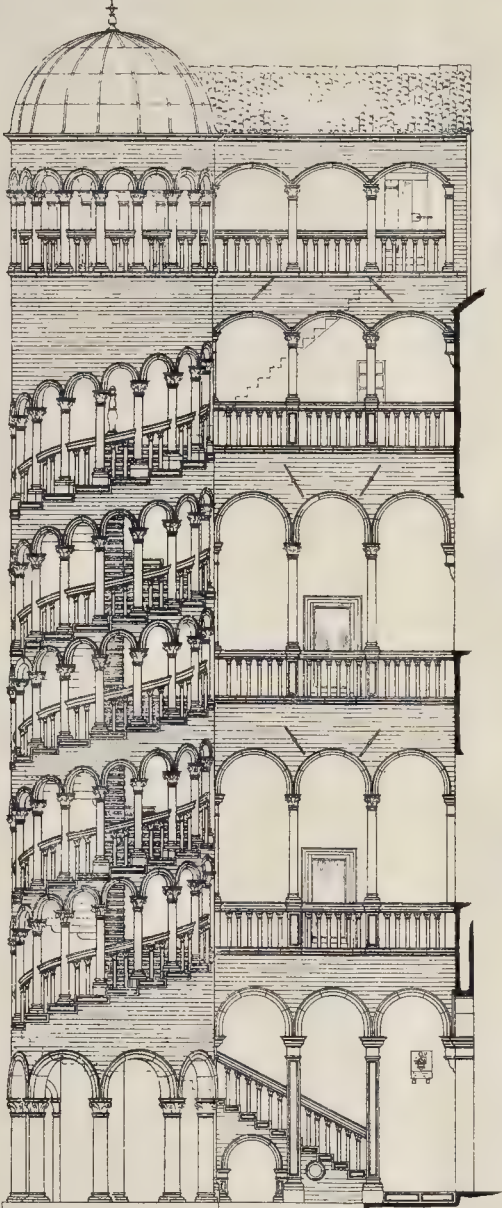
THE BUILDER, JANUARY 28, 1893.

Proposed Houses
for Henry
for McCaffrey
Gillcock
Architect

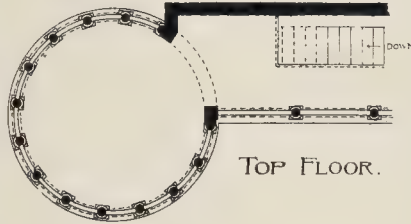


SCALA DEL PALAZZO MINELLI. VENICE.

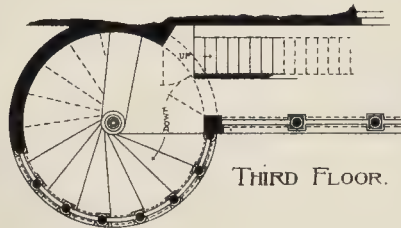
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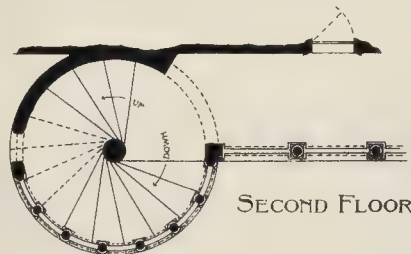
ELEVATION.



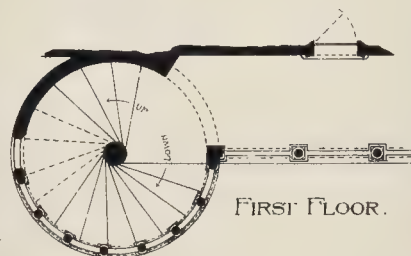
TOP FLOOR.



THIRD FLOOR.



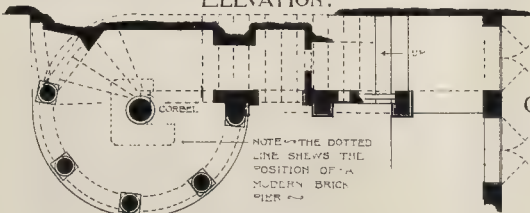
SECOND FLOOR.



FIRST FLOOR.

NOTE THE MATERIALS USED
ARE FLORENCE BRICK
AND WHITE MARBLE.

GROUND FLOOR
PLAN.

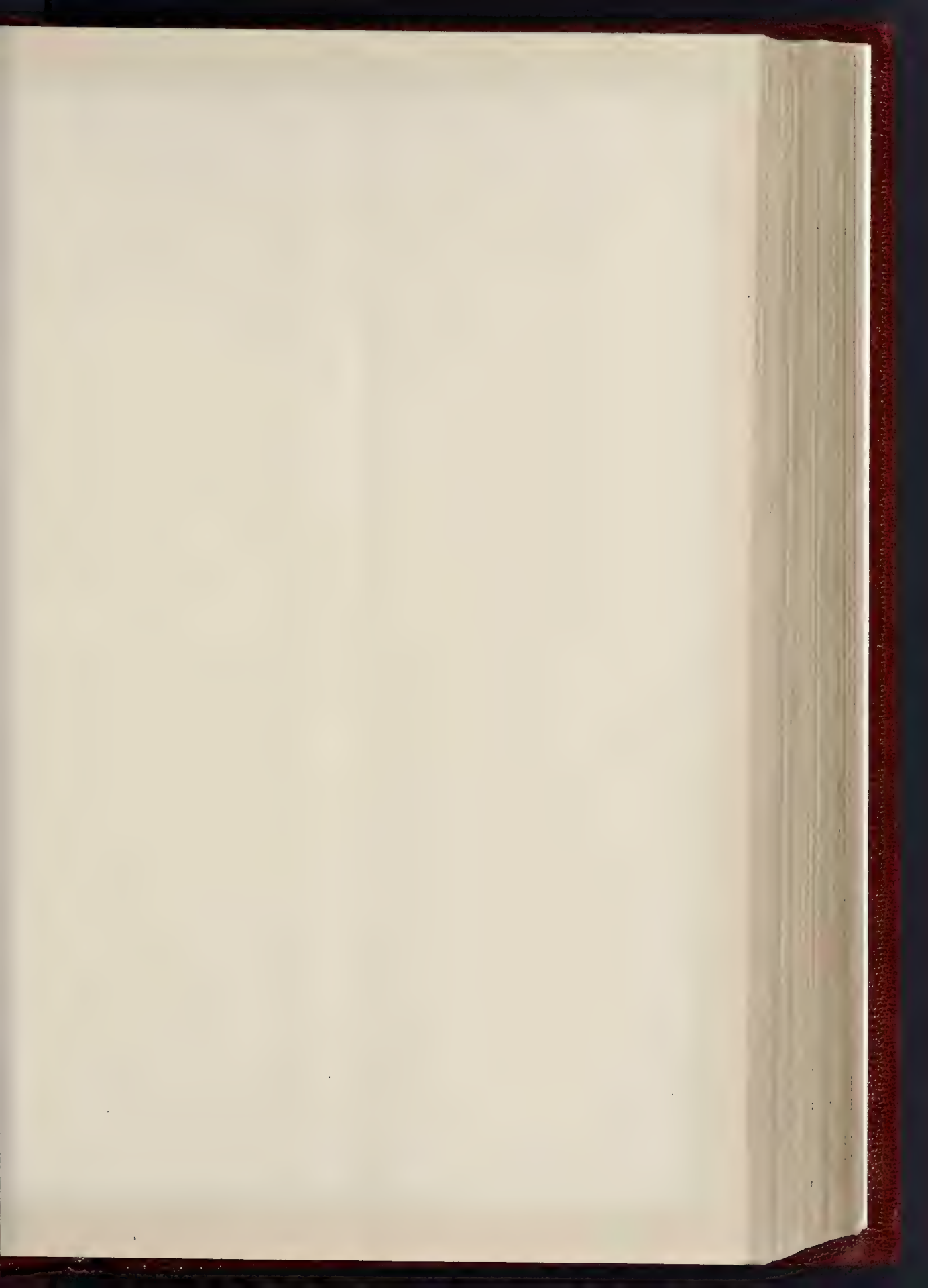


NOTE THE DOTTED
LINE SHOWS THE
POSITION OF A
MODERN BRICK
PIER.

Shelton Holman
June 1892.



HOUSE AND OFFICES BATTLE - SENSEN MR. FRANK H. TOL, I RIBA, ARCHITECT





ST. APOLLINARIS IN CLASSE.



SAN VITALE

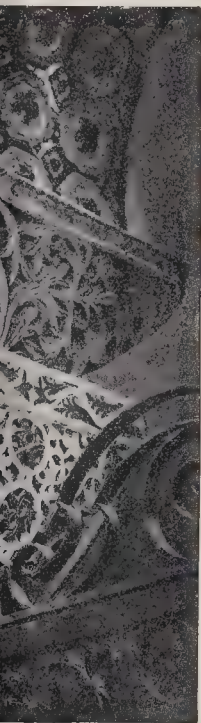
BYZANTINE CAPITAL

S. MARK VENICE



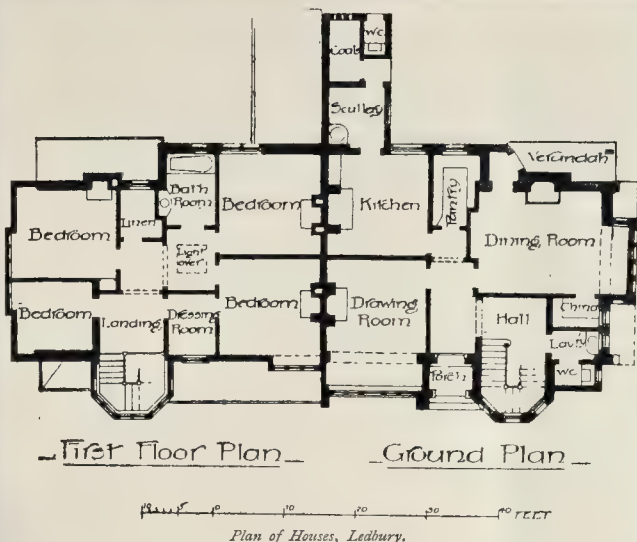
ST. MARK, VENICE.





ST. MARK, VENICE.





STAIRCASE, PALAZZO MINELLI, VENICE.

THIS staircase, known also as the Scala di San Paternian, rises in an out-of-the-way little corner called the Corte del Maltese, about midway between the Piazza and the Rialto.

It is an early specimen of Venetian Renaissance, and forms the only erected portion of a palace, designed probably by one of the Lombardi family, to whom "the floating city" owes so many of her architectural beauties. The building shows many of the peculiarities of the late Lombardic Romanesque, noticeable even as far south as Pisa; while the balustrade and the stilted arcade remind one how hardly Byzantine art died out even in the "Renaissance" of Venetian architecture.

R. S. B.

LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

Tenders.—Tenders were received for the erection of a Fire Brigade Station in Queen's-road, New Cross, and for putting in the foundations of artisans' dwellings at Blackwall. The lists will be found on another page.

Appointment of Manager of Works and Stores.—The Works and General Purposes Committee presented the following report and recommendation:—

"Under the resolution of the Council of November 22 last, an advertisement was issued inviting applications for the post of Manager of Works and Stores, at a salary of £700 a year. The applications (126 in number) were, in the first instance, referred to a joint sub-committee, consisting of members of the General Purposes Committee and of the Works and Stores Committee, who, at our request, selected six candidates whom they considered the most suitable. Having seen the six candidates thus selected, and fully considered their respective merits and qualifications, we submit to the Council the names of three of them in the following order.—Mr. T. Holloway, Mr. G. T. Earle, and Mr. A. Robertson. We recommend,

"That Mr. Thomas Holloway be, subject to a certificate of fitness by the Council's medical examiner, appointed Manager of Works and Stores at a salary of £700 a year, upon the following conditions:—That he do hold his office during the pleasure of the Council; that he be required to give his whole time to the duties of his office, and be not allowed to take any private business; that any fees received by him either as a witness or in any other capacity during the pleasure of the Council; and further, that on retirement he shall not be entitled and shall not make any claim to any retiring allowance under the Superannuations Act, 1866; and that he will submit to any general scheme which the Council may adopt with respect to insurance for pensions or superannuation."

Mr. J. Williams Benn, M.P., in moving the adoption of the recommendation, asked leave to amend the recommendation by the insertion of the words "and any discounts or allowances on materials purchased," after the words "paid to the Council."

Leave was given to amend the recommendation in this way, and it was unanimously agreed to without discussion.

Shortly afterwards Mr. Holloway appeared on the dais and expressed his thanks to the Council for appointing him.

Blackwall Tunnel.—The Bridges Committee presented a long report providing for the sewerage, raising, and forming of all the southern approach roads to the Blackwall Tunnel. It was necessary that the whole of these roads should be finished and ready for traffic as soon as the tunnel is completed, which, if within the contract time, would be about April, 1895. The Committee recommended:—

"That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the plans and specification submitted be approved, and that the Bridges Committee be authorised to issue advertisements inviting tenders for the works."

The recommendation was agreed to.

The West Ham Corporation Bill.—The Parliamentary Committee presented the following report and recommendation:—

"There are several matters in this Bill which may probably require consideration, but there is one to which we wish to draw immediate attention. By Part III. of the Bill it is proposed that the London County Council shall permit the sewage of the borough of West Ham to be delivered into the northern outfall sewer, subject to such payments at such times and in such manner as, failing agreement, may be determined by arbitration. This clause opens up a question of considerable importance, especially having regard to the large and increasing population of West Ham, which, in 1891, was 204,902. It is true that there have been instances in which the sewage of outlying districts has been received into the main drainage system of London; but it is not convenient that this arrangement should be extended, and that the London County Council should be compelled to accept the responsibility of dealing with the sewage of districts not under its government and control. The Council will wish to avoid, if possible, a Parliamentary contest with the neighbouring Corporation of West Ham, and it seems clear that such a proposal as is now made is one which ought to be the subject of negotiation and agreement between the two bodies. But in our opinion the proposal is inopportune at the present time. It is intimately connected with wider questions, such as the rectification of county boundaries and the unification of London. Moreover, further legislation to supplement the Local Government Act, 1888, has long been looked for, and, pending the introduction of a measure for the constitution of District Councils, we do not think it desirable that places in the immediate neighbourhood of London should have further powers of this character granted to them. Without entering into any details of the Bill at the present time, we are of opinion that the attention of the Government should be directed to it, and we recommend—

"That a communication be made to the Local Government Board calling attention to the West Ham Corporation Bill, and expressing the opinion of the Council that pending the introduction of the Bill for the constitution of District Councils it would be premature to grant the powers asked for."

Considerable discussion ensued on this recommendation, and an amendment to the effect that the matter be referred back to the Committee for further consideration was moved by Col. Hughes, M.P., who contended that it was the duty of the London County Council to give all reasonable facilities to the Corporation of West Ham in regard to the disposal of its sewage, which now passed into and fouled the River Lea, and as the River Lea fell into the Thames at a point above the Northern Outfall sewer, the Thames was seriously polluted. On the other hand, it was stated on behalf of the Parliamentary and Main Drainage Committees that they had no objection, *per se*, to admit the West Ham sewage into the Metropolitan Outfall sewer, but it was a question of terms upon which the Council and the Corporation of West Ham had been unable to agree. The terms proposed by the latter body were unreasonable, and it was now proposed by this Bill to force the hands of the Council. Ultimately, the amendment was rejected by a large majority, and the recommendation of the Committee was agreed to.

Technical Education.—The Special Committee on Technical Education presented a long and important report, but its consideration was postponed for a week.

After transacting other business, the Council adjourned at 7 o'clock.

COMPETITIONS.

PUBLIC OFFICES, ILFORD.—In this competition the first premium of 50 gs. has been awarded to the design with the motto "Eureka," by Messrs. Clark & Hutchinson, London.

NEW CHURCH, ST. ANNES-ON-THE-SEA, LANCAIRE.—The parishioners of St. Annes-on-the-Sea have selected the design and plans for the new Church of St. Thomas, about to be built on the Drive, at St. Annes, at the south or Lytham side of the town. Three designs were received, and, after some discussion, that sent in under the device of a ring and a dove was selected. On opening the sealed envelope which accompanied the design, this was found to be by Messrs. Paley, Austin, and Paley, of Lancaster. The new church, the cost of which will be £6,000, is to be in the late Decorated style, and will have its floor level raised some feet above the surrounding streets, on a terrace. The number of sittings is 600.

NEW MARKET, &c., PONTYPOOL.—At a recent meeting of the Pontypool Local Board (Mr. W. Sandbrook presiding) the competitive plans of the proposed new market were discussed, and ultimately those signed "Dymd Fo," which had

DRAWING-ROOM, "WARIALDA," EASTBOURNE.

THE house of which this is one of the rooms, was erected in 1891 in the upper portion of Carlisle-road, Eastbourne, on the slope of the hill known as "Paradise." The window shown on the left of the drawing looks over the village of Meads towards the sea. The glazed door on the right leads to a conservatory.

The inglenook arch and the ceiling are of plaster; and the whole of the furniture, including the mantelpiece, overmantel, and grand piano, of inlaid satinwood: the grate is of electro-copper.

The architect is Mr. Louis Ambler, and the drawing was exhibited at the last Royal Academy.

HOUSE AT BATTLE.

THE fact that this building is to be situated in a central position in the High-street, and in proximity to the Abbey, has induced the proprietor to permit the architect considerable liberty with the design, which has been prepared in harmony with the half-timber work as frequently met with in Sussex towns and villages. A very interesting example may still be seen in the "Old Abbot's Hospital," adjoining the Abbey entrance. The introduction of such a design will not, therefore, be out of place, considering the town it is to be placed in. The internal work will accord with the exterior design—hall, staircase, dining-room, and office having ceilings framed with roof timbers, high dado panelled, &c. The architect is Mr. Philip H. Tree, of St. Leonard's; the drawing was exhibited at the Royal Academy last year.

AN ARCHITECT-MAGISTRATE.—We have pleasure in noticing that Mr. J. A. Gutch, F.R.I.B.A. and Past-President of the Architectural Association, has been appointed one of the County Justices for Northamptonshire.

been prepared by Messrs. Robert Williams, Ethingam-road, Lee, S.E., and Mr. D. J. Lougher, civil and mining engineer, Pontypool, were adopted, subject to modifications.

ARCHITECTURAL SOCIETIES.

THE MONTHLY STUDENTS' MEETING of this Association was held at the Art Gallery, Newcastle-on-Tyne, on the 18th inst. Mr. J. H. Morton, F.R.I.B.A., President of the Association, occupied the chair, and Mr. C. S. Errington read a very interesting and instructive paper on Gothic mouldings. The lecturer traced the development of mouldings through the different periods of Medieval architecture, and illustrated this by full size cartoons and by demonstrations on the blackboard. There was a large audience of students and associates.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—At the meeting of this Association on Wednesday, January 18th, Mr. Allan Wyon, F.S.A., in the chair, it was announced that an invitation had been received from the Mayor and Corporation of Winchester for the congress of the present year to be held in that city, and that the invitation had been formally accepted. The congress will be held in August, and visits will be paid to Romsey, Southampton, and various other places of antiquarian interest in the locality. The Rev. D. Bowen exhibited views of his church, Monkton, near Pembroke, showing the chancel restored, it having been in ruins on the occasion of the Society's visit. Mr. J. T. Irvine forwarded drawings of some curious interlaced carving found in Otley Church, Yorks, which were pronounced to be of Pro-Norman date by the meeting. Mr. J. Storrie reported the discovery of encaustic tiles of Medieval date, in forming the foundations of Lloyd's new bank at Cardiff and also many examples of Roman pottery, some being of peculiar type. Mr. Loftus Brock, F.S.A., described some further portions of old Bridewell Palace, consisting of a pointed arch built upon piles, which have been met with during Messrs. Mowlem's works for the erection of a new electrical depot in the rear of De Keyser's Hotel, Blackfriars. The chairman exhibited various English and old Colonial coins. Mr. Davis produced a large series of traders' labels, in lead, issued from Haarlem, and dredged up in the Thames. The first paper was by Mr. T. Cann Hughes, on the miseries of Chester Cathedral. These are of the fourteenth century date, carved in oak. The subjects represent a strange collection of mythical beasts and birds, with but few Scriptural subjects. Several appear also at Worcester and other places, especially one, a favourite subject, a fox preaching to geese. Some of the subjects were not replaced in the restoration, by reason of their indecency. The paper was illustrated by photographs of the entire series, taken by the lecturer's father when the work of repair was in progress. The second paper was by Mr. H. Lyster Cumming, F.S.A. (Scotland), on the signs of the old booksellers in Duck-lane, now Duke-street, Little Britain.

Correspondence.

To the Editor of THE BUILDER.

LONDON WATER SUPPLY.

SIR,—The question of the future water supply of greater London, when it becomes greater still, and nobody knows how great it will be, is one of magnificent importance.

Shall the supply be gathered from the bowels of the earth, where the quality is generally considered to be above suspicion, or shall it be taken from the River Thames, from some distant natural lake, or from some great reservoir produced by damming up the waters in a valley?

A deep well supply has its fascinations; and if the quantity needed were anything but so enormous, probably there would be room for very little argument against it, but the interference with the underground waters from whence the vast supply would be drawn is an unknown quantity, and the possible consequences are alarming.

That deep well waters as public supplies produce a lower death-rate than waters collected from fairly pure rivers carefully stored and efficiently filtered, *ceteris paribus*, has never been shown. The natural drink of man must have been taken from springs, rivers, and surface waters; but then the savage did not pollute his rivers as does civilised man.

I am one of those who believe for many reasons in a lake or river supply to London, rather than a deep

well supply, accompanied, of course, with efficient filtration.

The actual forces at work in a well constructed filter are somewhat complicated. All particulate matters, including living germs, are strained out of the water as cotton wool will strain them out of the air, or if any pass through they must be of that type which can withstand contact with oxygen, and therefore not of the morbid or disease-giving kind. Further than this straining action, if the filter be constructed partially of a porous material, and not of dense non-porous sand grains, the filtering water with the dissolved impurities streams through the pores of the material in the form of a mist or cloud.

Whilst in this finely-divided condition, the oxygen resident in the pores, and that which was originally dissolved in the water, is made to actually touch, and therefore to act chemically upon, the impure matters. This is a process of wet combustion, and by it the unwholesome matters are positively burnt up into innocuous inorganic substances. Then again, at least upon the surface of the filter, there is generally some action going on by nitrification brought about by the intervention of certain kinds of microscopic organisms. It is claimed by some bacteriologists that this latter is the most potent agent of all.

Thus it is seen that a filter built up of porous materials is not a mere strainer, but is, when well managed, a real purifier of impure water.

It is, however, upon the action of flowing waters upon organic compounds in solution, and upon germs in suspension, that I wish now to dilate. The question how far an individual microbe or pathogenic germ, say a cholera bacillus, can travel down a river (Mr. Hawsley says it travels up) is a matter of extreme interest. In my opinion its journey is a very short one.

The life of a microbe is ephemeral. How long it may be I do not know, but judging from analogy,

it is probably not to be exceedingly short, probably only a few hours. Furthermore, it is extremely improbable that a pathogenic germ would keep up its properties as a deleterious ferment even for more than the briefest time, when the pabulum upon which it was trained and brought up, and the natural environment of its existence, are as greatly altered as from that of typhoid or choleraic excrement, in the darkness and deoxygenated conditions within the intestinal canal, to the light, and wholesome oxygenised fluids and gases which surround it in a river or stream.

Each tiny blade of grass submerged in every watercourse, and each spray and leaflet of every aquatic plant, is in itself a delicate apparatus for the elaboration and liberation of oxygen—oxygen in a most potent form. When the sun is pouring his rays down into the depths of pond, lake, or river, little streamlets of oxygen bubbles may be seen, rising from thence to the surface.

These, together with sunlight and fresh air *ad libitum*, constitute a marvellous natural laboratory for the purification of noxious matters.

Again, we have to recognise the beneficial action of the higher forms of microbe life, forms of living organisms which Pasteur first taught us delight in sunlight and fresh air, the so-called nitrifying germs. These form a vast army, and nobody can calculate the amount of good work they do.

In consequence of my belief in the enormity of the power of the purifying agents naturally at work in rivers and streams, I am all the more anxious that they should be kept free from pollution, for in the matter of pollution, as in all other matters, the last feather may break the camel's back. It is a question of the survival of the fittest. If the balance of power lies on the side of impurity, the forces of Nature will take another route, and purification will be reached through noxious putrefaction. Thus the same end will be attained—namely, the pulling down of complex organic compounds, and the building up from the old materials new and simpler inorganic substances, fit food for vegetable life.

However we go to work, Nature will have her way—purification, absolute and perfect, will be the ultimatum.

All waters are at some time rendered impure, and all impure waters in time become pure. "Once polluted, always polluted," is a phrase indulged in by an eminent chemist; it is a statement, however, which is dangerously misleading, for probably every drop of water upon the earth's surface has passed through the intestinal canals of animals over and over again, and will so continue to do to the end of all things.

ARTHUR AXELBY, Ph.D., F.S.C.
County Laboratory, Southampton.

THE ORIENTATION OF CHURCHES.

SIR,—In reply to your correspondent, Mr. Loftus Brock, will you permit me to say that although the three churches alluded to as connected with St. John Baptist by orientation are doubtless the most suitable to illustrate the subject, they are by no means the only examples, in the list of forty (in which no other church connected with that Saint occurs), of orientation being connected with the present dedication, as he would seem to imply.

If, in nautical terms, the bearing of a church is

taken to be a "quarter point," the unit by which the course of a ship is determined at sea (and this practical application of the mariner's compass to the orientation of a church is not inappropriate when the analogy between its nave and a ship—Latin *Navis*, Greek *ναυς*,—is borne in mind) then ten churches agree with the present dedication, allowance being made in some cases for the difference between the old and new style of reckoning, including the church of Orchard Portman, Somerset, with Norman remains, dedicated to St. Michael, and twenty-two do not so agree; of the remaining number, either I have been unable so far to ascertain that any day in the Calendar has been assigned to the names of the personages connected with them, or their dedication is unknown.

The first test proposed by your correspondent as an easy one would doubtless be reliable were there no question of re-dedication to be considered, and it is just that foreign influence, with little or no sympathy for orientation, acting upon the British Church to which he alludes, which has produced it is thought in so many cases what I venture to think the original builders would have regarded as an anomaly—viz., the want of agreement between the day of orientation and that of dedication. With respect to the subject of the angles of sunrise generally I may remark that the azimuth of the rising and setting of the sun depends upon the obliquity of the ecliptic and the latitude of the place, and that neither of these quantities has changed appreciably, for the purpose under consideration, in historic times; therefore by reference to any azimuth tables the true bearing of the sun at rising, as distinguished from the apparent bearing which is the result of refraction, can be obtained for any day within the limits of latitude given by such tables, and the angles so obtained would have been the same at the date of erection of our earliest churches—i.e., the points of sunrise now, as then, would, for the practical purpose of laying down the axis of a church on the ground, be identical.

With regard to Welsh churches I may add that the name of the Saint connected with the church is incorporated with the place-name, as is thought to be the case at Llanthony, in many other instances—e.g., Llangattock is the church of St. Cadoc, Llanilltud the church of St. Illtud, two names not found in the Calendars at my disposal, but the rule for orientation seems to be in operation there as in England, for in five Welsh churches which have been noted no two are alike, and there is a difference of as much as 40 deg. between one axis directed to the north of east and another to the south of that point.

The use of a shadow cast by a pole at sunrise for determining the line of the axis of a church by its builders is obviously open to this objection, that the different lines on the same day would be given in this way in different localities, although in the same latitude; for, in the case of one church-site on a plain and another in a valley running north and south, the hill in the latter case may shut out the sun for an hour, or more after its time of rising on the plain, so that the two shadows would not be parallel with each other—in other words, the bearings of the two axes would show a difference of many degrees, although presumably referring to the same day.

For this and other reasons I am inclined to the view that our forefathers would not have been satisfied with a method which would have perverted the point of the true bearing of the sun at rising as determined by calculation rather than by local observation.

The whole of the forty cases recorded lie within the points of sunrise, at the summer and winter solstices respectively, although, in some instances, approaching very near those limits, which, as your correspondent justly remarks, in referring to the sunrising as generally determining the line of the axis, "is sufficient to account for almost all the differences of position that are found to exist," and the antiquity of the custom cannot be doubted, for if the subject is worked out, it must, it is thought, be connected eventually with an earlier custom—viz., that of orientation.

To those who may wish practically to pursue the matter further, it may be well to mention that the following simple requisites are thought to be sufficient to enable anyone to do so. A well-adjusted compass sufficiently large to show each of the 360 deg. of the circle, a set of azimuth tables, a knowledge of the latitude of the place and of the magnetic variation which is now westward for the United Kingdom; this is published annually in Whitaker's and other almanacs; and a reference to a chart of magnetic curves of equal variation is also necessary. Azimuth tables are prepared with astronomical refinement, and if the same degree of accuracy is desired in taking the bearing of a church, a reference to the present pole star, Alpha Ursæ Minoris, will be necessary; but for the purpose of testing a mason's line, an operation with which many of your readers must be familiar, the corrected compass bearing will probably be found to be sufficient. I may perhaps be permitted to say that the subject of "The Occidentation and Orientation of places of Divine worship," and some of the difficulties connected with it, such as the want of coincidence in the

* See *Builder* for January 7, p. 27. This and Mr. Jones's letter on the same subject have been unavoidably delayed for want of space.

* There are thirty-two points in the mariner's compass, therefore a "quarter point" would be barely 3 deg.

lines of the axes of nave and chancel in many cases, is being more fully considered in the pages of *The Messenger* (Robert Banks & Son) for November and January, and is to be concluded in a future number.

J. HOUGHTON SPENCER.

Taunton, January 9, 1893.

SIR,—A systematic investigation of the orientation of churches in England is a work which should be undertaken, and in part furtherance of Mr. Loftus Brock's suggestion (see *Builder*, January 7, 1893, p. 17) I give below a table of four Saints' days with the horizontal angle of sunrise calculated for latitude—50 deg., 53 deg., and 56 deg. North—and also for the years 1700, 1400, and 1000 A.D. The days have been selected, not on account of the importance of the four Saints, but as best fitted for exemplifying the marked effect latitude has upon days falling near the winter and summer solstices, with but little influence near the equinoxes; and the fact that under the gradually increasing error of the Julian Calendar and the subsequent correction in 1752, the maximum effect falls upon days near the equinoxes.

Approximate Horizontal Angle of Sunrise, North or South of True East.

Dedication and Date.	Latitude North.	A.D. 1700.			A.D. 1400.			A.D. 1000.		
		New Style.	Old Style.		New Style.	Old Style.		New Style.	Old Style.	
The Annun- ciation, 50° March 25, 53° 30'	50° 53° 30'	2 50 N 3 10 N 3 30 N	12 0 N 12 50 N 13 10 N	7 30 N 7 30 N 8 35 N	6 0 N 6 15 N 6 45 N					
S. John Baptist, June 24, 50° 53° 30'	50° 53° 30'	38 10 N 41 40 N 44 15 N	37 0 N 40 0 N 44 30 N	37 40 N 40 35 N 44 30 N	37 45 N 41 0 N 45 45 N					
S. Michael, Sept. 29, 50° 53° 30'	50° 53° 30'	4 30 S 4 50 S 5 15 S	11 0 S 11 50 S 12 10 S	9 0 S 9 30 S 10 20 S	8 0 S 8 30 S 9 15 S					
S. Thomas, Dec. 21, 50° 53° 30'	50° 53° 30'	38 10 S 40 40 S 44 20 S	37 40 S 40 40 S 44 30 S	37 50 S 40 50 S 44 50 S	38 0 S 41 15 S 45 10 S					

The preparation of a more comprehensive table involves considerable labour, and before such a work is entered upon it is sufficient to remark that any such table is bound only to give the astronomical or theoretical angle of sunrise in a given latitude on a given day? Whereas, it is not more than likely that the old builders would prefer to lay down the axis of their church by the simple expedient of watching for the sun to peep over, say a range of distant hills upon the morning of the day dedicated to the Saint; and assuming the site to be in a hollow, the difference in such a case between astronomical and the visible sunrise might easily amount to several degrees horizontal measurement?

Also, although it sounds so easy, how is true North to be found by the many investigators of the subject? Mr. Houghton Spencer (see *Builder*, December 24, 1892, p. 504) uses 1st ordnance maps by which, if not by larger ordnance maps, all angles obtained by a magnetic compass alone, should be checked; for the compass is not only liable to yearly variation (now slowly reverting once again to true North), but also varies in different latitudes and longitudes, and would on any one day make an appreciable difference in, say, Durham, Dover, and Truro. The present Pole Star, too, may be one and a half degrees East or West of North, according to the sidereal time of the observation, and to a still greater degree 800 years ago.

Whatever mode you now adopt for finding the cardinal points, the observation requires adjustment, and there is a consequent liability to error, and be it remembered precisely the same difficulties must have arisen when the churches were originally set out.

Jan. 10, 1893.

FRANCIS E. JONES.

CONCRETE FLOORS.

SIR,—With reference to your correspondent's letter in the *Builder* for January 14, the best system of construction for concrete or fire-resisting floors, will, as heretofore and probably for some time to come, be a matter of opinion only. Proof positive as to what constitutes the best floor of the kind under usual conditions, and viewed from different standpoints, has yet to be determined, and will only be decided when a series of exhaustive trials is made of all the apparently best systems, under circumstances, entirely free from prejudice or personal interest. Floors in which concrete is the main feature have been constructed in many ways; each finds its advocates, and each possesses advantages which constitute its best recommendation, but are absent in others. Moreover, what is essential for a residential dwelling is not at all necessary for buildings of the warehouse class, and *vice versa*. For instance, solid concrete is one of the best conductors of sound, therefore most unpleasant for the floors of a dwelling-house, while this is a matter of little consequence for the floors of many other buildings. Again, for buildings

containing large quantities of inflammable goods, ordinary concrete is not a good material to withstand an excessive and continuous heat. The ceiling, or the underside of floors, is obviously more subject to intense heat during a conflagration than the upper portion, or floor proper, which is often inundated with water, causing the solid concrete to be undergoing two extremes of temperature at the same time, and it may be this, in a degree, that causes portions of the concrete to come down in masses, and to make concrete floors a source of anxiety to firemen. This points to the necessity of using some other material for the underside of certain floors, resulting in the adoption of clay tiles, bricks, or lintols, resting on iron girders (the girders encased) with concrete deposited thereon to form the upper portion. For residential dwellings there is not so great a necessity for this form of floor, because the heat could never be so intense as it might be in warehouses when on fire. The walls of ordinary dwellings are scarcely of sufficient thickness to carry the heavy dead-weight which concrete floors of a slab form necessitate—i.e., if over 10 or 12 ft. between bearings. Flat concrete slabs to carry ordinary weights, up to 12 ft. between bearings are quite safe if only a very moderate thickness, but much care and caution are required in their construction.

One of the main objections to slab floors—and the wider the span the greater the objection—is the necessity of a rigid staging or centreing to support the heavy mass of concrete, and without deflection, until it has set, and the greater the distance between bearings the longer has the staging to remain before it can be removed, oftentimes causing much delay and inconvenience.

For a groined or arched section of floor, the cost of staging is, as a result, also increased.

For fireproof, or fire-resisting floors—for no ordinary building can be made absolutely fireproof—the following requirements are, I submit, necessary for residential buildings, before their general adoption in place of wood may be anticipated.

1st.—The floor and ceiling portions divided or disconnected, so far as practicable, to deaden sound and avoid rupture if subject to a conflagration, arising from the upper and under portions forming one mass and subject to extremes of temperature.

2nd.—The formation of chambers, continuous tubes, or cavities, as a result of this disconnection (and which shall be accessible at different points) to admit of ventilation, and provide channels for gas-pipes, water-pipes, electric light wires, &c.

3rd.—The ceiling portion to be of burnt clay tiles, bricks, slabs, or other materials capable of withstanding great heat.

4th.—The distribution of materials in the best form, due regard being had to cost, weight, strength, simplicity of construction, and durability; wrought or rolled iron being admissible if efficiently protected from heat, and it is proved to be an important factor in bringing about the desired results.

It cannot be expected that fireproof floors will ever be possible at the same price as common wood floors, but the difference is not so great, while the gain from durability and healthfulness would render them cheaper if they cost double or treble those made of wood. The sense of safety which they bring about, too, is a consideration, and if only as elements of safety in cases of large conflagrations, their general adoption should be seriously considered, and every possible information obtained and given the public relative thereto. If the matter of fireproof floors and the condition of existing wood floors were made the subject of an exhaustive inquiry and series of experiments, there would be, I submit, as much reason for giving public information and advice relative thereto—and for the same reason—as the publication by the Local Government Board of its many sanitary Acts of Parliament, and the model by-laws which it prints and distributes to assist local authorities in dealing therewith.

ALFRED.

THOMAS POTTER.

SOME ANCIENT WALL PAINTINGS.

SIR,—My attention has been called to two letters on this subject that have been recently published in the *Builder*, and in which my name has appeared. With your permission, and to save space, I will reply to both letters at once.

Mr. James Neale, F.S.A., writing in your issue of January 7 in reference to my communication of November 19, 1892, which I had the honour to make to you respecting the Canterbury wall paintings, says he "fears Mr. Newman has not been careful as to his facts." This is so serious a charge that I will reply to it at first by balancing Mr. Neale's fear by my own hope that he does not mean what he says; if he does, however, I must point out that his objection to my communication is surely on a question of terms and not of facts, for the facts, on Mr. Neale's own showing, are precisely neither more nor less than I apprehended for I derived them from the same "excellent description" of his work that he has drawn so largely upon in his letter. I ventured to call Mr. Neale's work on the Eastbridge wall paintings "structural restoration." Mr. Neale prefers "preservation." Well and good, only if so, the wall painting has not been preserved. I should scarcely have been asked to try and preserve it. That is all. I never disputed the efficiency of Mr. Neale's

work as far as the structural restoration or preservation went, though how far the use of the "old Portland cement" would tend to preserve the painting might be open to discussion, but suffice that Mr. Neale has admitted that the "method pursued for the preservation of the paintings was somewhat hazardous."

Mr. Neale trusts that my preservative solution "will not act in the manner of many other solutions, and end in the destruction of the paintings." I sincerely trust so too. Mr. St. John Hope asks me in his letter of your issue 3rd December, 1892, as to the nature and properties of the preservative solution I have used, and Mr. Neale remarks in his letter that "perhaps" I will satisfy your readers on this point. I reply I shall be most happy to afford this satisfaction when the proper time arrives—i.e., when an adequate interval has elapsed to satisfy myself whether both the solution and the method of its application have been successful. Until this time has elapsed, I must continue to decline to publish my method, if only for the obvious reason that unqualified persons with partial knowledge might do much mischief, for which I shall in a degree be blamable.

Mr. Neale agrees "with Mr. Hope as to the sad fate of many wall paintings owing to the use of preservative solutions." Will both gentlemen permit me the luxury of mingling my tears with theirs in these antiquarian regrets?

PHILIP H. NEWMAN.

P.S.—Is Mr. Neale aware that there are unmistakable traces of actual painting, or superficial restoration, of some recent date on the work at Eastbridge, Canterbury, we are discussing? As Mr. Neale "saw the painting recently," he may be able to tell your readers when this vandalism was committed.

P. H. N.

PRESENT COST OF PLASTERERS' WORK.

SIR,—On behalf of the members of the Master Plasterers' Association, may I be allowed, through the medium of your columns, to draw the attention of architects, builders, quantity surveyors, and those interested, to the absolute necessity of making considerably increased allowance when estimating for the cost of plastering under present circumstances? The recent increase in wages from 9d. to 9½d. only amounts to about 5 per cent., or, taking the various allowances payable under certain conditions, to 7½ per cent., a rise which, if it represented the actual facts, would be of little consequence; but, apart from this nominal rise, the actual increase is considerably greater, and for the following reasons.

In the first place, the unions insist, as far as they are able, in extracting an all-round wage of 9½d., in spite of the fact that a very considerable proportion of their members are not competent workmen, and even if willing, are not able to earn the money demanded, as they (the unions) accept, without question or enquiry as to competency, all who apply to join their body, and as is naturally the case, the worse the workman, the more anxious he is to be included in their ranks.

It is amusing to witness the alacrity with which they dive into their pockets and produce their "tickets," although in many instances they have but the remotest acquaintance with the craft they profess to practise, beyond the laying trowel or the casting brush.

They have ceased to adhere to the old maxim of "A fair day's work for a fair day's pay." The fair wage they have, but the fair day's work they withhold.

There can be no doubt that the disuse of the system of apprenticeship has had much to do with this state of things, lads having to "pick up" the trade as best they may, except, perhaps, where they are the sons of plasterers and have the opportunity of working with their parents.

There are beyond doubt honourable exceptions to the foregoing, but as all practical men are agreed, there is serious falling off both in the quantity and quality of the work done, and it is frequently the case that men who are desirous of doing a fair thing are checked by others, and informed that they will be reported if they dare to exert themselves beyond their fellows.

Signed, on behalf of the Committee of the Master Plasterers' Association,

S. WRIGHT, Secretary.

LEAD-LINED IRON PIPES.

SIR,—I see there is a notice in the *Builder* for this week of a lead-lined iron service pipe, as having been devised by Mr. J. W. Harrington, superintendent of the Wakefield Waterworks, Massachusetts, and that a company has been formed out there to work the same. I am pleased to be able to say that Brother Jonathan is not always ahead of the old country. Mr. Neale's notice is in the matter of lead-lined iron pipe, for I believe that an exactly similar pipe has been made in Yorkshire for nearly two years by Mr. Edwin Walker, the inventor of the "iron-encased block tin pipe," known as the "Health" pipe, both the iron-encased tin and the iron-encased lead pipes being made in the same manner. Both these pipes have been extensively employed in the West Riding of Yorkshire and Lancashire, where there is an abundance of water under great pressure.

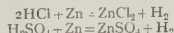
JUSTICE.

The Student's Column.

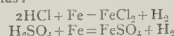
CHEMISTRY.—III.

PREPARATION OF HYDROGEN.

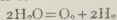
HERE are many ways of preparing hydrogen, but it is most conveniently obtained by the action of zinc on sulphuric (H_2SO_4) or hydrochloric (HCl) acid, thus:—



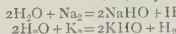
Instead of zinc, iron may be used to decompose the acid, thus:—



Hydrogen may also be prepared by the electrolytic decomposition of water, the water being acidulated with a little sulphuric acid in order to render it a better conductor of electricity.



or it may be prepared by decomposing water by means of metallic sodium (Na) or potassium (K)



Experiments.—Group 2.

Place a few small pieces of granulated zinc in a small wide-mouthed bottle provided with a gas-tight stopper (preferably a rubber or caoutchouc one) through which pass two glass tubes as shown in Fig. 3, one a thistle-headed funnel tube, the other a conducting tube similar to that used in the preparation of oxygen.



FIG. 3

Pour enough water down the funnel tube to just cover the zinc, and then down the same tube pour some of the acid, either HCl or moderately dilute H_2SO_4 . The end of the funnel tube should dip below the surface of the liquid in order that no gas may escape through it. Immediately the acid is added, bubbles of gas will rise through the water in which the conducting tube is immersed, but as hydrogen forms an explosive mixture with air, the first portions of the gas driven over must not be collected. Before collecting the gas for use, fill a test-tube with the gas and then apply a light to it, holding the mouth of the test-tube downwards. If a slight explosion occurs, it proves that the air has not been wholly expelled; if, however, the gas burns quietly the hydrogen may then be collected over water in the same way as the oxygen was collected.

With the gas thus prepared observe the properties of hydrogen. Note that the gas is colourless and odourless.

Plunge a lighted taper into a jar of the gas and observe that while the gas burns at the mouth of the jar where it comes into contact with atmospheric oxygen, yet the taper is immediately extinguished by being plunged into the middle of the jar of gas. Hence hydrogen is inflammable, but is not a supporter of combustion.

Marsh's Test for Arsenic.

If an acid or neutral solution of any arsenic compound is brought into contact with nascent hydrogen—i.e., hydrogen at the moment of its liberation from a compound—a compound called arseniuretted hydrogen (AsH_3) is formed. As this compound is produced and easily detected in solutions containing very small quantities of arsenic, and as antimony is the only other known substance that is acted upon in a similar manner, the production of this compound is adopted as a test for all substances suspected of containing arsenic.

The following is a simple method of applying the test:—

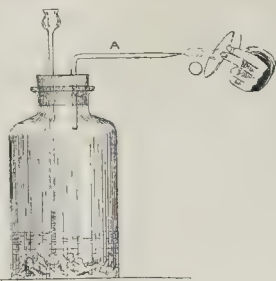


FIG. 4

Arrange an apparatus for generating hydrogen as shown in Fig. 4, the outlet tube (A) of which is made of hard glass tube instead of ordinary glass, in order to withstand heat better. Cause a moderate evolution of hydrogen in the manner previously described. Place a cloth round the bottle in case of explosion, and when all the air has been driven out of the apparatus apply a light to the jet at which the hydrogen is issuing.

To fill the test-tube for ascertaining whether all the air has been expelled, it is necessary to tilt up the hydrogen apparatus in such a way that the test-tube may be filled while held in an almost vertical position. If the test-tube is held horizontally it is impossible to completely fill the test-tube with hydrogen; a little air always remains in it, and consequently it seems impossible to completely expel the air from the generating apparatus. If preferred, the glass tube may be bent upwards at right angles before making the experiment. Now hold a cold piece of porcelain in the burning jet of gas in such a way that the flame spreads over the surface of the porcelain. If any stain is produced the materials are impure and cannot be employed for this test; if, however, no stain is produced both the zinc and acid may be considered free from arsenic. In the latter case some of the solution suspected to contain arsenic may be poured down the funnel-tube into the generating bottle. Again depress the cold porcelain into the flame. If any arsenic was present in the suspected solution a brownish-black stain possessing a metallic lustre will be produced on the porcelain.

The stain produced by the antimony compound (SbH_3) is a deep dull black. The two stains may be easily distinguished from one another, however, on account of the fact that the arsenical stain is readily soluble in a solution of sodium hypochlorite or bleaching powder, while that produced by antimony is almost unaffected by it. If only a portion of the stain is soluble, it indicates, of course, that both arsenic and antimony were present. If a stain is produced on the porcelain, the gas should be extinguished and the hard glass tube should then be heated near the middle by a Bunsen gas flame, when a garlic odour will be emitted if arsenic was present, and in the colder part of the tube a metallic mirror should be produced, owing to the decomposition of the arseniuretted or antimonyuretted hydrogen.

If both are present, two rings or mirrors will appear in the tube and may then be distinguished from one another; they are, however, somewhat alike, and when only one mirror is produced it is impossible for an inexperienced operator to say with certainty whether it is due to arsenic or antimony.

This test is usually applied, with others, for the detection of arsenic in wall papers, and other commercial substances. One method for obtaining the arsenic present in the wall-paper into solution is to cut the wall-paper into strips and soak some of these, first in a little pure dilute ammonia, when, if Scheel's green—i.e., copper arsenite—was used for colouring the paper, a blue colour will be imparted to the solution; finally, an excess of the hydrochloric acid found to be free from arsenic is added to the solution. The strips of paper should be allowed to soak for some time in the acid solution, which may be warmed slightly to accelerate the rate of solubility of the arsenic compound. The solution may then be poured off and tested in the manner described above. It is, however, better to place some pieces of the paper or other material to be tested directly into the bottle in which the hydrogen, free from arsenic, is being generated without subjecting it to any

previous treatment, but it requires some little manipulative skill to do this without exploding the gas and yet to re-light the hydrogen jet sufficiently quickly to detect any traces of arseniuretted hydrogen that would be immediately driven over. In order to detect very minute traces of arsenic, several further precautions which it would be useless to describe here must be observed.

Reinsch's Test for Arsenic.

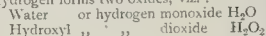
A simpler test for arsenic in wall papers, &c., than the above is the following, which is known as Reinsch's test:—

Boil a small slip of bright copper foil in a test-tube with dilute hydrochloric acid; if the metal remains perfectly bright and no deposit can be seen upon it, the materials may be regarded as free from arsenic. Now re-boil these materials with some of the supposed arsenical substance. If arsenic was present a grey film will appear on the copper. If a grey deposit is thus obtained, the copper strip containing it should be removed, washed, dried, and gently heated in a small hard-glass tube. If the grey deposit was caused by arsenic, it will oxidise and sublime on the cooler parts of the tube in the form of minute white crystals of arsenious oxide.

Both Marsh's test and Reinsch's test are capable of detecting very small quantities of arsenic, and are in fact the two tests universally employed for the detection of arsenic in materials of every kind.

Hydrogen and Oxygen.

Hydrogen forms two oxides, viz.:—



CHEMISTRY.—IV.

WATER H_2O .

Composition.

PURE water is a compound substance consisting of the two elements hydrogen and oxygen in a state of chemical combination, in the proportion of two volumes of the former to one of the latter.

Its composition may be determined synthetically by exploding a mixture of two volumes of hydrogen and one of oxygen in a stout, graduated glass tube (Fig. 5), commonly called a eudiometer tube.

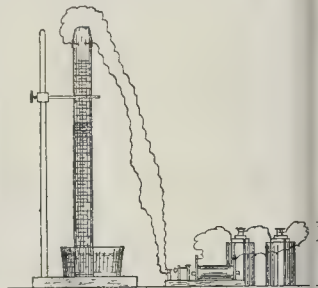


FIG. 5

The tube is closed at one end, and the other end, which is open, is immersed in a trough of mercury. After the gases have been admitted in the correct proportions so as to about half fill the tube, this open end is lowered yet further in the mercury until it presses against a caoutchouc pad at the bottom of the trough.

Into the tube, near the closed end, are fused two small platinum wires which almost meet in the inside of the tube. These two wires are connected with an induction coil or a Leyden jar and when an electric spark is by this means passed through the mixture, a flash of light may be seen, and the gases expand suddenly (for which reason the tube should never be more than half filled with the mixed gases) owing to the great heat produced by the combination.

When the tube cools, the water produced may be seen as moisture condensed upon the sides of the tube, and the mercury will rise in the tube, showing that a vacuum has been produced.

While in a state of vapour the water will occupy two-thirds of the volume that would have been occupied by the original mixture at the same temperature, that is to say three volumes of the mixed gases only occupy two volumes when chemically combined.

When condensed to the ordinary atmospheric temperature, the water produced only occupies about $\frac{1}{1000}$ th part of the volume occupied by the mixed elements.

The composition of water may also be ascertained by its analysis. A simple method of effecting this is to invert two graduated cylindrical glass tubes of equal size, and filled with water previously acidulated with sulphuric acid, over two small plates or slips of platinum foil immersed in water also acidulated with sulphuric acid as shown in Fig. 6.

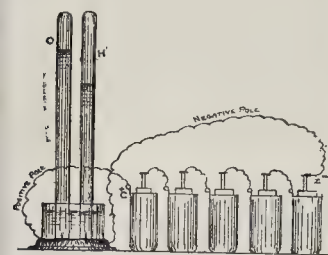


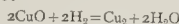
FIG. 6

Connect the two platinum plates to a battery of five or six Daniel Bunsen or Grove cells by means of insulated copper wire. The current of electricity in passing will decompose the water and cause minute bubbles of gas to appear on the platinum plates. These bubbles as they appear, are, however, rapidly displaced by other bubbles of the gas, and then rise in the inverted tubes. Eventually the gas which rises in the tube over the platinum plate connected with the negative pole of the battery will occupy about double the volume of that which rises in the tube connected with the positive pole.

When one of the tubes is nearly filled with gas, the electric current should be stopped. By removing the tube which contains double the volume of the gas in the remaining tube, and applying a light to its mouth, it will be found to be hydrogen. By means of a glowing splinter the other may be shown to contain oxygen.

As oxygen is slightly more soluble in water than hydrogen, it will not quite equal half the volume of the hydrogen. Neither of the gases are soluble in the water to any great extent.

Another excellent method for determining the composition of water is that of passing pure, dry, hydrogen over dry copper oxide heated to redness. The hydrogen combines with the oxygen in the copper oxide to form water, leaving metallic copper.



The water formed (as water vapour) is condensed and accurately weighed when cool.

The bulb tube containing the copper oxide is also weighed when cold both before and after the experiment. By this method it is found that approximately for every 16 parts by weight of oxygen lost by the oxide, 18 parts by weight of water have been manufactured, showing that water consists proportionately of one atom of oxygen (atomic weight = 16) combined with two atoms of hydrogen (atomic weight = 1).

Physical properties of Water.

Pure water is transparent and odourless, and has only a pale bluish colour when seen in considerable bulk. At temperatures between 32° and 212° Fahr. or 0° and 100° Centigrade it is a liquid.

If heated above these temperatures at the ordinary atmospheric pressure, it becomes a colourless, invisible gas which is decomposed into its constituent elements if heated to a sufficiently high temperature.

The boiling point of water is found to vary with the atmospheric pressure. The boiling point is 1° C. lower for every 1,080 ft. above sea level.

Thus, by noting the temperature at which water boils, an aeronaut can ascertain his altitude above the earth.

Similarly the temperature at which water boils in a deep mine is higher than 212° F.

When gradually cooled from its ordinary temperature, water contracts regularly until it reaches a temperature of 39.4° F. or 4° C., at which temperature it ceases to contract. The maximum density which water can acquire is, therefore, reached when it is cooled to 4° C. If cooled below this temperature the water expands until it reaches the freezing point (32° F. or 0° C.)

when a further considerable and sudden expansion occurs.

This force of expansion is almost irresistible, and is the cause of the numberless fractures which occur in leaden water-pipes during winter, for, although the damage is not discovered until the ice thaws, the fracture takes place, of course, immediately the water freezes.

It is owing to this expansion that ice floats on the surface of the denser water, and, therefore, that deep reservoirs of water are seldom frozen completely to the bottom in such temperate climates as England; and it is by the force of expansion that huge masses of rock and cliff containing crevices filled with water are split asunder in frosty weather.

Water is, therefore, an exception to the rule that liquids when solidified possess a greater specific gravity in the solid than in the liquid condition. The specific gravity of its three modifications are: Ice = 0.917 (water = 1.0). Water = 1.000 . Steam = 0.625 (air = 1). Pure water is accepted as the unit for comparing the specific gravity of all liquids and solids. Air is most frequently used as the unit standard for the comparison of the specific gravity of gases. Water is 825 times heavier than air.

It is generally found that in converting a solid into a liquid, or a liquid into a gas, a certain amount of heat is absorbed in altering the physical condition of the substance without producing any change in its temperature.

The heat which disappears in this way is termed latent heat, and it is found that the amount of heat required to convert any weight of ice at 0° C. into the same weight of water at 0° C. would be sufficient to raise the temperature of that water at 0° C. to 79° C., or would raise the temperature of seventy-nine times that weight of water 1° C.

The latent heat of water is, therefore, said to be seventy-nine thermal units.

The latent heat is again rendered sensible when the water returns to the solid condition.

The latent heat of steam is 536 thermal units, but, as in the case of water and ice, all this heat can be regained and utilised by condensing the steam.

All gases are more or less soluble in water. Hydrogen and oxygen only to a slight extent, carbon-dioxide and sulphuretted hydrogen more so, while ammonia and hydrochloric acid are very soluble, especially in cold water. As a rule, gases are most soluble in cold water, solids in hot water.

Natural Water Supply.

Water is never found pure in Nature, but its impurities are not necessarily injurious to health. In fact, pure water would be found unsuitable for drinking purposes, for it would lack the small quantities of oxygen and carbonic acid obtained from the atmosphere which render water palatable.

Rain Water.—Water obtained by melting freshly fallen snow, or collecting rain water as it falls in clean vessels, at a distance from any house or factory is the purest found naturally, but even this contains dust particles and oxygen absorbed from the air. It would be wholesome, but insipid and flat to the taste. For washing purposes it would be excellent.

If collected in a town, rain water would contain many impurities, and in some districts would be unwholesome to drink, even after filtration.

Spring Waters are generally very good for drinking, although some of them are rather too hard to be economical washing waters. Those occurring in granite or sandstone districts are as a rule exceptionally wholesome. Some of our purest water supplies are spring waters, notably among which is the Rabat Fountain of Balmoral in Scotland, which is said to contain less than one grain of solid matter dissolved in one gallon of the water.

River Water.—Most of the rivers of England are supplied by rain water which has passed over cultivated, grazing, or inhabited land, from which it may take up matter injurious to health. By contact with decaying vegetable matter, with refuse heaps, with natural or artificial manure, or with the sewage and slops from dwelling houses, rain water is liable to become dangerously contaminated.

It is said that such diseases as cholera and typhoid fever have spread through whole towns by the contamination of the town water supply with sewage from persons suffering from these diseases.

In rivers, however, a natural purification is continually carried on, for as the water charged with organic matter is hurried along, it is continually brought in contact with fresh oxygen, which, by oxidising it, renders it harmless. How-

ever much organic matter a water may contain, it is always rendered harmless by complete oxidation, for by it the organic matter is completely decomposed, the carbon forms carbonic acid; the hydrogen, water; and the nitrogen, nitrates and nitrites.

River water is, however, frequently contaminated so continuously and to such a large extent that only a partial oxidation is effected, in which case the water is unfit for drinking.

Surface-well waters are more likely to be polluted with sewage than that from any other natural source, because in most neighbourhoods where such wells exist the soil is a gravelly one with a clay subsoil. The consequence is that if the layer of clay sinks a little in any particular spot, all the slops, wash waters, and drainings from stables, manure or refuse heaps sink through the gravelly soil, and, meeting with the clay, soil flows along it until it reaches the lowest level of the clay, which will probably be found to be identical with the well. Even if the clay subsoil is perfectly level, the waters which reach it from various sources must become mixed, although not to such a large extent. The drainings are, of course, purified to a certain extent by passing through the gravel, which acts as a very good filter; but the oxidation is usually only a partial one, the layer of gravel not being sufficiently deep to bring the whole of the water into intimate contact with the atmospheric oxygen. Professor Church, F.R.S., in his useful little book, "Plain Words about Water," mentions the following case of a surface well that came under his notice.

"In a country town in a back lane was a small yard with several cottages. At the end of the yard stood a pump. From this was drawn occasionally a scanty supply of a liquid miscalled water. At last it failed. The explanation was soon found. The owner of the adjoining house had cut off the supply of water from a water closet, putting an earth closet instead. Since that change the water in the yard pump fails, except in very wet weather."

Deep well waters are usually very good for drinking, because all the organic matter in the rain water which supplies them, by passing through thick layers of sandy or rocky soil, becomes completely oxidised. Care must, however, be taken to prevent any surface water finding its way into the well near the top. Unfortunately, deep well waters not infrequently contain a large amount of lime and magnesium salts, dissolved from the soil through which the water has passed. Although these salts within certain limits have not been proved to be prejudicial to health, they at least render the water unsuitable for washing purposes.

GENERAL BUILDING NEWS.

THE NEW "MUNICIPAL LODGING-HOUSE," erected by the London County Council in Parker-street, Drury-lane, is to be opened for business this Saturday, January 28. A private view of the establishment was given on Wednesday afternoon last. The building has been erected at the instance of the Public Health and Housing Committee of the Council. The establishment has been prepared to accommodate 326 men with lodgings. They will be housed in separate compartments, which are 8 ft. high, 7 ft. long, and 4 ft. wide. The building is lit by electricity. The house also contains a large general room, a kitchen, a library, a shop for the sale of cheap provisions, a lavatory fitted with baths, and a number of lockers for the lodgers. As Chairman of the Public Health and Housing Committee, Alderman Becheroff explained that in 1890 the Housing of the Working Classes Committee of the last Council made an inquiry into the common lodging-house accommodation in London. They found that there were some 900 of these houses, accommodating over 30,000 persons. The members of the Committee inspected many of the worst of these houses, as well as some of the best, and as to the worst he could only say that no words could adequately depict the misery of them. Subsequently the Committee visited seven lodging-houses in Glasgow, started by the municipality, which were not only remunerative, but had in no way interfered with private enterprise. As a result of the investigations of the Committee, they recommended the Council to erect a model lodging-house on the Parker-street site, and the Council approved the proposal. The work of erecting the building was put out to tender, and the cost had been kept within the amount of the contract—14,300l. The furnishing had cost 1,250l., and with the addition of 3,700l., the value of the site, and 1,100l. for architects' commission, &c., a total of 20,350l. was reached. To secure a return of 3 per cent. on this, and such a sinking fund as would ordinarily be required to replace the cost of building in eighty years, a yearly gross income of 2,450l. was

required. To meet this the Council had fixed the charge for a bed at 5d. a night. We may add that over one end of the large sitting-room is a fresco by Mr. Stewart Carmichael representing "Industry." The architects of the buildings are Messrs. Gibson & Russell. We gave plans, sections, and detailed description of the building in our number for June 20, 1891.

THE NEW "OXFORD," OXFORD-STREET, W.—This music hall or theatre of varieties will shortly be reopened, after having been rebuilt under the direction of Messrs. Wylson & Long, architects. A private view of the building was given on the 20th inst. The arrangements of the seating, exits, &c., seem to be very good, and the gangways and corridors spacious. There are two tiers or circles and a commodious stage flanked by a few private boxes on either side. The roof is a flat dome divided up into eight compartments. The four columns which are the main supports of the roof are so disposed that not a single seat in the house has the view of the stage interrupted. Mr. Frank Kirk was the general contractor. The constructional ironwork and fireproof floors were supplied by Messrs. Dennett & Ingle; the plastic decorations were executed by the Plastic Decoration Company; the colour decorations by Messrs. Campbell Smith & Co.; the upholstery by Messrs. Atkinson & Co.; the electric lighting by Mr. Harry South; the gas lighting by Messrs. Vaughan & Brown; the mosaic and marble work by Mr. Charles Evans; the sanitary fittings by Messrs. H. B. Finch & Co.; and the gates and ornamental ironwork by the Bostwick Gate Company, Limited; the pewtering by Mr. T. Heath; the glass by Mr. W. Ramsay; the fire hydrants by Messrs. Merryweather & Co.; and the stone and wood carving by Mr. McCulloch.

THE "GREEN DRAGON," WINCHMORE HILL.—Winchmore Hill was once a border village of the great "Chase Forest," one of the last remnants of which is the "Winchmore Hill Wood," through which now runs a public path for about three-quarters of a mile—one of the prettiest walks in Middlesex. Tom Hood, the poet and humourist, resided some years in a villa some two hundred yards from the "Green Dragon." In his poem, "Our Village," many of the objects depicted may still be recognised at Winchmore Hill. Thus he wrote:—"There are plenty of public-houses, but the 'Green (Man) Dragon' is reckoned the best, as it is the only one for love or money can raise a position, a blue jacket, two deplorable lame white horses, and a ramshackled neat post chaise." Probably the new "Green Dragon," will, like the old one humorously spoken of by Hood, be reckoned one of the best public-houses in the northern suburbs by the many who are attracted each year by the pleasant scenery which is to be met with in that part of Middlesex. In re-erecting the building to meet the needs of the increasing number of visitors the whole premises have been enlarged. On the ground floor there are spacious public and private bars, and also private sitting-rooms, &c.; and on the first floor a coffee-room, capable of seating 150 persons, is provided, besides a private dining-room and other apartments. The verandah is entered from this coffee-room. The second floor is occupied by bedrooms. The kitchen, &c., are on the upper floor. The building is erected of red bricks, and covered with Grindled Brosely tiles; the hayloft over stables and the gables to main building have half timber and rough-cast treatment. The contract was taken by Mr. S. Goodall, of Stoke Newington. The bar fittings and pewterware are by Mr. Heath, of London; Messrs. J. & J. King, of Norwich, supplied the stained glass; Messrs. Waygood & Co. the dinner list; Messrs. Yates, Haywood, & Co. the stoves and encaustic tiles. The plans were prepared by, and the works have been carried out under the superintendence of, Messrs. George J. Skipper, F.R.I.B.A., and F. W. Skipper, architects, Norwich.

CLUBHOUSE, WALLASEY (CHESHIRE).—On the 21st inst. a clubhouse for the members of the Wallasey Golf Club was opened. The chief apartment is the club-room, measuring 45 ft. by 19 ft., and lighted by several windows. On the ground floor there is also the secretary's office, a dressing-room, lavatories, and a drying chamber. The club-keeper has a sitting-room and other house accommodation on the ground floor, and outside a verandah runs the whole length of the house front. The first floor apartments are reached by a staircase, upon ascending which the dining-room (40 by 17) is reached. Accommodation for smokers and smokers is furnished. On this floor there is an additional and smaller dressing-room. The keeper's house accommodation, a service-room, and dinner lifts connected with the kitchen below, complete the first floor arrangements. The architects were Messrs. Francis and George Holme, Liverpool. Messrs. Jones & Sons, also of Liverpool, are the contractors who have carried out the work, and the contract has been completed at the cost of between £2,000 and £3,000.

CHURCH OF SS. MICHAEL AND ALL ANGELS, BARNES.—The new church of SS. Michael and All Angels, Barnes, which was consecrated by the Lord Bishop of Rochester on Thursday, takes the place of the temporary mission church in Archway-street, Barnes. It is planned upon the lines of an

ancient basilica, having a nave 30 ft. wide and 56 ft. high with clearstory, and an apse at the eastern end, the altar being raised nine steps above the nave floor. The chancel is brought out 25 ft. into the nave, and divided therefrom by a stone wall, which is to be surmounted by a brass railing when the funds admit of it. The baptistry is at the western end of the nave, separated from it by an arcade of three arches. The arcades on the north and south sides dividing the nave from the north and south aisles consist of six bays each with columns of red Mansfield stone. At the eastern end of the north aisle a morning chapel has been erected with apsidal end dedicated to the memory of the late rector, the Rev. Lewis Taswell Lochie, through whose exertions a great part of the funds were raised. The south aisle with the vestries at the east end, and also the tower are not at present erecting for want of funds. The church is built principally of brick, faced with red bricks on the outside, and with tile roofs. Mr. Charles Innes is the architect, and Messrs. Balaam Brothers were the builders. The cost of the portion of the building at present erected has been about 5,000l.

CHURCH OF ST. MARY, GESTINGTHORPE, ESSEX.—At St. Mary's Church, Gestingthorpe, the principal feature of the restoration just completed has been the opening out of the sedilia and the extension of the sacristy, so as to enclose them within the altar rails. Remains of two sedilia were to be seen, but after the work had been begun a third was discovered entirely blocked up and with the stonework to the arch removed. The hanging beam of the fourteenth century when a window was inserted, and in the seventeenth century this window was itself filled in and a brick pier was carried up from the seat of the sedile to support a mural monument. It was decided to reopen the window from the tracery inwards and to put up the monument on the north-side of the chancel. While cutting into the north wall to do this, a thirteenth-century lancet window was found loosely filled with rubble, but quite hidden. This is now opened out to show the internal plays of the jambs, but as the vestry roof cuts across, it is not pierced. The sedilia have been completely restored, a new oak altar-rail has been fixed, the sacristy floor has been laid with mosaic pavement, and a brass eagle lectern has been presented by Mr. W. E. Oates, of Gestingthorpe Hall. The work has been carried out by Mr. H. Runcall, of Helstead, under the direction of Mr. Arthur Blomfield Jackson, architect, London.

IMPROVEMENTS AT EDINBURGH CASTLE.—The military authorities (says the *Scotsman*) are at present carrying out at Edinburgh Castle a series of alterations which will have the effect of not only enlarging somewhat the barrack accommodation, but improving the appearance of the large gaunt-looking building which tops the rock on its western side. For some time past the accommodation provided for the men in this building, which is known as the New Barracks, has not been considered by the authorities to be in all respects satisfactory. Along the western side of the building referred to, and on the first floor level, there runs a corridor 7 ft. or 8 ft. wide, upon which the several barrack-rooms on that floor open. The interior wall which divides the rooms from the corridor is to be removed, and each room is to be lengthened to an extent equal to the corridor's width. Then, to preserve the existing communication between barrack-room and barrack-room, a verandah, about 8 ft. wide, will be carried along the exterior of the building from side to side.

PROPOSED NEW BATHS FOR BILSTON.—On the 21st inst. Colonel John Odo Hasted, R.E., held a Local Government Board inquiry at the Bilston Town Hall, relative to the application of the Town Commissioners for permission to borrow 2,500l. for the fitting-up of public baths in that township.—Mr. J. D. Wassell, clerk to the Commissioners, explained that the present baths were purchased in 1870 from a company, which had not been a success. The buildings generally were in a bad state of repair. Structurally the premises would remain the same, and the sum named was required to put the baths in a satisfactory state, and one suitable for the requirements of the town. The Commission Improvement Act of 1860 empowered the Commissioners from time to time to provide public baths within the district. The premises would include one swimming bath 53 ft. by 24 ft.; eighteen gentlemen's slipper baths, and six ladies' ditto, with offices for bath attendant, &c., and the usual sanitary arrangements.—The Town Surveyor (Mr. C. L. N. Wilson), who prepared the plans and specifications, explained the structural arrangements, which included, amongst other provisions, ten new dressing boxes, and a small washing bath for use before entering the swimming bath. There was no opposition to the scheme.

PARISH BUILDINGS, PLYMOUTH.—The new Parish Buildings for All Saints', Plymouth, were opened on Sunday. They were erected from designs by Mr. Edmund Sedding, of Plymouth, at a cost of 1,300l.

PROPOSED NEW TOWN HALL FOR BELFAST.—We understand that the Town Improvement Committee of the Belfast Corporation have decided to advertise for designs for a new city hall and municipal offices at a cost of over 1,000,000l. The Lincen Hall premises, which occupy about four acres in the centre of the city, have been secured as a site for the proposed new buildings.

SANITARY AND ENGINEERING NEWS.

CARDIFF.—At a general meeting of the Cardiff Rural Sanitary Authority on the 11th inst., Mr. William Fraser, Surveyor and Chief Sanitary Inspector to the Authority, was appointed an additional member to the Board, at the rate of an aggregate salary of 325l. per annum. Several large engineering schemes are on hand.

PROPOSED PIER IMPROVEMENTS, BOURNEMOUTH.—At a recent meeting of the Bournemouth Town Council, the Pier Committee reported the receipt of a letter from Mr. F. E. Robinson (the Engineer) enclosing an estimate of the cost of erecting on the shore end of the pier a pavilion similar in character and arrangement to a sketch prepared by the Borough Surveyor, such estimate amounting to 35,000l., including the necessary additional pier works to carry the building. The Committee recommended that Mr. Robinson should be asked to submit a sketch design of a building that could be constructed at the shore end of the pier at a cost not exceeding 25,000l., including the widening of the pier to a sufficient extent to carry the building, such building to be about 45 ft. in height, constructed on the lines of the sketch prepared by the Surveyor, provision to be made for the spaces next to the present pier abutments could be hereafter used as shelters and refreshment rooms. They also recommended that Mr. Robinson should be requested to furnish alternative estimates of the cost of extending the landing stage either 150, 200, or 300 ft., together with separate estimates of the cost of extending the pier to the same lengths respectively.—In reply to Alderman Ridley the Mayor said 35,000l. was the amount contemplated spending on the pier, that being the sum applied for in the provisional order.—The report was adopted.

FOREIGN AND COLONIAL.

FRANCE.—There is to be an exhibition in the Durand Ruel Gallery of the works of two Japanese painters, Autamaro and Hiroshige.—The Imperial works of repair at the Chateau de St. Eustache, for which the Municipal Council has voted a first credit of 50,000 francs. The total cost will be about 200,000 francs.—M. Pierre Vauthier has arranged for an exhibition of the twelve large views of Paris which have been ordered by the Service des Beaux-Arts for the Impérial Exhibition.—A statue of Emile Augier, the poet, is to be erected in the Place de l'Odéon.—In the course of April and May the celebrated Spitzer collection will be sold by auction, with the exception of the armour. The catalogue, which will be sold at 50 francs, will enumerate more than 3,300 articles and will include about sixty plates illustrating the large proportion of the objects for sale.—The principal staircase of the Mairie of the Ninth Arrondissement—formerly the Hotel Aguado—is to be decorated with busts in stone of General Foy, Pigalle, Paul Delaroche, and Méhul. The work has been entrusted to the sculptors Desca, Allouard, Louis Noël, and Levasseur, who are also to execute the statues representing Eloquence, Sculpture, Painting, and Music, for the same staircase.—A committee, presided over by M. Giniain, has awarded to M. Binet, pupil of M. Laloux, the prize in the competition called "Prix de reconnaissance des Architectes Américains." The subject for competition was the decoration of the salon of the "Transatlantique International."—The Duchesse d'Uzès is at work on the model of a colossal statue of the Virgin about fourteen metres high, to be called "Notre Dame du Salut dans le Rouergue."—M. Suchetet (sculptor) and M. Bresson (architect) have obtained the prize in the competition at Lyons for a monument to the poet Solary.—In April next there is to be a congress at Mustapha, in Algeria, to which are invited all engineers, architects, contractors, and others interested in construction.—M. Béjot, a banker of Paris, has discovered in the Park of the Chateau de Millemont, which he has recently purchased, two somewhat injured works of the celebrated sculptor Pigalle, representing Venus and Mercury.—The Société les Amis des Arts at Constantine (Algeria) has organised an exhibition of painting and sculpture to open on the first Sunday in April and remain open a month.—M. G. Maurin-Goustiaux, Government architect, has obtained the first premium in the competition opened by the "Société Française de bienfaisance" at San Francisco, for a hospital for that city.—At the competition opened by the town of Lorient for an elementary school and a Salle des Fêtes the first premium has not been awarded; the second has been given to M. Louis Calinaud, architect, of Paris; the third to M. Hennequin, also of Paris.—The Government propose to spend a sum of nearly 1,000,000 francs in operations for deepening the harbour of St. Nazaire (Loire Inférieure).—M. Moreau-Vauthier, the sculptor, has been suddenly at Paris at the age of sixty-one. The death is also announced, at the age of fifty-four, of M. Pichou, architect.

BERLIN.—The Emperor has ordered Professor Begas to have his latest model for the National Monument to Emperor William I. carried out by March 22, 1893, this being the hundredth anniversary of his deceased grandfather's birthday. The houses required for the enlargement of the proposed site of the monument are being cleared of their tenants,

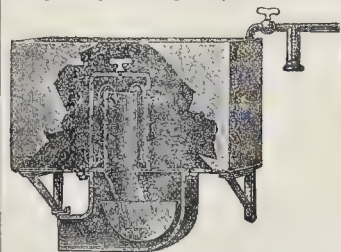
and their demolition will be commenced in April. —The designs for the proposed new homes of the Prussian Diet and Upper House are now on view. The work will be taken in hand at once. —The Council of the Prussian Royal Academy has published a financial report showing that the institution has a capital of over 25,000*l.* The Council will invest the money and use the interest for the support of helpless artists or families of deceased exhibitors at the annual salons. A second report of the Academy contains a warning to would-be sculptors, stating that this profession is fearfully overfilled in Germany. Another report speaks of the proposed German "Artists' Home" at Rome. The Academy has solicited contributions from the various German Governments towards an endowment fund for this institution. —The winner of this year's Louis Boissonnet Travelling Studentship (150*l.*) will have to measure up the Church of St. Andrew's, in Mantua, for the Prussian Government. The church is ascribed to Albert. —The winner of the Schinkel Medal of last year, Herr Spalding, has exhibited an excellent collection of colour-sketches of Dutch architecture. —The Society of German Engineers offers a premium of 250*l.* for the best essay on the development of steam-engine construction in the several great industrial centres of the world. —The Council of the Amalgamated Societies of Architects and Civil Engineers will publish a report on the merits of the various modes of protecting buildings against fire. —The exhibits of the City of Berlin destined for the Chicago Exhibition are now on view in the Town Hall. Architecture and civil engineering are well represented. Nearly all the latest municipal works of any importance are illustrated either by models, drawings, or photographs. —Dr. Hans Brackebusch, an eminent chemist, has offered the Berlin municipality the advantage of an invention of his which when used on public drinking fountains, &c., would ensure the water taken being filtered to such an extent as to be absolutely free of all germs of disease. The water in no way loses its flavour. The cost of the apparatus and its working will be nominal. After some scientific tests, it is probable that the offer will be accepted. —The municipality of Charlottenburg intend completing the Berlin-Charlottenburg Tramway Company to run their cars by electricity. In case of a refusal on the part of the company their concession will not be renewed next year. —SWEDEN.—The Municipality of the City of Stockholm has appointed an influential committee to consider and report upon the question of building a new town hall in Stockholm, together with other important public buildings. —A small Greek chapel has just been completed and completed in Stockholm. —The Swedish Government and the Stockholm Municipality have under consideration plans for the erection in the capital of a group of new prisons. —An important new mansion has been added to "modern Stockholm" by the completion of the structure erected in the Hamngata, built by Herr A. E. Yelander, architect, for a gentleman holding a high position in the King's household. The ground floor is occupied by shop premises. —The work of rendering the Vasa quarter, —a new portion of Stockholm, —one of the most fashionable and attractive is rapidly progressing, fine mansions in English style being raised, and broad avenues being laid out in all parts of the estate. The quarter will be lighted with the electric light. —The Swedish house at the Chicago Exhibition being erected under the superintendence of a Swedish firm of architects in that city, Messrs. Ostling Brothers, but the building is designed by a Stockholm architect. —The Crown has decided to restore the "Gamla Kungshuset," or Old King's residence, in Stockholm, a venerable historical edifice, at a cost of 4,000*l.* —An important piece of tapestry has been acquired for the Château of Gîsholm (the ancient Royal castle now in course of restoration) which dates from the period of the first Vasa King, Gustavus, and is of native manufacture. —The Crown has passed the designs and plans for the new city church to be built in the town of Helsingborg, and the drawings will shortly be made public. —The ecclesiastical authorities in the city of Kalmar are petitioning the Riksdag for a grant of 100,000*kr.*, wherewith to restore the ancient Kalmar Cathedral, in accordance with the designs prepared by Nikodemus Tessin Senior in the year 1650. —The old Dannemora Church, in Dalecarlia, has now been restored, the work having occupied some six months. The wall and dome paintings have also been successfully restored. They date from about the year 1400. —Another venerable Dalecarlian church is forthwith to be restored, viz., that of Siora Tuna. The tower is to be rebuilt, Gothic windows inserted, and the chancel adorned with Medieval paintings. A well-known architect, Herr Carl Møller, is entrusted with the work, which is estimated to cost about 100,000*kr.* —Thirdly, the work of restoring the old Visby Cathedral, in the island of Gotland, has been successfully completed at a cost of 50,000*kr.*, and stained-glass windows have been inserted. —A model of the ruins of the remarkable Helgönd Church, in that island, has been prepared by Herr Iven Rasman for the Chicago Exhibition. —Plans have been accepted for the new water and sewerage works in the town of Karlshamn, which are to cost 400,000*kr.*, likewise those for the town of Nyköping, which are to cost 250,000*kr.* —It is projected to deepen and improve the important Vaddö Canal, at a cost of 539,000*kr.*

MISCELLANEOUS.

COLLAPSE OF "PEMBERTON'S PARLOUR." CHESTER.—The *Chester Courant* of Wednesday last says:—"Not only the citizens of Chester, but archaeologists throughout the country, will regret the sudden collapse of the small tower on the City Walls known as Pemberton's Parlour. The structure was apparently sound enough, but on Monday afternoon, shortly after four o'clock, without any warning, the whole of it, with the exception of the front part, fell down into a plantation at the back, owned by the Municipal Charity Trustees. Nobody was hurt by the occurrence, though some people who were passing were considerably alarmed. The City Surveyor (Mr. I. Matthews Jones) was quickly on the spot with a staff of workmen, and he caused the only portion remaining standing, consisting of the arch and the west corner, with the inscription panel, to be propped up, hoping to save the panel from destruction. Mr. Jones also took the timely precaution of having the walls and the road below barricaded at both ends. The collapse is attributed to the effects of the recent frosts and thaw, together with the vibration caused by the passage of heavy trains on the London and North-Western and the Great Western Railway, which is quite close to the building."

MIDDLETON'S "GRIP" SAFETY APPARATUS.—This is a very ingenious apparatus for catching a cage or lift in the event of the hoisting-rope breaking. The rope for the apparatus is a separate one from the hoisting-rope; it is fastened to the under side of the cage, passing under a pulley at the bottom of the shaft, and then passed up over the pulley on the grip apparatus shown in the illustration. The grip, A, is shown in the illustration as in action pressing the rope against the fixed jaw of the grip. Under ordinary circumstances the gripping-piece, A, is held up clear of the rope by a small wire, the end of which is shown at B. On the small flywheel attached to the pulley axle is a hammer-head, C, which is attached by a spring connexion, so that it flies out in proportion to the speed of the wheel. On the hoisting-rope breaking, the pulley immediately begins to revolve more rapidly as the weight of the cage comes upon it, and the hammer-head flies out so as to strike the block D in its revolution. D being connected on the same solid axle with B, the force of the blow breaks the wire and allows the grip piece to drop against the rope, which it clutches closer in proportion to the weight and pull of the cage. The apparatus, of which we have seen a working model in action, appears to be absolutely certain and immediate in its action; and if the spring by which C is attached should become at all weakened by use, the only effect of this would be to bring the grip into action at a rather slower speed than before, so that this is a weakness on the safe side, at all events. The apparatus is already largely in use, we believe, and it seems a thoroughly good device for the purpose.

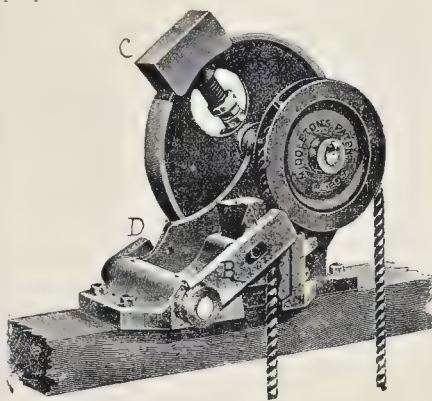
MERRILL'S PATENT FLUSH-TANK.—This is an automatic flush-tank primarily intended for a trough closet. It is some question whether trough closets are desirable at all, after some recent experiences, but an automatic flushing-tank is, of course, useful for many other purposes. This one is self-trapping, and untamps at the end of every flush. The action is as follows:—There is placed below the tank a tumbler or tipping-bucket into which the long leg of the siphon dips, reaching nearly to the bottom.



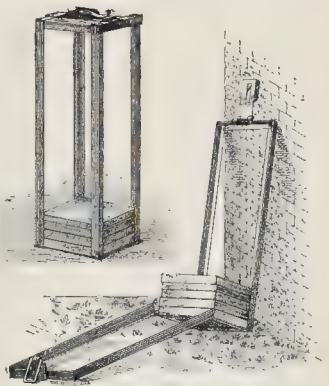
When the water in the cistern rises to the bend of the siphon, it runs down the long leg into the tumbler, thus trapping the siphon and confining the air contained in it. As a consequence, the water in the cistern rises above the bend of the siphon in about the same proportion as in the tumbler. When the tank is filled, the tumbler also is filled to its tipping point, and discharges its contents, unsealing the siphon, which is instantaneously charged by the head of water in the cistern. The tumbler remains tipped until the finish of the flush, when the air passes up the siphon, effectually unphoning it, thus dispensing with the usual leak-off holes or small siphons

IMPROVEMENTS IN THE CITY.—Alderman Treloar, at a meeting of the Commissioners of Sewers on Tuesday last, replying to a vote of thanks for his services as Chairman during the past year, remarked that among the improvements carried out during the year, the completion of the widening of Ludgate-hill is the most important. The total length of the thoroughfare is 850 ft., the width, formerly 47 ft., is now 60 ft., and the total net cost to the City has been about 230,000*l.* The Central London Railway Bill project necessitated a great deal of consideration, resulting in the Commissioners agreeing, subject to certain conditions, to a scheme for an underground station, with subway approaches, opposite the Mansion House. Access to this station will be by two large staircases formed in the footway pavement in front of the Royal Exchange, and also by six others close by. Connected with these staircases will be subways which will enable not only the railway passengers to get to and from the station, but the public generally to cross beneath the roadway at that spot, using either of the staircases as may be most convenient to them. This Bill has received the Royal assent. Another work regarded by some as of great importance, viz., the artesian well, was completed during the year, and the results of the analyst's report as to the quality of the water was in every way satisfactory. The necessary fittings have been laid on, and the water is now supplied to the tenants in the artisan's dwellings belonging to the Commission.

PROJECTED EXHIBITION IN VIENNA.—According to the *Neue Freie Presse*, a syndicate has been formed with a view to the holding in Vienna next year of a general industrial and commercial exhibition.



THE "DUBROT" BRICK AND TILE CARRIER.—This simple contrivance, patented by Mr. Dubrot, seems likely to be useful. It consists, as will be seen by the illustration, of a light metal frame, with one




side hinged, and a carrying hook on the top for use when loaded. It is made, we understand, in various sizes for bricks or tiles.

STEEL FLOORING FOR RAILWAY BRIDGES.—Messrs. Braithwaite & Kirk have recently placed, on a bridge on the North-Eastern Railway, a steel floor of deeper section than any they have previously used, being of 18 inches depth and over 19 feet long, riveted to the lower flange plates of girders. The ridges of the floor formed by plates in this and the reverse section, overlapping to form a double thickness at the top.

CONTRACTS—Continued.

Public Appointments, p. xv.

back of the shingle is fastened a plate with a slot, and at the other or upper end a hole is made. The slot is made to slide over the screw hook or nail fixed into the wood



ILLUSTRATIONS.

Cathedrals of England and Wales: XXVII., Ripon.—Drawn by Mr. Beresford Pite, A.R.I.B.A.	Double-Page Ink-Photo.
Plan of Ripon Cathedral.—Drawn by Mr. Roland W. Paul	Double-Page Photo-Litho.
Chancel-Screen, St. Paul's Church, Morton, Gainsborough.—Mr. J. T. Micklethwaite and Mr. Somers Clarke, Architects.	Single-Page Photo-Litho.
Organ-Case and Stalls, St. Paul's Church, Morton, Gainsborough	Single-Page Photo-Litho.
Details of Pavement, Siena Cathedral.—From Drawings by Mr. T. Rogers Kirtell	Double-Page Ink-Photo.

Blocks in Text.

Plan of Constantine's Bath.	PAGE 84	Interior or Chapter-House, Ripon	PAGE 97
Plan of St. Bardas, Salonica	" 85	Plan of East End, St. Paul's Church, Morton	" 97
Plan of Saxon Crypt, Ripon Minster	" 89	Plan of Low Side Window, Burgh-by-Sands	" 97
Head of Effigy of Sir T. Markenfield, Ripon	" 90	Doulton's Improved Self-Adjusting Pipe-Joint	" 99

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The Architectural Association Sketch-book.



THE eleven volume of this publication quite keeps up the previous standard of excellence in the drawings and interest in the subjects. It contains seventy-two plates, of which fifty-one illustrate subjects in England and Scotland, three are from Belgium and France, one (only) from Greece, three from Spain, and the remainder from Italy. The contingent of sketches from Italy is a fair proportion, but there is room for a larger illustration of other countries in future numbers, from Greece and its neighbourhood especially, when any members of the Association are able to get so far. It is perfectly comprehensible, however, that most of those who contribute have little opportunity of going to the other end of Europe. Mr. Schultz, who has had more opportunities in this respect than many of the members, has not been unmindful of the claims of the Sketch-book; the one contribution from Greece is his, and he gives several others from Italy.

Among the English subjects illustrated we have to thank Mr. Vacher and Mr. Lewis for a valuable series of measured drawings from Westminster Abbey, six plates; Mr. Vacher alone contributes a measured drawing of a bay of the choir, with drawings of the triforium and clearstory, and in conjunction with Mr. Lewis has prepared sections of the mouldings filling three more plates. His drawing of the clearstory is a very good and boldly executed piece of work, and in regard to the plates of mouldings we may call attention to the clear and finished manner in which these are delineated. In several of the plates in which large size sections of mouldings are given, the plan has been adopted, which seems fashionable among draughtsmen at present, of edging the profile with a narrow solid black shading, one side of which of course defines the profile; the other margin of the shading just skirting along it irregularly, not parallel with the profile line, and yet sufficiently near it to look at

first glance as if it were meant to be so. The effect of this is to present to the eye a number of thick ragged black marks straggling about the page; the effect is ugly, and it does not define with sufficient clearness to the eye the profile side of the shading. It is a great deal better to do as Mr. Lewis has done (for we see on looking at the signature that the mouldings are drawn by him from Mr. Vacher's full-size profiles), to define the profile by a clear and decisive black line, and then shade inside it with a tint. The matter is not one to be considered beneath notice; there have been various fashions in the way of showing profiles of mouldings, and some are distinctly better than others, both in appearance and in a practical illustrative sense. Mr. Lewis's black line is, to our judgment, thicker than necessary; the thinner the line, so long as it is a firm and even one, the more accurately can small details in the profile be shown; but it is better than the irregular black marks which we meet with on other pages. We may observe however, while on the subject, that full-size profiles are 50 per cent. more valuable than any reductions, as records; and a great many full-size profiles can be got on an average-sized page by adopting thin but distinctive lines and letting them cross each other freely. We admit that it does not make so agreeable a page to look at, and that it does not present to the eye the general proportion of parts at a glance; but it gives the precise facts in a way a reduction cannot. This is especially important in the case of the mouldings of a large and historic architectural monument; we do not say it would be worth while in the case of an ordinary small work, such as a font or a pulpit.

Mr. W. J. Tapper contributes a complete set of measured drawings, including a large-scale plan, of the interesting church of Patrington, Yorkshire, a cross church of late fourteenth century date, with the unusual feature of a transept with east and west aisles, on the same scale as the nave. The drawings comprise longitudinal and cross sections and two elevations. The treatment of the base of the spire, which rises from the middle of a thin open arcading finished above

with pinnacles, is peculiar though not architecturally very admirable. The spire is a lofty thin stalk absolutely without ornament or architectural incident of any kind, another peculiarity. The page does not allow of showing the entire height of the spire; a perspective sketch showing the proportions of the whole composition would have been a useful addition; but the set of drawings is of distinct value as a record of a church which has so much individuality of architectural character.

Mr. A. H. Hart gives a series of perspective illustrations of portions of Oxford colleges: the exterior of the Dining Hall of Brasenose; the main quadrangle of St. John's, a charming bit of collegiate architecture, with its picturesque arrangement of windows; the west door of Magdalen Chapel; and the garden front of St. John's, with its characteristic oriel, in which we see late Gothic windows and mouldings supported on a classic corbelling. In regard to the west door at Magdalen, he notes the fact that the detached pointed arch which stands free, with open spandrels, in front of the square-headed doorway, has kept its form perfectly, though the horizontal door-head behind it has sunk in the centre; a curious instance of the "staying power" of the pointed arch. From the appearance of the plate we presume the original drawings were in pencil, and they seem to have been a little overshadowed, which gives rather a want of clearness, except in the case of the doorway, which is on a large scale and suits the method of drawing better.

There are some interesting bits of domestic work in the English portion; among others the delightfully picturesque old Swan Inn at Knowle (Warwickshire) by Mr. Bidlake, with its wrought iron sign which sends the pictured swan flying out over the middle of the road; a piece of work which must have been a pride to the man, an artist in his way, who executed it. An old deal doorway from Carey-street, by Mr. Dodds, is very interesting; still more so is Mr. Rickards's drawing of the staircase and doorway from Whittington Chambers, College Hill, E.C., shown in an excellent geometrical drawing, with the details of the joinery given. Mr. Sakurai gives a clear and well-executed perspective drawing

of the west door of Salisbury Cathedral, a little deficient in power, but commendably careful in drawing; the rather too clean and finished look of the masonry is due perhaps to the restorer as much as to the present artist. Mr. John Begg's bold pen sketch of the massive architecture of Jedburgh Abbey choir is an admirable example of free sketching of this kind; he also contributes a sheet of measured drawings of the same building, and another of measured drawings of Dunblane Cathedral. Mr. Lorimer's complete plans, elevations, and two views of Kellie Castle, in three sheets, form a good conclusion to the British series.

The one Greek illustration, by Mr. R. W. Schultz, is a most interesting coloured plate of the beautiful radiating panels of mosaic from Hadrian's Stoa, Roman work though on Greek ground, and in which something of the Greek spirit is shown in the design of the narrow centre panel, and in the outer borders, and in fact the work was very possibly executed by Greek hands, though the diaper pattern filling the larger panels is distinctly Roman in type. Mr. Gimson's drawing of some of the sculptures from the north porch of Rouen is an excellent example of pencil drawing of this class. Mr. Selby's drawing of a stained-glass window from the Laurentian Library at Florence, ascribed to Giovanni da Udine, is a very interesting contribution, printed in a light warm colour which is very suitable to the subject; this is one of the examples of that Renaissance method of stained-glass design in which figures and conventional decorative objects are painted on the plain white ground, with no connexion, and the window bars divide it up into squares irrespective of the design. Another illustration of special interest is Mr. F. Masey's drawing of the beautiful bit of ivory decoration in black cement from a tombstone in Santa Croce. Mr. T. Maclaren illustrates the charming pulpit by Matteo Civitate from Lucca Cathedral. Mr. Prentice gives an interior view of San Clemente at Rome, with a small plan attached, and also a very bold and powerful sketch of the celebrated staircase in Burgos Cathedral. Lastly we may mention a beautiful pencil sketch by Mr. Schultz of capitals in the narthex of St. Mark, which is one of the finest things in the volume.

There has been a definite attempt made in this volume of the Sketch-book to give a little more information than before in regard to the date and (where possible) the authors of the work illustrated, and a printed form has been made out to send to the authors of sketches, in which they are requested to fill up the name, subject, country, district, and date of the work, with the authority for the date, if any; and the index has been remodelled on these lines. This is a good innovation, and will add to the value of the work for the future. We may add that Mr. Pite has made a fine sketch for the title page, a half section half perspective of an imaginary Classic vaulted building of which we see part both of the interior and the exterior architecture, somewhat after the manner indulged occasionally by the architects of the Renaissance. We hope the Sketch-book will go on and prosper and even surpass its present excellence; to which end we may exhort all members of the Association who are conscious of the power of drawing well to do their best to support it.

"APULIA MONUMENTALE."—Under this title Signor Mosconi, photographer, of Rome, is issuing a fine set of photographs (some of which have been forwarded to us) of ancient edifices of Southern Italy.

PRICE OF LAND AND HOUSES IN THE CITY.—Since the auction on the 31st ult., when the vendor's bid of 150,000*l.* for the freehold of Nos. 11 and 12, Cornhill, was not exceeded, the property has been sold by Messrs. Fox & Bousfield, it is stated, at over 6*l.* per foot superficial. At the sale of four other houses, being freehold, in the same street on the 24th ult., No. 24 was sold for 23,500*l.*, or about 42*l.* 14*s.* 6*d.* per square foot; and Nos. 25, 26, and 27 for 90,000*l.*, or, say, 47*l.* 3*s.* 7*d.* per square foot.

THE STONE, CEMENT, AND ASPHALTE INDUSTRIES OF THE UNITED STATES.

THE recently-issued "Mineral Resources of the United States," 1889-90, though rather late in its appearance, contains some interesting statistics concerning the stone industry of the States. The figures apply in the majority of cases to the year 1889; in 1890 no detailed statistics were attempted to be collected, at least not on such a scale as the previous year, when the information was got together for the eleventh census report.

The value of limestone produced in the United States in 1889 was 19,095,179*l.*; the greatest amount was raised in the State of Pennsylvania—2,655,477*l.*; next came Illinois with 2,190,607*l.*; Indiana, 1,889,336*l.*; Missouri, 1,859,960*l.*; New York, 1,708,830*l.*; Maine, 1,523,499*l.*; and Ohio, 1,514,934*l.*. Neither of the other States produced a million dollars' worth; whilst several fell below 30,000*l.*. The principal purpose for which the limestone was used was for the production of lime, the value being computed at 8,217,015*l.*. For building purposes, 5,405,670*l.* worth of limestone was used; for street work, 2,383,456*l.*; the remainder having been employed for bridges, railroad work, &c.

The value of the granite produced in the United States in 1889 was 14,464,095*l.*. Of this, Massachusetts provided 2,503,503*l.*; Maine, 2,225,839*l.*; California, 1,329,018*l.*; and Connecticut, 1,061,202*l.*. The purposes to which the granite was put were—Building, 6,166,034*l.*; street work, 4,456,891*l.*; monumental and decorative purposes, 2,371,911*l.*; railways, &c., 1,238,401*l.*

The total value of the sandstone produced in the same year was 10,816,057*l.*. The State of Ohio heads the list with an output valued at 3,046,656*l.*, the other States falling far behind; Pennsylvania gave 1,609,159*l.*; Colorado, 1,224,098*l.*; whilst New Hampshire, Tennessee, and Idaho did not produce 5,000*l.* worth. More than 65 per cent. of the whole of the sandstone raised was used for building purposes, viz.:—7,121,942*l.*; for street work a quantity valued at 1,832,822*l.* was taken up, and for bridge, dam, and railroad work 1,021,920*l.*

The value of the marble produced in the United States in 1889 was 3,488,170*l.*. This was the output of ten States, as follows:—Vermont, 2,169,560*l.*; Tennessee, 419,467*l.*; New York, 354,197*l.*; Georgia, 196,250*l.*; Maryland, 139,816*l.*; California, 87,030*l.*; and Pennsylvania, Massachusetts, Idaho, and Virginia together gave 121,850*l.*. A considerable quantity of marble was also imported, the value of which in 1889 was 675,415*l.*, and in 1890, 785,383*l.*. Italian marble, principally Carrara, formed over three-fourths of the total imports. Small proportions came from Mexico (Mexican onyx), and marbles for special purposes were derived from France and French possessions, Austria-Hungary, Great Britain, Germany, Canada, and Turkey-in-Asia.

Slates valued at 3,482,513*l.* were produced in the United States during 1889, of which Pennsylvania provided not less than two millions of dollars worth. By far the greater portion of this was used for roofing purposes, but 684,609*l.* is the estimated value of slates used for other work.

Bluestone was produced in 1889 to the value of 1,689,606*l.*, the whole being quarried in the States of New York, Pennsylvania, and New Jersey. We may mention that bluestone is the name given to one of the varieties of sandstone, consisting of exceedingly small particles of silica cemented together by silica, and the special character of the material has led to its being considered apart from other sandstones. Although practically the whole of

the mineral matter binding the grains together is siliceous, there is frequently a slight amount of argillaceous material present. The quartz grains are so very small, and the siliceous cement so firm, that the stone is exceedingly compact and difficult to work. As a rule it is very durable, but we imagine its quality in this respect is largely controlled by the proportion of argillaceous matter. A certain amount of the stone is raised from large quarries which regularly employ hands, and have good plant and machinery, but a not inconsiderable quantity is derived from the spasmodic efforts of men who simply provide themselves with ordinary quarry tools, and who dislodge the stone wherever it can be found. Bluestone obtained in this manner is usually transported to a number of shipping points, where it is sold to dealers who make a business of collecting irregular consignments of this nature, and shipping them to the places where the material is used. The irregular methods of conducting the bluestone industry are probably due in a great measure to the manner in which the stone occurs in nature. Many of the ledges opened up run out in a short time, and are then, of course, abandoned, so that long-continued operations at one point are not possible in many cases. Originally, bluestone was used for flagging only, to which purpose the larger portion is still applied, but now it is found in rubble masonry, retaining walls, bridges, kerbing, gutters, &c.

A large quantity of hydraulic cement is produced in the United States in 63 different establishments, situated mostly in the States of New York, Indiana and Kentucky. In 1890, 7,398,734 barrels were turned out, with a total value of 5,582,243*l.*; and in 1891, 7,607,067 barrels valued at 5,512,153*l.*. The amount of Portland cement from 18 establishments open was in 1890, 335,500 barrels, worth altogether 704,050*l.*; and in 1891, 454,813 barrels, representing a value of 1,067,420*l.*. Quite one-half of the cement sold at Buffalo and points west of that city is in sacks. All cement sold in Buffalo, and west of it, is rated at 26*l.* per barrel, whilst all sold east of that place contains 30*l.* to the barrel, and Portland cement, 38*l.*, so that there are three different weights for a barrel of cement in the United States—a very convenient arrangement in the hands of some people, no doubt. The fact that Portland cement is frequently said to do better on the other side of the Atlantic than the natural cement, may be in some cases due to the fact that one-third more of the material is given to the barrel.

The production of asphalt and its ally, bituminous rock, was limited to California, Kentucky, and Utah in the years 1889-90. Ohio produced also 600 tons in the latter year, but it was not sold. The varieties, qualities, and values of the several bitumens are so widely different that they might readily be classed as separate minerals. In fact, a new name is usually given to each new discovery. During 1889, 51,735 short tons, valued at 171,537*l.*; and in 1890, 40,841 short tons, worth 190,416*l.* were turned out. It is noteworthy that prior to the year 1888, the output was entirely from California, and the industry had hardly assumed commercial importance. In 1887, for instance, only 4,000 short tons were chronicled, but in the following year, when Utah also began to yield the material, the output suddenly increased to over 50,000 short tons. Notwithstanding the large proportions which the asphalt industry has attained in the Western States of America, the bulk of supply for the United States, in fact nearly all that is consumed in the Eastern cities is procured from the island of Trinidad, in the West Indies. This is mainly due to the excessive cost of transportation from the Western localities. The area laid with Trinidad asphalt in the eleven years, 1880-1890, was 6,803,054 square yards, which is equivalent to 446 miles of roadway 26 ft. in width. A limited amount of asphalt from Neuchâtel, Switzerland, is also imported into the United States.

NOTES.

AS the St. Pancras Vestry did not trouble themselves to give us any official notice of the exhibition of the competition designs for their proposed new offices, we presume they concluded that we should hardly think the collection of much interest, and we are quite disposed to agree with them. The average merit of the designs, in fact, is what we must expect to find in a vestry-hall competition as long as superior architects have so little faith in the manner in which such competitions are likely to be conducted. The first premiated design, by Mr. W. Harrison, is one of the best; we do not know that we should conclude it was the best. The plan is compact and economical, at the cost of being rather wanting in clearness and symmetry of arrangement; but the Council-chamber and committee-rooms are placed on the second floor, which we should call a very inconvenient arrangement. The elevation is unobjectionable in point of taste; we fear more can hardly be said. The second place is given to Messrs. Gibson & Russell, whose plan has more of internal effect and symmetry, but spends a rather large proportion of space on corridors, and the committee-rooms and Council-rooms are too much spread out on the first floor, and not sufficiently concentrated. The architectural treatment is effective, and the building would have been a picturesque one in execution. We hardly think so much could be said for Messrs. Malcolm Stark and Rowntree's design, to which the third premium has been awarded, but the plan has a good deal of merit, especially in the arrangement of the ground-floor offices. Among other designs exhibited (taking them in order of hanging) there is artistic feeling and picturesqueness in the rather odd elevation by Mr. F. W. Dixon; Mr. J. Johnson's is a very neat-looking and decidedly "vestry-hall" elevation; Mr. P. J. Marvin sends a simple brick elevation, with hardly any decoration but a sculptured frieze under the eaves, which is in very good taste; Messrs. Hall & Ardron (we presume—spelt "Ardroan" in the printed list) have laboured hard on a carefully-prepared set of plans and elevations, showing a front of considerable dignity and effectiveness; Mr. Worley's design has picturesque elements; Mr. H. Wightman Rising sends a quiet and tastefully-designed Queen Anne elevation; Messrs. Tulloch & Dennis send a bold design in round-arched style, with sculpture introduced in the spandrels of the upper windows, and a tower rather too large for the occasion, but the whole design has dignity. With these exceptions, we may say that considering that there are sixty designs sent in, and that the building (to cost about 30,000*l.*) is a tolerably large and important one, we have seldom seen a poorer set of competition designs, many of them looking like the efforts of pupils rather than those of practised architects.

THE Education Department has made a move in the right direction by drawing more attention to the sanitary state of elementary schools. That these places should be in a proper sanitary state is important in the highest degree for the health of scholars and of teachers. In the next place, when the importance of this fact is brought home to the persons who are managers of these schools, and to School Boards, it is likely to add to the general appreciation and knowledge of sanitary principles. From the first of the month inspectors are to fill up a form at their annual inspection, which will give the Department particulars of the sanitary state of every elementary school in the kingdom, and it will in time form a complete statistical record of the condition of school premises. It is to be regretted that no machinery exists for obtaining similar information in regard to higher grade schools, or of compelling higher grade schools which are deficient from a

sanitary point of view to amend their ways. When the Education Department make their report, after the first year's experience of the new system, some interesting facts from a sanitary point of view are likely to be made public.

AT the Mansion House Conference on Monday, Sir James Whitehead and his Railway Rates Association, received the unanimous support of a host of M.P.'s and others holding widely different political views. The meeting was a thoroughly representative one, and was described by the Lord Mayor as the most important of its kind ever held at the Mansion House. The sympathetic reception of the agriculturists by the President of the Board of Trade the previous week doubtless encouraged the promoters to submit strongly-worded resolutions,—all of which were carried with the greatest enthusiasm. The Association has always been pretty active, though hitherto it has mainly stood on the defensive. At Monday's meeting, however, Mr. Barran, M.P., accurately designated the proceedings "a declaration of war,"—a statement emphatically endorsed by those present. The justification for this attitude is to be found in the fact that the railway companies obtained Parliamentary sanction for their maximum rates largely on the faith of the assurance,—again and again repeated,—that they had no intention of raising their rates, although a complete revision might be found necessary. It is argued,—and, we believe, are almost invariably based upon the new maxima; and the re-adjustments and "concessions" which are gradually being made afford a proof that it is necessary for traders to make use of the strongest pressure possible, or be saddled at once with charges only intended to be held in reserve against emergencies. Mr. Channing, M.P., said that the rates just issued have defeated the intention of recent legislation, while Mr. Barran declared that Parliament would be willing to follow the lead of that meeting, an assurance which was upheld by an encouraging speech by Mr. James Lowther, M.P., and sympathetic utterances by other speakers. The lead of the meeting was drastic enough, a resolution being carried urging the prompt passing of an Act "for so extending the powers conferred upon the Board of Trade as to give them jurisdiction in cases of complaint or dispute to determine what an actual rate or charge shall be." The railway companies might fairly denounce this as constituting an unwarrantable interference with their business; but it must be admitted that the traders may quite as fairly point to the treatment they have just received at the hands of the companies, as justifying them in seeking further protection.*

IT was inevitable that the deputation which waited upon the Chancellor of the Exchequer on the Decimal question should receive but slight encouragement; otherwise Sir William Harcourt's utterances would have been decidedly disheartening. The difficulties connected with the change are as apparent and undeniable as are the benefits which would ultimately ensue, and Statesmen are confronted with too many other important questions to attempt to grapple with one which would meet with hostility from a large section of the community. It cannot but be regarded as extremely unfortunate that each successive

* In several industries it has been found that the railway companies have effected advances in their charges by means of alterations in the computation of weight. It appears that the increased charge upon Portland stone is due largely to this: the stone being now reckoned at 24 cubic ft. to the ton, instead of 16 cubic ft. as formerly. The quarry owners are memorialising the railway companies with a view of getting the old conditions restored, and appeal to builders, and others interested, for support. Messrs. Webber & Pagnoune, of the Eastern Works, Portland, have the matter in hand, and invite signatures to the protest they have prepared. If, as we understand, 24 ft. of stone does not weigh a ton, the railway companies have taken up an untenable position, and there should be but little difficulty in obtaining the desired relief.

Government should feel compelled to throw cold water upon the efforts of the Decimal Association, tempered as it generally is with a sufficient amount of sympathy with the objects of the Association to prevent its being too chilling. Of course in any scheme for revising our coinage, the pound sterling would remain the standard, but several writers boldly propose the abolition of the penny. The latest suggestion,—in last month's *Westminster Review*,—assumes that the public would submit to the substitution of "half-groats" and "mites" for pence and farthings. The half-groat would be worth one-tenth of a shilling, and "as a safeguard" the proposer would "strictly forbid the application of the term 'penny' to the new half-groat." Sir Wm. Harcourt considers that it is as futile to think of interfering with the penny as it is with the pound sterling. He insisted upon looking at the question as a practical one, and not a theoretical one, and argued that no inquiry would do more than establish the sound theoretical advantages of the system. With this the deputation had to be content for the present, but we doubt not that the Association will persevere with their commendable efforts to bring about the desired change.

THE Board of Trade Returns for the year show that our imports of materials used in the building trade are still increasing, while our exports are diminishing. Of wood and timber, we imported in 1892 the following quantities:—Hewn, 2,469,140 loads, valued at 4,905,846*l.*, against 2,251,577 loads, valued at 4,508,787*l.*, in 1891; sawn or split, planed or dressed, 5,094,309 loads, valued at 11,180,141*l.*, against 4,378,452 loads, valued at 9,379,808*l.*, in 1891; staves of all dimensions, 136,063 loads, valued at 593,539*l.*, against 130,101 loads, valued at 590,543*l.*, in 1891; mahogany, 56,315 tons, valued at 501,213*l.*, against 48,021 tons, valued at 449,433*l.*, in 1891. It will be seen that the increase in the imports of wood in a more or less worked condition is far greater than of wood and timber in the hewn state. For the latter the increase was 715,857 loads (nearly 16½ per cent.) and 1,800,333*l.* (over 19 per cent.) respectively; for the former, 217,563 loads (over 9½ per cent.) and 497,059*l.* (over 11 per cent.) respectively. Our chief sources of supply of hewn wood and timber are still Sweden and Norway, Russia, and "other countries"; of the material in the more advanced state, Sweden and Norway, Russia, and British North America. The imports of iron manufactures (girders, beams, and pillars, large quantities of which are used in the building trade) amounted to 74,586 tons, valued at 502,574*l.*, in 1892, against 74,035 tons, valued at 509,880*l.*, in 1891. While the quantity was slightly larger, the value somewhat declined. There was a further increase in window and German sheet-glass and plate-glass, the imports of the former being 993,117 cwt., against 855,332 cwt. in 1891; of the latter, 212,159 cwt., against 175,793 cwt. The value of window and German sheet-glass rose from 490,535*l.* in 1891 to 564,231*l.*; but that of plate-glass, notwithstanding the larger quantities imported, fell from 338,669*l.* to 334,303*l.* Turning to exports of building materials, we find that there was a decrease in almost all descriptions. Our chief exports consisted in painters' colours and materials, of which we shipped goods of the value of 1,524,600*l.*, against 1,617,318*l.* in 1891; decrease 5.8 per cent. Next follows cement, the exports of which were 493,128 tons, valued at 902,599*l.*, in 1892, against 575,060 tons, valued at 1,140,697*l.*, in 1891. In this material the decline was thus 14½ per cent. in quantity and nearly 21 per cent. in value. Our exports of plate-glass also show a considerable decrease, from 3,284,513 square feet (valued at 212,422*l.*) in 1891 to 2,158,046 square feet (valued at 116,569*l.*) in 1892, or over 34 per cent. in quantity, and over 26 per cent. in value.

A CORRESPONDENT calls attention to the very bad lighting of the stations on the Underground Railway. There is no doubt this is a just cause of complaint on the part of the public, and it is an instance of the disregard of the public convenience which characterises some railway companies. The underground stations should certainly be lighted by electricity; even, however, if they are lighted by gas, a little care would enable the stations to be better lighted than they are at present. No attempt is now made by means of reflectors to illuminate the platforms. The power of the gas-jets is wasted above the heads of the passengers. Neither the Metropolitan nor the Metropolitan District Railway is financially a success, and, therefore, the public must expect them to be economical. But true economy consists in making the most of materials at hand, which is certainly not at present done by either of these companies.

RANKINE'S theory and formula as to foundations in loose soils, which was based on the modern theory of granular masses, seems to be called in question by the results of some calculations and experiments by Professor V. J. Kurdjumoff, which are detailed in a recent number of *Der Civilingenieur*—which go to prove that Rankine's formula must be accepted at least with reservation. Another worker in this field of research has been Pauker, whose theory is based on the mutual action of sliding and resistance prisms, but this also is attacked by Professor Kurdjumoff's investigations; as the former assumed the resistance and sliding prisms to have plane slide-surfaces, whereas the latter are curved; nevertheless Jankowski's modification of Pauker's formula gives results which fairly agree with experiment, although based on assumptions not strictly correct. Rankine's formula is said to fail because it involves the false assumption that the difference in the pressures on two adjacent elements can be finite. In support of the theoretical reasoning put forward by Kurdjumoff—in which he shows that the slide surfaces are probably defined by continuous curves starting vertically from the edges of the foundation, passing under the latter and out to the surface of the ground at the opposite sides—an apparatus was designed by means of which it was sought to determine the actual form of the slide surfaces. A box, having a glass slide, was filled with sand, and a rectangular block of wood was pressed down on the sand by a screw and guided in so that one side touched the glass. A section of the material was thus exposed, and records were obtained by photographing with magnesium light; the sand, it should be stated, being arranged in different colours. When the pressure was exactly vertical the sand gave way on both sides of the block, and the curves of the slide surfaces were symmetrical with respect to the vertical axes, starting from the middle of the foundation. With an increase in the depth of foundation, the outer portions of the slide curves became steeper, so that the width of the prism of the disturbed material measured perpendicularly to the sides of the block was not proportional to the depth of the foundation nor to the resistance. When the pressure deviated to a certain extent from a vertical direction the disturbance of the sand sometimes occurred on one side only. By giving various slopes to the surface of the sand the form of the slide curves was correspondingly modified. The curves were also affected by difference in the height of the surface on the opposite sides of the block. In the latter case the author arrived at the following rule:—"The width of the displaced prism is inversely proportional to the depth of the foundation on either side." A vertical wall, in close proximity to the block, was found to increase the resistance of the foundation, and to act in a manner similar to a difference in the

height of the surface on opposite sides of the block.*

IN the last issue of the *Bulletin de Correspondance Hellenique* (vi.-vii., 1892), Mr. Maurice Holleaux publishes the very interesting series of bronze plaques found in the excavations at the sanctuary of Apollo Ptoios. These bronzes, though found some years ago, have hitherto only been made the subject of brief notices in reports. Six of the thirteen fragments published contain decorative motives only,—e.g., heraldically-arranged sphinxes, griffins, birds, &c. The remaining subjects are divided between *genre* and mythology. These last are of great interest. One fragment represents the subject—hitherto rare in art—of the combat between Zeus and Typhon. Zeus strides forward, with his thunderbolt uplifted, to attack a colossal winged monster. Another fragment represents Prometheus attacked by the vulture. Obviously, as a glance both at style and subject shows, we have here a close analogy to the archaic bronze reliefs of Olympia. On one of these, it will be remembered, a fragmentary inscription is still legible, and the letters show that the work must have been executed somewhere in the neighbourhood of Sicyon, Corinth, and Argos. From this same district must have come also the analogous reliefs found at Dodona; and, finally, the present specimens from the Ptoion, in the north of Boeotia. Their discovery evidences the widespread influence of the Argive-Corinthian school of metal-working.

THE November number of the "Transactions of the American Society of Civil Engineers" contains a paper dealing with the subject of thin floors for bridges, in which the author reviews at some length Mr. Olander's paper upon the same subject, read before the Society of Engineers in March, 1887, and provides some practical transverse sections of bridges showing successful methods of constructing railway bridge floors, in cases where it is undesirable to raise the rail level and where the headway required for the under-passage or roadway necessitates a limited thickness for the rail-floor. In a paper upon "Railway Signalling as Applied to Large Installations," Mr. R. C. Rapier's paper upon the "Fixed Signals of Railways," read at the Institution of Civil Engineers, March, 1874, is alluded to, and the value of the interlocking tappet specially dwelt upon. The author's recommendation for signalling is to eliminate the human agency as much as possible. Another author in a paper upon "Electric Rock blasting," argues that the fuse cannot at best be as safe as the electric blast, and that the reliability of batteries as generators renders electric blasting preferable to the process of simply igniting a fuse leading to a cap which is inserted in a cartridge. In a discussion on motive power for street railways, the electric motor is stated to be wasteful, unsightly, and not entirely reliable, while cable traction is asserted to be advantageous and successful. The volume closes with a discussion upon pile-driving, in which regret is expressed at the want of uniform practice by engineers and contractors in this branch of engineering. The result of rapidity of blows for penetration is presented. Errors derived from investigation with ordinary sounding rods are emphasised, and very proper remarks made upon the mistake of using piles to support both vertical loads, and in addition to be expected to act as retaining walls when unanchored or not held back by bracing.

THE third and last of Professor Silvanus Thompson's lectures at the London Institution, on electric lighting, dealt with

* Investigations on this subject have also been carried out by Forchheimer, a brief description of which may be found in the minutes of proceedings of the Institution of Civil Engineers, vol. lxxii., p. 331.

systems of distribution, meters, and other accessories. The series, parallel, three-wire, and transformer systems were explained with the help of diagrams; their history briefly indicated, and the circumstances pointed out which determine the suitability of each. The Professor then explained in some detail the combination of transformer and three-wire systems adopted by the City Lighting Company, and illustrated it practically by a Mordey transformer, placed on the floor, and a bank of lamps, with the three "leads" from the transformer, on the wall behind the lecture table. Just touching on distribution by storage batteries, the lecturer passed to the consideration of meters, which he treated with characteristic humour. He was so often asked, he said, whether there existed a "reliable" electricity-meter that he proposed having a card printed, "There is not yet a 'reliable' gas-meter." The electricity-meters now in the market were, he maintained, ten times more reliable than any gas meters. Proceeding to details, he then explained the principle of a number of meters, proposed or actually in use, beginning with Edison's electrolytic cell, which, he said, was obsolete, owing to certain objections to it in practice; and going on to the Aron meter, invented by Messrs. Ayrton & Perry, with its differential gear; Hopkinson's motor meter; the Ferranti direct current meter; the Shallenberger, which was shown in action, measuring the energy consumed in lighting the theatre; Elihu Thomson's meter for alternating currents and a new form of self-winding clock-meter, in which for differential gear there was substituted the device of having the hands of the clock driven by one gearing, and the face by the other. From measurement of electric energy to its cost was a natural transition, and to the best way of reducing the cost by daylight use of the plant for purposes other than lighting. The practicability of this was shown by a motor driving a fan, and a number of utensils lent by Messrs. Bins, waver for heating and cooking by electricity were exhibited. Finally, the audience were dismissed to the strains of an ordinary piano played by some mechanism which was driven by an electric motor; an application which the lecturer said he could hardly recommend as an "all day load." Professor Thompson, we may add, is almost the ideal popular lecturer; he is fluent, and never at a loss for a word; he seems instinctively to take the measure of his audience, and to know exactly how much to tell them, and has the art of making what is trite seem new, and what is complex, simple.

A NEW antiquarian magazine, to be published quarterly under the title of the *Illustrated Archaeologist*, is announced to appear on May 1 next. It will be edited by Mr. J. Romilly Allen, and its special feature will be illustrations, which will be the main object, the letterpress being merely descriptive of the illustrations.

THE series of pictures by Mr. Ayerston Ingram, now being exhibited at Messrs. Dowdeswell's under the title "A P. & O. Voyage," have an interest apart from their artistic merit. The idea of illustrating a voyage in this way is a very happy one, and might be further applied. We get the scenery of the various coasts that are passed in succession, the knocking about of the big steamer in "the Bay," the slow progress between the low sandy banks of the Suez Canal, the deep blue water of the Indian Ocean, the white buildings of Sydney under the bright sun, one after another, in a way that makes one almost realise the voyage, as well as some of the incidents of steamboat life. Many of the sea-pictures are admirable in themselves, apart from their place in the story.

THE miscellaneous collection of paintings on view at the Fine Art Society's Gallery contains some good things, and is worth a visit. Among the small works are some of architectural interest, such as Signor Giampietri's powerful representation of the arch of S. Severus, Rome, and Mr. Cotman's little views of Pinner and Rainham streets. In Mr. Albert Goodwin's Tewkesbury, a charming little landscape, the tower in the distance does not give a correct impression by any means of Tewkesbury Tower; we should not have recognised it.

A CURIOUS sample of the inaccuracy and indifference of daily papers about architectural matters (so long as they can have a fling at architects) is exhibited in a paragraph which originated with the *Daily Chronicle*, and is now getting industriously copied in provincial papers. This states that the violent attack on the architectural profession in the *Edinburgh Review* is one of the best things that has ever appeared in that periodical, and that it is probably from the pen of Lord Grimthorpe! The article is in the *Quarterly Review*, and Lord Grimthorpe is one of the persons attacked in it, though his name is not actually mentioned; one of his tracery windows at St. Albans being illustrated as "the horrid example." The person who wrote the paragraph cannot even have read the article; but anything in the shape of abuse of architects is always good "copy" for the average daily paper.

LETTER FROM PARIS.

We mentioned a few months ago the case of the sculptor Lecerue, better known under his pseudonym of "Jacques France," who, having in vain endeavoured to popularise a very ugly bust of "La République," in a fit of fury stabbed the expert who had been appointed to examine into his claims. Thanks to the ability of his counsel, "Jacques France" has been acquitted after passing ten months in prison. The jury took the view that he was not in a state of mind to be entirely responsible for his acts. In fact, the sculptor in question is a very poor creature, the victim of a vocation for which he had no real ability, and of his own exaggerated vanity. The incident is fortunately a rare exception; there is plenty of painful struggle for life among the ranks of French artists, but disappointment is in general accepted silently and with dignity.

M. Pierre Vauthier, who has been commissioned by the Municipality to prepare a series of views of Paris for the Chicago Exhibition, is an artist eminently qualified for such a task; perhaps no one is better acquainted with all the picturesque corners of the city, and his pictures, after filling a place in the exhibition, will have a certain permanent value as historic records. The pictures which he has painted represent the Avenue de l'Opéra, the Halles, the Place de la République, the Boulevard des Italiens, the Quai aux Fleurs, the Pont d'Austerlitz, &c. All the pictures, now being exhibited at the Georges Petit Gallery, are fine and clear in lighting and effect, and do great credit to the painter.

The exhibition of the works of two Japanese artists, at the Durand Ruel Gallery (already referred to in our foreign notes), MM. Antomaro and Hiroshigé, has proved very popular with the Parisians. The paintings are vividly realistic in effect, and show great ability and variety of execution.

The small exhibitions continue to succeed each other. The "Cercle de la Rue Volney" has just organised its annual exhibition of paintings, and if we pass over the works of some amateurs who are only too happy to exhibit side by side with well known masters, the exhibition is noteworthy for the number of good portraits and landscapes. Among the former is an admirable portrait of Mlle. Rachel Boyer, by M. Benjamin Constant; M. Bouguereau exhibits a "jeune fille au papillon," faultless in drawing, and M. Henner a curious study; among other exhibitors are MM. Bergeret, Berthelon, Boucher, Damoye, Jules Lefebvre, Henri Martin, Rixens, Vibert, and Yon.

M. André Sinet, the pastellist, who has become in his way a fashionable portrait-painter, has collected some of his recent works in the "Galerie des Artistes Modernes," in the Rue de la Paix. It is a collection of very conventional

pictures, but showing a great deal of facility and spirit, and is at all events very popular with the Parisians.

Sixty years ago, in 1832, a group of artists, among whom were Decamp, Ary Scheffer, David d'Angers, Robert Fleury, Isabey, Delaroche, and others, petitioned King Louis Philippe that the annual exhibitions of pictures should take place in the months of September and October instead of in May and June. The petition was unsuccessful, although it was not then the fashion, as it is now, to quit Paris at the end of June and not return till the end of October. At the present time, that which is called the "grand public," or "tout Paris," departs immediately after the "Prix de Paris." It is difficult therefore to understand the action of a certain number of members of the Société des Artistes Français, who are again moving to have the Salon relegated to September 1st as its opening day. Their argument is the difficulty of preparing pictures during the colder and darker months of the year; but it is not likely this attempt will prevail against the general fashion and the increasing taste of the Parisians for country life at that time of the year.

The sites proposed for the exhibition of 1900 are still under discussion; one project succeeds another, but nothing like a decision has been arrived at. The proposer of one of these schemes, M. Saint-Lanne, has commissioned two able decorators, MM. Hista and Chaperon, to execute a model showing the immense agglomeration of buildings which he proposes to construct behind the Auteuil viaduct, on both banks of the Seine, and which will cover about 150 acres. Taking the river as a base, M. Saint-Lanne places upon it a bridge tower of enormous proportions, the four towers of which will be connected with the palace of electricity, and with a "Tour Ville," in 45 stories, to contain two thousand apartments, a theatre, a bathing establishment, gardens, restaurants, &c., on the right bank, and on the axes of the terrace will be a "Place des Nations" 400 metres in length by 200 in width, abutting on the Palace of Electricity, to be built in steel, and of which the highest lantern will overtop the Eiffel Tower. At the centre of the Place is to be a state pavilion, around which will be grouped the foreign exhibition departments. On the left bank will be the pavilions of Machinery, Industries and Transport, the Agricultural exhibition, the Colonial and Ministerial exhibitions. Such is the project, of which we give an account as a curiosity, and without the least belief in its accomplishment, considering the restricted and economical ideas of most of the members of the organising committee appointed by the Government.

By the side of these discussions for a celebration which would form a bond of union between France and other nations, our press is preoccupied with certain more bellicose subjects, and is pressing on the Government the consideration of the danger which the dome and campanile of the church of Sacré Cœur might prove in time of war, as marks to guide the enemy's artillery. The fact is that the subject of a second siege of Paris is merely a pretext that has been invented by those who have all along been endeavouring to prevent the completion of the church on Montmartre. However, slow as its progress has been, and in spite of the death of its lamented architect, the work has gone on, and since the visit of the Congress of Architects two years ago considerable progress has been made, and the cupola of the choir may be expected soon to emerge from its scaffolding. An absurd rumour that the Council of Defence of Paris had given orders for the removal of the church and the erection of a fort on the same site may be traced to the same influence, and is absolutely without foundation.

The jury of architecture of the Académie des Beaux-Arts, under the presidency of M. Ginain, has been occupied with the decision on 140 designs sent in for the Godebreuf prize, the subject being "A Flèche." A first medal has been awarded to M. Rigault, a pupil of M. Guadet, and Second medals to M. M. Selmersheim, Bigot, and Averd.

M. Hector Lemaire, the sculptor, has been appointed professor at the Ecole Nationale des Arts Decoratifs in place of the lamented Moreau-Vauthier, whose death was briefly announced in the last number of this journal. Moreau-Vauthier was an artist of great and rare talent. He was the son of a dealer in ivory, and studied in that material under the sculptor Tousseint. His first works in decorative art received awards at the Exhibitions of 1855 and 1867, and the marriage coffer which he executed in 1857 for the Baronne de

Rothschild was much admired. He was the author also of a great many well-known pieces of sculpture, his "Petit Baveux" exhibited in 1869 is in the Luxembourg, his "Neride" in marble adorns the apartments of the Prefect of the Seine in the Pavillon de Flore. We may also mention his bronze statue "Un Père Italien," his "Bethsabée," a marble statue; his stone figure of Ste. Geneviève, and the bronze statues of "Jeune Faune," "Pascal Enfant," and "Gavroche." His "Un Prévôt des Marchands" has been recently purchased by the municipality, which intends to acquire various works in ivory, onyx, and silver, for the Galliera Museum.

M. Paul Peraire, landscape painter, has just died in Paris at the age of 63. He was a native of Bordeaux, and studied under the direction of Eugène Isabey and Luminais. Since 1866 he had exhibited every year, at the Salon, landscapes principally of scenes in the outskirts of Paris. Among his recent works may be mentioned "Les Environs de Corbeil," purchased by the State in 1890, and his last picture exhibited in 1892 at the old Salon, "Un Coup de Vent," also purchased by the State.

The sale of the Spitzer collection is definitely announced to commence on April 7, in the Hôtel No. 33 in the rue de Ville-Just, and will go on till the 16th of June.

WHAT IS ARCHITECTURE, AND HOW CAN IT BE ADVANCED?*

BY PROFESSOR AITCHISON, A.R.A.

* I HOPE I made it clear that the distinguishing character of architecture as compared with mere building is giving the true character to the structure, and that this character is to be got by making the shell perfectly fitted for the occupants by using the materials properly, and by making them strictly conform to the laws of statics.

The fitness is only to be got by knowing how the occupants employ themselves, and adapting the shell to such occupations; and I now speak of a single shell, perhaps the rarest thing to be found in a civilised country.

In 1848 I saw a Welsh cabin: it was round, with one low opening which acted as door, window, and chimney; and the shepherds' huts of the Roman Campagna were not unlike it, but bigger. The peat smoke in the first was too stifling to let me stay till I could see what the inside was like, and I don't recollect even entering the other.

This circular shape was possibly due; in the first instance, to the ease with which the branches of trees can be fixed into the ground in a circle, their tops bent and tied together to form a roof; they were then wattled, and the roof was mostly thatched. Even now if we had nothing to build and roof with but rough stones, we should probably build the shell like the Treasury of Atreus at Mycenæ. I merely speak of these as a type of forms suggested by the ease of making them, and by no means as a type of the forms produced by the wants of more civilised occupants.

The fitting a single shell for its purpose would give the outside form, and would vary as the occupants had more wants and the builder more skill. A hut, if it were to contain many persons, and had no chimney, would in rude times naturally take a circular form, the fire being in the middle, and the smoke going out at a hole in the top, for the occupants would naturally form a circle round the fire; but directly indoor occupations were followed, the hut in northern countries would want windows.

Modern houses, - and, in fact, most buildings, - are an aggregation of separate shells for different purposes, and should be arranged separately before being put together; and then the requisite passages for getting from one shell to another, and the requisite staircases for getting from one story to another, should be arranged.

The next consideration must be the material of which the house is to be built; for present purposes, the material might be wood, brick, rubble, or large stones; with wood or large stones for the material the openings would be spanned horizontally with timber or a large stone; but if the house were built of brick or rubble the window openings would be arched.

Let us take, as an example of modern commonplace architecture, a warehouse for the storage of some one sort of raw material, to be built of brick, some stories high, and floored and roofed with wood.

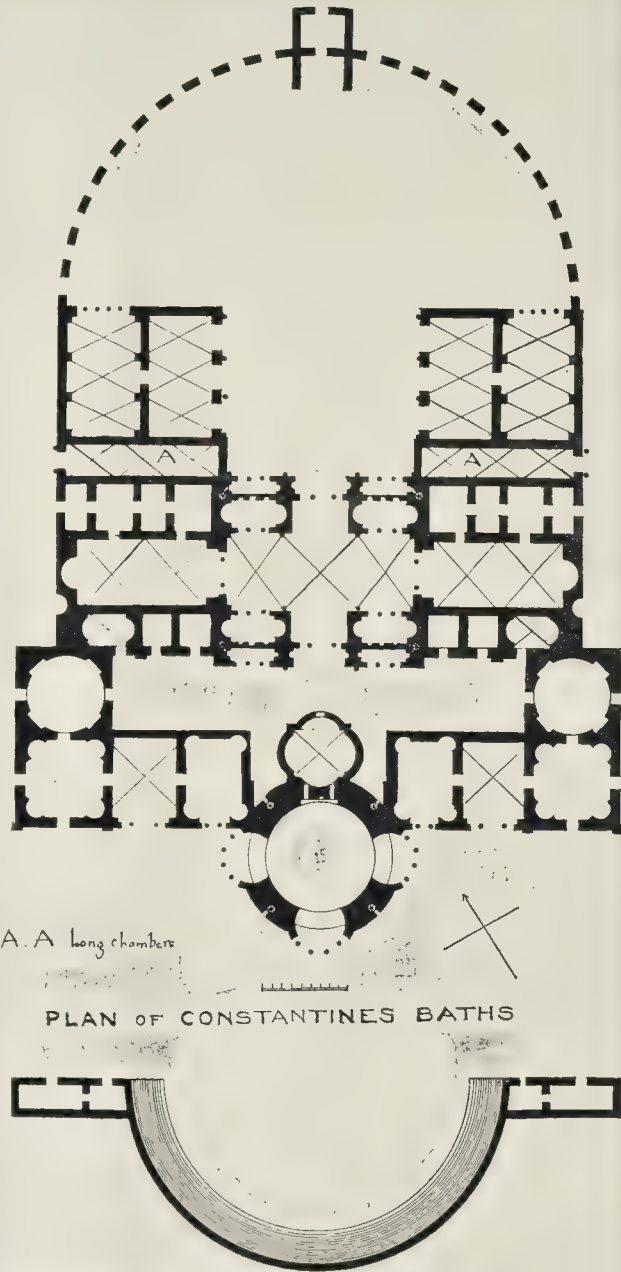
* Being the second Royal Academy Lecture on Architecture this Session. Delivered on Thursday evening, January 26.

We must either let the eaves overhang, to take the rain from the building, and to protect the walls,—and such roofs are not easily repaired,—or we must have gutters at the back and front and gable ends. As, after a time, all gutters leak, we must arrange them so as to be clear of the walls, and defended by a parapet; to do this we must corbel out at intervals and arch between, which gives a natural cornice. If the depth of the warehouse and the weight of the goods on each floor were not too great, we should joist from wall to wall.

The long wall of the top story would only carry half the roof, but the one below would not only carry half the roof, and the wall of the story above it, but half the load on the floor; and that of the lowest story would carry half the roof, all the wall above it, and half of all the load; consequently the wall of each story requires to be thicker than the one above, and as we should naturally place the thinner wall in the middle of the wall on each story. The drifting rain would lodge on the outside set-off, and sink into and destroy the wall; so we have to cope it with a projecting and throated coping, which forms a string, to prevent this and to prevent the wet from dribbling down the face. Below the cornice we have therefore as many strings as there are stories, and we want some kind of footing to the walls to distribute the load on to the earth; we want windows for light and ventilation, and the window openings must be arched over; but as the inside face would take not only the weight of half the wall, but the principal part of half the load, we should want the inside arch deeper than the outside, and consequently we should get a stepped arch. Besides the features already described, we want one or more ranges of loops for the reception and delivery of goods, a staircase to get to the stories, and probably an office for the accounts and payments, each involving a different size and situation for its windows. Warehouses are not generally built in uninhabited plains, so the owner should not be allowed to destroy the prospect of his neighbours, as well as their light and air, without giving them something which may give some interest and pleasure to the beholders.

I cannot help thinking that the ultimate shape of inhabited architectural monuments will be mainly due to the proper arrangement of the building, and to the materials with which it is built, though something must be dependent on the way that emotions are expressed. The parts will take their shapes from the strains they have to bear. We shall, I think, find out these shapes partly by theory, and partly by experiment, in all the materials we use; and the forms will be different when they are used in compression, tension, or cross strain, and these shapes will probably be different for brick, stone, concrete, wood, or iron. For stone piers that have but one uniform pressure to bear, we shall find, if we have not found, the proper shape by analysing the strains or pressures, and seeing by experiment what can be cut away. We shall also find by the same methods what shape the pier will take if it has many and various pressures: take, as an example, the nave pier of a Medieval cathedral; it has one main vertical stress or strain from the roof, the solid wall of the clearstory, the triforium, and the nave; two from the main primary wall arches with their loads; two from the secondary arches with their loads; one from the cross or transverse ribs of the vaulting of the nave, one from that of the triforium, and one from that of the aisle; two from the diagonal ribs of the aisle; and two from the same ribs of the triforium; and finally, two from those of the nave. If, in the first instance, the pier were square, it would be found by calculation or experiment that certain portions of the stone could be safely cut away, but at present we have no notion of the form that would be left, and the same would happen in a stone or brick arch. The S Curves that the angle piers of the nave and transept have taken in most Medieval cathedrals show that the thrusts have not been properly abutted, but in this stage of the inquiry that is a minor consideration; the question is, whether the forms chosen are the proper ones? A column is not, I think, a form to suggest the abutment of thrusts, for these compound columns, besides bearing downright stress, have to resist the inward thrust of the transverse and diagonal ribs of the aisles and triforium, and the outer thrust of the similar ribs of the nave vaulting, as well as the downright weight.

To go back to my former simile of the shell-fish, the cockle and the scallop are both fluted, but differently; they are both slightly different in shape, and both have their flutes radiating in a slightly different way. These shapes and these



PLAN OF CONSTANTINE'S BATHS

flutes must be so arranged for some convenience or protection to the animal, yet these two forms have so pleased mankind that they have carved imitations of them for ornament on their architectural works. The univalves are mostly in some form of spiral, except the limpet, probably for economy of space and strength, but each sort has a different spiral, as well as their spirals differently arranged; some have it on a plane, like the ammonite, and others on cones of various altitudes, while some again have the mouth branched, evidently for legs or feelers, and these shapes are not to amuse or delight us, though they may do so, but to give the accommodation and protection most needed by the creature.

One peculiarity of architectural monuments is

that they always afford shelter, and for this reason have often been used for purposes different, and sometimes even antagonistic, to the end for which they were built. Another peculiarity is the similarity of the emotions that monuments erected for cognate purposes excite; for instance, those erected for the highest purpose, religion, have mostly been found to sufficiently excite religious emotion to fit them for the temples of a new faith, though that faith has been quite different from the one it has superseded.

The pagan temples were used by the Christians as churches, possibly by the Moslems as mosques. The buildings on the Acropolis of Athens were first used as pagan temples, then as Christian churches, and then as residences by the Turkish

governors. Possibly other temples were used as mosques, for the Saracens certainly used the Christian churches as mosques almost without alteration, and those secular buildings, the Baths of Diocletian, are still used as a Romish church, while the Christians use the mosque at Cordova as a cathedral.

This at least shows that there was nothing repugnant to a new creed in the architectural expression of a former one, and that the sublimity of merely secular buildings produced the emotions desired in ecclesiastical buildings, as we also see in the basilicas. We might think that the Romanesque and Byzantine ecclesiastics were indifferent to the emotional aspect of the buildings, one set belonging to an undeveloped people, and the other to a decadent one, and that each set of ecclesiastics thought no more of the emotion produced by the monuments than the ants of Alexandria did of the hieroglyphics on Cleopatra's Needle, when they made them the floors and walls of their dwellings or the streets of their cities; but this could hardly be the case with the Saracens, who would certainly have levelled them with the ground, if they suggested any antagonism to Islam.

Man is a peculiarly imitative animal, and when he finds a building that a superior nation has used for any purpose, he mostly makes his own in imitation of it; if the altered circumstances will allow of it; hence the arrangement of the Roman house, at least in some warm countries, is still adhered to. The gilded halls of the Romans became the gold parlour of the abbots, whose window still bears the name of oriel.

When Christianity became the State religion, the basilicas given by Constantine to the Christians became their churches, and the form, with very slight modifications, is still the form in the Romish Church, though the Orthodox Church mostly preferred a different shape.

It is to be remarked that the basilica was not a building for religious purposes amongst the ancients: it was taken by the Romans from the Greeks, by whom it was called *σπρά βασιλική*, and was where the king (*βασιλεύς*) administered justice, and where, on the abolition of a king, the *ἄρχων βασιλική* did the same.

The Roman basilica was oblong, with a wide nave and aisles, and sometimes with double aisles on either side of a central nave, of which the Julian basilica at Rome may be given as an example. If the basilica was entered at the narrow end, the opposite end, if square, was divided off from the aisles, and the two aisles formed *chalcidica*; the judges sat in the central part, opposite the nave. The Basilica of Maxentius at Rome was entered at the narrow end, and had an apse at the other; the side apses are of more modern date. If the basilica was entered in the middle of the long side, there was generally an apse at the end, as before, and sometimes one at each end, as in the Basilica of Trajan, as shown in Professor Middleton's plan. The columns of the nave were mostly in two heights, with galleries over the aisles.

The nave was used as an exchange, and Vitruvius tells us that in his basilica at Fano, he so arranged it "that the merchants who are in the basilica may not interfere with those who have business before the magistrates." In one of the basilicas found in England there is a transept at the end in front of the apse, thus making the Tau form.

The galleries over the aisles were walled in, so that the occupants could not be seen by those in the area below, and are supposed to have been used by the public to hear the law cases; but these cases could only have been heard in the parts near the tribunal, and one side is said to have been devoted to men and the other to women.

When the basilicas became churches, these galleries were mostly set apart for women, but at Sta. Sophia, Justinian's pew was in the left gallery, probably from its being near the staircase that led to the palace.

I have mentioned this to show how readily a structure, designed for a totally different end, may be found quite fitted for another purpose.

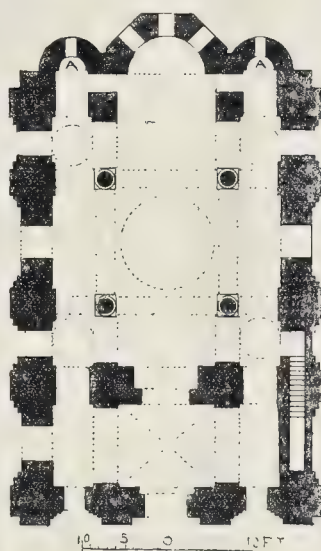
The luminous cross that Constantine saw as the Tau, or as a Greek or Latin cross, is the form that cathedrals have been given; and even early basilicas had the Tau form, as, for example, St. Demetrius at Salonica. In every country not petrified by custom or religious conservatism, there are changes, sometimes constant sometimes intermittent, in all things, but this is most noticeable in language, as Horace says in his "Ars Poetica":—

As forests change their foliage year by year,
Leaves that came first, first fall and disappear;

So antique words die out, and in their room
Others spring up, of vigorous growth and bloom.

The same happens in customs that are long continued. We see in the Roman baths, that persisted as large public establishments from Agrippa's days, 27 B.C., to Constantine's, 330 A.D., that many changes were made in their form, and these were probably due to changes in the exercises and routine of bathing. We guess at the uses of the new chambers, but it is clear that the exercises or the bathing in some particulars greatly varied in Constantine's time, for we see two long narrow vaulted chambers that exist in no other baths, of whose use we can only form the vaguest conjecture.

The same thing probably happened in the Christian ritual. At any rate, we see in the churches after a certain date a central lantern, apses added to both aisles, when each was dedicated to a separate saint, and the later additions of chapels round the choir, and eventually at the sides of both aisles of the nave as well. These additions to the structure are too palpable to be overlooked, but doubtless many smaller modifications of ritual caused minor alterations in the structure. The square east ends and apsidal transepts may have followed some ritualistic change. I think, however, it is only lately that we have arrived at the conclusion that one of the grand aims



Plan of St. Basilios, Salonica.

of architecture is to imitate Nature's organisms, and endeavour to make each part of a building absolutely fitted for all its uses, so that the outside may tell us the uses of the building, as the snail-shell does of the snail; though Vitruvius does give a reason why the hottest chamber of a bath should be circular. I think I have roughly given most of the requirements, except the lighting and ventilation, exclusive of æsthetic and emotional considerations, and it may be well to speak of the ventilation first, which, though vaguely known from very early times, has not been definitely known till modern days. The lantern showed its want of ventilation by going out; but people are not generally stifled in unventilated rooms, though their health will be impaired, for a very slight taint of breath will make the air of a room unfit for healthy breathing. A late doctor, in speaking of the ventilation of rooms, said, with some truth, that "the badness of design was mitigated by the badness of the execution," for "every floor-board, skirting, door, and sash, intended to exclude air admitted it." The safety of England, in the shape of ventilation, mainly depends on the open fireplaces. I may say, by the way, that innkeepers are allowed to let, as bedrooms, closets that are destitute of open fireplaces or any other proper arrangements for ventilation but those arising from bad workmanship. Each person requires 3,000 cubic feet of air every hour, and if any enclosed space is crammed with people much more is required, especially if some of the occupants are dirty, and wear filthy clothes. It is therefore highly important that rooms should

be larger and loftier than they are generally made, besides having a proper ingress for pure air, and a proper egress for the foul, particularly when the occupants stay in them for many hours. I say "proper," because it is of no use leaving two holes and telling the foul air to go out at one, and the fresh air to come in at the other; the air will not obey our verbal orders.

The next point is the lighting, and this should be so arranged that every part of the room be fully lighted,—a thing rarely attended to. A long room is better lit by a large window at the narrow end, and this requires that the room be very lofty if the light is to strike on the far end at the proper height. A cross light is never very agreeable, though it cannot always be dispensed with.

As regards doors and staircases in private buildings, where we have to consider nothing but use, it may be said that they should be big enough to take in a piano and to let out a coffin. When the late William Burges built his house a man said, "Your friend is not fond of music;" and when asked for his reasons he said, "A piano cannot be got into the house through any of the doors or windows."

If we could carry out all these things completely we should, I think, have a perfect architecture, or one at least as perfect as Nature's works. You may say, But what then becomes of all our domes, lanterns, towers, and spires? You would have them, too, if they were necessary. If your chamber were circular, and you wanted the height for air, and the roof incombustible and of brick or masonry, you would have a dome. If you wanted light in the centre of a large building; the means of getting it would probably take the form of a lantern. If you wanted a landmark it would probably become a spire; and if you wanted the sound of bells to be heard at a distance, the shell for these would be a tower of a size sufficient to carry the number of bells wanted, and of a height to let them be heard at the proper distance. In animals, I am inclined to think that all the colouring is protective. Nature has but one scheme,—fighting,—for destroying the worthless, and one for preventing the extinction of multitudes by the slow and painful process of starvation,—slaughter. The struggle for existence is always going on, even in plants. The flat fish that lies on muddy sand is grey; that which lies on sand and shingle is, like the plaice, a brownish grey, spotted with red and yellow, to make them unseen by their enemies. And I have little doubt that the green and silver of the mackerel, so much admired by the New Zealander, is equally protective. The eggs of birds laid in open nests assimilate in colour to their surrounding to protect them from their enemies; the brindling of the beasts of prey doubtless imitates the shadows of the desert sand, and thus enables the beasts of prey, unseen themselves, to see their prey at a distance, and wait until it is within reach; the stripes of the zebra probably make it indistinguishable from the ground it frequents at a distance; while, if we use coloured materials, it is to attract the eye or for beauty. If some colours and patterns on animals are the result of sexual selection, we must leave that for our æsthetic considerations.

As we are very far from being able to rival Nature's creations, we must see how we can attain some small part of the knowledge and skill we want, to imitate her. We must cultivate our faculties, and especially our observation, to see how the different human units behave, and how they combine themselves when in numbers and under various emotions. And we must also see how the architects of past times accommodated this unit, or these multitudes, under somewhat analogous circumstances. The ancients got their knowledge of the powers of materials by experience, but they reasoned on this experience as well. One quality of materials can only be learned by experience and observation, viz., how they weather, but this experience can scarcely be wholly personal, for the length of a man's life is not enough; the other pages of this book of wisdom are written on ancient and antique buildings. We have found out some laws of nature, and we can try what each kind of material will bear in compression, in tension, and in cross-strain; what it weighs, how much water it will absorb, and what not; reason on these facts, and use them as they answer our purpose: this is what the engineers do, and we see what constructive wonders they have accomplished with iron! Any mechanical trick in architecture will certainly arrest attention, though I think it is a mean expedient; yet we know the Medieval architects were very fond of this trick; they were, however, great jokers. They had found out the tensile strength of stone, and availed themselves of the

knowledge to support vaults on pendants, as you may see in Henry VII.'s Chapel at Westminster, at King's College, Cambridge, at St. Owen, Rouen, and elsewhere.

In the Courts of Justice at Barcelona, there is a quadrangular court, arcaded on the first floor. At the angle by the staircase the two arches at right angles to one another are carried, or seem to be carried, by a pendant; this is not all, for the passages at the back of the arcades are vaulted, so that this pendant carries the diagonal rib as well.

In rude times the materials at hand must always have greatly influenced the buildings. Early nations with little wealth, small means of transport, and generally surrounded by hostile tribes, must have been forced to make their buildings of the materials at hand; thus Strabo tells us that in Assyria "all the houses are vaulted on account of the want of timber;" and in speaking of the Hanging Gardens of Babylon, he says—"Their pillars, their vaults, and their terraces, are constructed of baked bricks and asphalt."

The Athenians were fortunate enough to have mountains of marble at hand; the Romans, from having no good building stone nearer than Tivoli, but excellent sand, used brick and rubble. Viollet-le-Duc recommends the study of Gothic to the French architects, for teaching them the ingenious practices of the Middle Ages and for sharpening their wits; and pays them the compliment of saying that they could raise fine buildings in paper if they were confined to that material.

All materials are good if used in an appropriate manner; but in London, where all the materials that have ever been used for building are to be found or got, we have mainly to choose those which answer our purpose and our pockets the best.

A caution may be given here, that all materials that can be cast or moulded may be used for the purpose of imitating ornamental work originally executed in a different material, and this sort of mean imitation has been used in papier-mâché, compo, cast-iron, and terra-cotta. We have used little cast-iron to imitate stone work, but American architects say it has been largely used in America.

I do not recollect even a stone spire, nor a stone front, imitated in cast-iron in England; though we have thousands of acres of imitation carved work in papier-mâché, compo, and plaster; but the terra-cotta leprosy is spreading over London and the provincial towns. Terra-cotta for ornamental panels recommends itself strongly to us *a priori*: we fancy we shall get the very touch of the artist, only shrunk by baking, but, in fact, it is all cast or squeezed work; but the objection is to its purely architectural use. Little curly bits put together imitate, very badly, I admit, stone mullions and transoms, but they have to do duty for them, and we ask how they are held up and together. The brick or concrete backing that forms the real walls of the building are faced with a thin veneer of terra-cotta that looks like big blocks of stone, and large buildings have a skeleton of iron filled in with concrete, rubble, or brick; yet all the walls look as if they were built of stone; it is less truthful than compo, and no line or moulding is so straight, and it may turn out to be even less durable. It is exactly the same as a cast-iron front in imitation of stone, only instead of being of molten metal, it is of baked mud. It would not be so delusive if it were enamelled, as we should then scarcely expect it to be solid.

The only other material that needs mentioning is iron. Mr. Ruskin objects to its use because it was unknown to the ancient Jews, and is not mentioned as a building material in the Bible; still, in spite of this religious objection, it is being used more and more daily, only as yet it is barely avowed. Like all materials it has its drawbacks: it rusts, it rapidly absorbs heat, and its contraction and expansion are great and irresistible; if heated or cooled it pushes out or draws in the masonry, or is itself torn. Like every other material, it must be shaped, moulded, and ornamented in accordance with its native powers and capacity. We cannot even imagine that the Medieval architects would not have obtained astounding effects if they had had to their hand a material that was twenty times as strong as good free stone, and could be moulded into any form that was chosen, even if that form was unadapted to its nature; nor that they would not have been able to mould or ornament it to their taste.

We cannot, I think, be said to have learnt our business if we can do nothing with it, and I think much the same may be said of concrete and cement. We have not done much with enamelled brick, if we compare our achievements with the magnificent Persian friezes from Susa; and next to nothing with solid glass.

The Romans were a constructive race, and they never neglected any raw material, however unpromising, if it would serve their turn at a pinch; and, thanks to M. Choisy, we have learnt that economy was one of their ruling passions. Stone chips or brick-bats, fragments of lava or rough stones, flints or pebbles, were almost sure to be met with where they built, and they built wherever their Empire extended; but bricks were always dear, even if they were at an easy distance from the works: the clay pits had to be found and dug, the clay to be tempered, the bricks to be moulded, to be dried, and to be baked in kilns with firewood, and then to be carried to the place where they were wanted, so they used as few of them as possible, and to make them go far, used them as triangles with the hypotenuse for the face, and made the cores of their walls of rubble, or, if you prefer the word concrete, of Roman concrete; for I think there is no doubt that the solid part of the concrete was laid by hand. I cannot help believing that the brick face kept up the squally rubble, or else why go to the expense of the facing? But this plan by no means exhausted their ingenuity. In Tunisia they wanted to build an aqueduct varying from 70 ft. to 120 ft. high, but had, at hand, in one of the valleys, nothing but dry earth, so they mixed this with lime and made blocks of it, 3 ft. 8 in. high, of which the whole aqueduct was built, arches and all: these tender blocks were slightly strengthened by pieces of olive wood at the bottoms. We can make common concrete of clean washed ballast and good Portland cement in the proportion of 7 to 1, that will bear on the cube foot 85 tons before it cracks, yet we have used it but little, and as far as I know have never attempted to give it any characteristic shape or moulding. Portland cement, too, is an admirable material as a protection against wet for poor or rough materials, but except as an imitation of stone it has never been artistically used.

A greenhouse is not generally a pleasant place to live in, therefore I say nothing of using ordinary sheet or plate glass, in iron frames, though for the front of a deep, narrow house it probably makes the best front, especially if the house be in a narrow lane with tall houses opposite, but we can get glass a foot thick if we want it. I do not know the first use has been used in masonry roofs, but I do not know why it should not be; the star-shaped openings in the domes of Saracenic and Moorish baths are very pretty, and could, I think, be used here in many buildings, if merely to give a pleasant variety to the vault. Stained-glass windows are supposed to have had their origin in Rome, when clear cubes of mosaic glass were let into pierced marble slabs, though I do not know if they were even used horizontally on roofs.

To learn who was the real inventor of anything, even though the invention has been made in one's own lifetime, is generally difficult; but I venture to say that the first pavement lights were made in England of thick glass in iron frames when the duty was taken off glass; and this plain glass was superseded by lenses, but very little use, as far as I know, has been made of it here, while in Paris the whole of the floors, and consequently ceilings of all the stories have been made of it in the *Credit Lyonnais*, and this does not say much for our wit; and there is ten times more enamelled pottery used in France than here, though I believe we were the first re-discoverers of this forgotten art. To dwell first on its sanitary advantages: from being glazed it affords a worse hold for dust and soot than rougher materials, and what dust and soot does cling to it almost calls out to be washed off, by its obliterating the colour and pattern. The capability of enamelled brick or terra-cotta to be washed without injury makes it compare favourably with paint after the first outlay, and it would not only give brightness, but colour, to our too dingy streets, and help to raise our spirits during the prevalence of the dull and misty weather which contribute so large a share of days to the year; but the delight of colour would be a pure gain, for it is in this that all western towns are so sadly deficient. It seems curious that it should have been so little applied in our grimy manufacturing towns, where cleanliness, brightness, and cheerfulness are so much wanted. Where we do find it largely used is in dry sunny climates, where there is practically no soot—in Persia, in Cairo, and in China.

The advertising shopkeeper would, too, find it an admirable field for puffing his wares; and if his architect made these advertising panels beautiful, we should, at least be spared from seeing the whole architecture of London ruined or hidden by boards or paper "posters."

I think every unprejudiced person would say,

when he understood the subject, that every architect ought to be a master of statics. But how few are! How it would thin the ranks of the students if the knowledge of so arid a science were to be a requisite, instead of an instinctive taste and a slight aptitude for sketching. Yet all that an architect can do is by directing building, and what can he direct to be done? The height, width, thickness, and shape of walls and vaults, and how these are to be shaped, moulded, or pierced.

Anthemius of Tralles, who built the great St. Sophia, must have known practically a good deal about statics; and we should have admired him still more if his knowledge had been more complete; but nowadays, to know even a little of the very foundation of the art is supposed to unfit a man for being an architect.

It is most curious that when English architects are deploring the waste of time involved in uselessly learning construction, the French architects are deploring the opposite tendency. M. Corroyer, the architect who wrote the celebrated book on Romanesque, says in his last publication—

"In England, in Belgium, in Holland, in Switzerland, and in Germany, the architects are at the same time engineers, and for them art is closely bound up with science. Thus, certain of their works owe to this alliance a particular character which ought to inspire us with very serious reflections. . . . We shall be obliged at the first glance to recognise that we are actually being influenced by this practice, instead of impressing our practice on others as we formerly did. . . . However, we must not allow the auxiliary of yesterday to become the master of to-morrow, nor the architect to abandon his high functions, so noble and so beautiful of yore, to become a simple, or even a skilful decorator." (*L'Architecture Gothique* by Corroyer: *L'Architecture Militaire*. Cap. I.)

Sir Christopher Wren was not altogether a bad architect, and he knew statics theoretically as well as practically. Genius, with practical knowledge and daring, may do much, but it is like being in the path without map, compass, or a knowledge of the woods; you go a long way round before you get out. All and more than all that the practical man can pick up in his life time, may be learnt theoretically in a few years.

It is, however, only quite lately, since Renaissance days, that the proper education for architects was ever thought of. Pericles' principle in the education of his son was followed, and we tried to become statesmen by riding on two horses. Why architecture stopped was very simple: it fell into the hands of those who did not even know what it was.

The Renaissance architects were scholars, antiquaries, goldsmiths, sculptors, and painters. If you could draw the human figure and chase a gold cup, you had, in their opinion, all that education could give to an artist, and this belief generally persists even to the present day. The Architectural Association is the only teaching body in London, that I have heard of, that attempts to impart to architectural students a knowledge of statics, and of the strength and qualities of materials. We do not know what was the training in the architectural schools that Constantine started, but we know what architects could do in Justinian's time. In the same century St. Benedict started a school of architecture in France, and this teaching was carried down in the various abbeys till the thirteenth century, when the architects formed themselves into lay guilds. We see to what a point of perfection the teaching had raised the architects. This theoretical teaching was continued through centuries, and was supplemented by practical knowledge acquired on buildings; though something was due to the current passion for geometry. The aesthetic form which Medieval work took may or may not appeal to our taste, but the vast and lofty works erected in Medieval times, under enormous difficulties and with slender means, must excite our wonder and admiration; there is some truth in what Ware says, for with him architecture meant construction:—"In the time of Pericles, though sculpture might be mature, architecture was in swaddling clothes."

In a capital like London, anything may be learnt that the learner likes and is able to learn, more especially now that books are so plentiful and so cheap, and there are so many free libraries; but it should be remembered that if the time devoted to learning is squandered, through folly, ignorance, or misdirection, the chances of ever getting again the education you have missed are small. Most youths during the years devoted to learning are fed, housed, clothed, warmed, and supplied with relaxation and amusement at other people's expense, but directly they start in life they have to labour for these things, and few have the health and strength to learn what is wanted

in their spare time, even if they have the energy and perseverance.

In my pupil days money was much scarcer than it is now; books were very rare and very dear, and there was hardly a free library. The architectural education of an office consisted of learning how to rub up Indian ink, to strain paper, to draw out the six Roman Orders, and perhaps the three Greek ones, and to sketch a piece of floral ornament. The Classic column and its entablature were looked on as the *ne plus ultra* of architecture; the remaining days of pupillage were employed in tracing or inking-in drawings, copying specifications, squaring dimensions, taking plans, mensuring up artificers' work, and drawing out the sketches of the master for practical but unarchitectural work. Some architects supplemented this by allowing their pupils to draw out some modern masterpiece, and to design a public building. This had to be large, and mostly with circular, oval, or octagonal rooms, with plenty of columns and pilasters, but with no definite object; it might be a palace, a house of parliament, a post office, or a bank, for to what purpose it was to be put was no part of the designer's programme.

The passionate study of Gothic did not do much to destroy the Classic fetish, it merely set up another; and, though the study of Gothic was valuable, its immediate effect was to engender a bitter war of words in which "pagan," "papist," and "barbarian" were freely bandied about. Both fetishes were upset by the Dutch Renaissance, so that it was like the triangular duel:—

"As when a barber and a collier fight,
The barber beats the luckless collier white;
The angry collier heaves his pondrous sack,
And bids with cholier beats the barber black.
Up comes the brick-dust man, with grime o'erspread,
And beats the barber and the collier red."

ROYAL INSTITUTE OF BRITISH ARCHITECTS:

LONDON STREET IMPROVEMENTS.

THE seventh ordinary general meeting of this Institute was held at No. 9, Conduit-street, on Monday evening last, the President, Mr. J. Macvicar Anderson, in the chair.

Mr. Arthur Cawston, Associate, read a paper on *The Advantages of Adopting a General Scheme in Making Improvements to the London Streets.*

The author commenced by saying that some time in March last he ventured to represent to the Chairman of the Art Committee of this Institute that the architectural improvement of London was a suitable subject for that Committee to consider. The interest that Mr. Waterhouse at once displayed resulted in the Art Committee making a serious attempt at finding a practical method for dealing with the subject. As a result of their deliberations, the Committee unanimously passed on November 17 last the following resolutions:—

"That this Committee is of opinion that the only thoroughly satisfactory method of improving the plan of London is by the preparation and adoption by the Municipal Authority of London of a comprehensive scheme.

"That such scheme when settled and authorised should be immediately carried out by dealing with the more urgent improvements from time to time, as the London County Council may deem advisable.

"That the Council of the Institute do approach the London County Council upon the subject, with a view to offering assistance in the preparation of a ground plan for the improvement of London.

"That the Committee are of opinion that Mr. Cawston's paper, referred to in the resolution of October 6, will best introduce the importance of the subject to the Institute; but that upon so vast and intricate a subject the individual members of the Committee are not prepared to assume responsibility for all the opinions and suggestions expressed therein."

The paper referred to in the last of these resolutions was the paper now brought before the meeting. When they as architects remarked the convenience and the spaciousness of well-ordered Continental towns, they could not resist a feeling of admiration for their grandeur, and a just feeling of pride in their foreign professional brethren whose ability and labour had produced such splendid results. But if their *confrères* abroad were entitled to praise for the splendid works they had achieved, could we here in London claim any such praise for what we had done towards the improvement of our capital?

When last year the Government tardily attempted to remedy the block in the law business of the country, they referred the question to a council of judges, who, as heads of the legal profession, were evidently considered responsible for the defects which caused the block. In the same way with regard to architecture, we could not get away from the fact that any impartial observer must consider that architects, more than any other body of Londoners, were responsible for the inadequate and inartistic streets of our capital.

Of course they who were in the secret knew (to their cost) that the real reason why London had lagged behind in the march of improvement was to be found in the fact that we had had no real municipal government, and naturally no municipal enthusiasm. Unfortunately, however, that was not universally appreciated, and so architects continued to suffer reproach for the absence of convenience and dignity in our streets.

However, we had now a popularly elected governing body. All excuses for procrastination therefore were gone, and London ought now to become what her inhabitants desired, and what her architects were able to make her.

Of recent contributions to the Institute on foreign cities which particularly referred to the subject before the meeting he need hardly remind them of that from their members, Messrs. Farrow and Blashill, who in 1889 gave an interesting account of those splendid extensions which had already taken place in Vienna; or that, in the same year, Mr. Francis Hooper, as holder of the Godwin Bursary, studied in Paris, and delivered before the Institute a most valuable account of Building Control and Administration in France. In his paper were enumerated the series of laws under which our industrious and thrifty neighbours had nearly completed the rebuilding and transformation of their capital. A vast transformation indeed, which had perhaps never been more powerfully described than by Mr. Albert Shaw, that most competent critic of municipal institutions, who wrote as follows:—

"In the work of transforming the labyrinthine tangle of narrow, dark, and foul Medieval alleys into broad modern thoroughfares, and of providing those appointments and conveniences that distinguish the well-ordered city of our day from the old-time cities, which had grown up formless and organless, by centuries of accretion, in this brilliant nineteenth century task of reconstructing cities in their physical characters, dealing with them as organic entities, and endeavouring to give such form to the visible body as will best accommodate the expanding life within, Paris has been the unrivalled leader. Berlin and Vienna have accomplished magnificent results in city-making, and great British towns—Glasgow, Birmingham, Manchester, and others—have in a less ambitious way wrought no less useful reforms; but Paris was the pioneer. French public authorities, architects, and engineers were the first to conceive effectually the ideas of symmetry and spaciousness, of order and convenience, of wholesomeness and cleanliness, in urban arrangements."

The grandeur and masterful thoroughness of the work proved that Paris as it existed at present was the modern model city London was probably destined to copy, as the increasing density of population made it necessary to pile up many more human beings on a square mile, without impeding a constantly increasing circulation.

For that reason, and because of the great strides in sanitary knowledge during recent years, it was essential that our metropolis should, as far as possible, be improved and adapted to the requirements of to-day. The principal reasons for such improvements might be briefly indicated under the five following heads: (1) The benefits to health, (2) to traffic, (3) to the labouring classes, (4) to the metropolis generally, and (5) to the nation.

They all knew what had already been done in reducing London's death-rate; but that rate in some of those districts where the population was most dense, such as Bethnal Green, still remained at 40.0 per thousand. It was just in those districts that one of the greatest dangers to the health of London lay. They were the spots on which epidemic diseases fastened, and until they were transformed, progress in lessening the general death-rate would continue to be arrested. Not only so, but London, which was once in the van of sanitary progress, had lost her place, and until the remedy be found, would fall further and further behind cities to which she formerly showed the way. The following figures were taken from the annual summaries of deaths issued by the Registrar-General since 1874, from which date only the death-rates of foreign cities have been included in the summaries:—

Death-rate in twelve leading European Cities in 1874 and 1890-1.

Cities.	1874.	1890-1 *	Decrease of death-rate.
Berlin	30.9 per 1,000.	20.9 per 1,000.	10.0 per 1,000.
Liverpool	29.5 "	23.5 "	6.0 "
Birmingham	26.8 "	19.7 "	7.1 "
Hague	26.5 "	19.5 "	7.0 "
Glasgow	31.1 "	25.3 "	5.8 "
Turin	26.7 "	22.8 "	3.9 "
Rome	27.5 "	23.6 "	3.9 "
Brussels	27.9 "	21.5 "	6.4 "
London	22.5 "	29.3 "	6.8 "
Paris	22.4 "	21.6 "	0.8 "
Vienna	24.0 "	24.9 "	Nil.
Dublin	26.0 "	26.5 "	Increase. 0.5 per 1,000.

* NOTE.—During the years 1890-1 influenza was prevalent in parts of Europe, and affected the death-rate materially. For this reason where the rate seriously differed in any city during these two years, the lower rate was quoted as being closer to the normal rate.

These figures clearly showed the improvement that had taken place in many large cities, and they also showed that no material alteration had taken place in the health of London and Paris during the same period. The reason of this was, he thought, to be found in the fact that radical changes were being made in those cities which showed marked improvement, while in London and Paris little change took place during that period.

For instance, between 1875 and 1885, Birmingham transformed about 80 acres in the centre of the town from squalid slums into fine thoroughfares. Mr. Chamberlain, in his evidence before the Royal Commission on the Housing of the Working Class, stated,

"The effect on the death-rate has been very remarkable indeed. The eight most insanitary streets in the area before the scheme averaged, for the three years before the proposals were in operation, 53.9 per thousand; since then, in the last three years, the same streets have averaged 21.4 per thousand, and the scheme in part, with the other causes to which I have referred, throughout the borough of Birmingham, have led to a general reduction of the death-rate throughout the borough from 26 in the thousand for the three years 1873, 1874 and 1875, to 20 in the thousand for the three years 1886, 1887 and 1889."

In Glasgow, the City Chamberlain stated that the great municipal work of breaking up the dense fetid closes in the old central districts of the city, together with improvement in sanitary administration, had resulted in the annual saving of the lives of 1,271 inhabitants. This great municipal work was also completed during the period referred to. Similar sanitary and street improvements were being vigorously carried out during the same period in Berlin, Liverpool, and the Hague.

No doubt these great strides of improvement were taken in following the example of London and Paris. London had, before this period, by the construction of her great sewerage works and other sanitary improvements, reduced her death-rate materially, and Paris, by abolishing her slums, and transforming herself into a city of wide and beautiful streets, had also reduced hers. But during the later period above referred to, both London and Paris more or less rested on their onward march, for no one could believe that the London death-rate of 20.3, or the Paris death-rate of 21.6, was the ultimate goal of sanitary reform. Many of them, indeed, believed in the possibility of reducing those figures to one-half. That that was no dream was shown by the death-rate of Hampstead, which was 14.7, and by the striking experience of the Artisans' Dwellings Company, which was able to boast of a death-rate in its tenement blocks of 12.85.

In attempting to carry out extensive alterations in conservative London, many great difficulties and expenses would have to be faced, most of which would not have existed if in the past there had been efficient municipal control. The want of a general plan showing future street alterations authoritatively settled had also undoubtedly been the reason why many streets lately formed were not for the general convenience, had not been financially successful, and had neither created enthusiasm amongst the public nor brought credit to the authorities.

The author next proceeded to examine in detail, and under the following heads, the reasons for having a comprehensive plan, and as complete a comprehensive plan as possible:—

1. For discovering the causes of our present inconveniences.
2. For producing the best improvements that can be produced.
3. For forwarding them as rapidly as possible.
4. For making them as economically as possible.
5. For esthetic reasons.

The Importance of a General Plan for Discovering the Causes of Our Present Inconveniences.—Immediately a general plan of London was examined by anyone anxious to solve the many problems of our present inconvenient streets to discover where slums were mostly to be found, and the reasons that had prevented improvement, he must be first struck by the fact that many slums existed in the very centre of our capital on sites which, in a well-arranged city, would be the most valuable. The cause was soon apparent, and, as usual, the impediment to progress was the English law. Look at the shape and extent of the "Devil's own" estates, which extended a distance of about three-quarters of a mile, from Theobald's-road on the north to the Thames embankment on the south, and which presented a barrier against any attempt at opening up the most crowded districts of central London, of admitting to them more light and air, or of allowing any better means of communication between the City and the West-end. Wherever barriers to free circulation existed, whether in a

river, in the human frame, or in a city, there would be formed an aggregation of scum, of disease, or of slums. Now such a want of free circulation existed in central London on both sides of the Inns of Court, and hence the unpardonable squalor peculiar to the slums in the central square mile of our capital. The first urgent need for improvement, therefore, was the opening up of these districts by broad thoroughfares, which must of course pierce the sanctuaries of the law.

Other impediments to free circulation would, unfortunately, be found. South of the Thames, railway viaducts and embankments divided the metropolis into sections, and several contiguous districts, when the trouble, danger, and nuisance thus caused would have been entirely avoided by making the lines in cuttings or tunnels, as on the north side of the river. Superb public parks and gardens were so enclosed and so difficult of access as to form most serious impediments to street improvement, and the full benefit of their presence was denied us, whilst their surrounding streets were filled to overflowing. A wide tidal river hemmed in, and was hemmed in, by stifling purlieus that had become crowded and neglected for want of opening up by wide streets and additional bridges. These were but a few of the difficulties that must be removed if London was to be made convenient and healthy. If it was also to be made beautiful, other difficulties had to be overcome. We found many public and other important buildings hidden away in tangled and crowded streets, so as to be almost unapproachable, and entirely forgotten. Whilst many hills in our home counties offered sites which were in every way suitable, we found here in central London asylums for lunatics, schools for the blind, homes for foundlings, occupying acres of unsuitable sites in crowded districts, impeding surrounding progress, and depriving their hard-working neighbours of healthy homes.

The Importance of a General Plan for Producing the Best Improvements that can be Produced.—Probably the best complete scheme of London improvements should embody—(a) The complete utilisation of every district of London's enormous area for its most valuable purpose. (b) The creation of continuous arteries, sufficiently wide for the future as well as for to-day, and judiciously placed so as to connect the most important centres of business and habitation and the railway termini. As to the first (a), that consideration had up to the present time been entirely lost sight of whenever improvements had been considered, consequently, the re-housing of the displaced working population, a question inseparable from the improvement schemes in London, had always been a most serious difficulty. As it seemed most probable, for many reasons, that improvements would be carried out in the slums before elsewhere, the question still remained of the first importance. It was no doubt necessary for the working classes to live within a reasonable distance of their work, but surely it was not consistent with the general welfare to give up the very central square mile of London to such purpose, especially as more comfortable and healthy dwellings could naturally be provided where land is so much cheaper, as in parts of Southwark, Lambeth, Clerkenwell, and Marylebone. If a map of London were studied, acres upon acres of land which could be made available for workmen's dwellings, and which was most likely always to remain the most valuable and suitable for that particular purpose, was at once discovered within a mile of the centre of the metropolis. Such sites were occupied by the Foundling Hospital, the Military School at Chelsea, and many similar institutions, Bethlehem and St. Luke's Lunatic Asylums, many gas-works and water filtering beds. Would it not be well to remove these present occupants into the suburbs or the country, and clear the sites for labourers' dwellings? Some of them might regret the disturbance of old hospitals, but a larger majority of them regretted more sincerely what was apparently the only alternative; namely, the removal of workmen to the suburbs, and the consequent loss of time and money in conveying them to and from their work. He had calculated that fifteen sites, which he proposed should be gradually devoted to this purpose, contained an area of 144 acres. After deducting one-fifth of this area for additional broad roadways, and, assuming that the same density per acre would be as healthy on those sites as on the site of Peabody dwellings and playgrounds in Drury-lane, the extra number that could be accommodated within one mile of the centre of the metropolis was found to be 127,000 men, women, and children. As to the second point (b), the creation of continuous arteries

sufficiently wide for the future as well as for to-day, and judiciously placed, so as to connect the most important centres of business and habitation, and the railway termini, immediately a comprehensive plan was studied, the small number of our main streets, and the shortness of our other streets, was at once manifest. As Mr. Albert Shaw remarked, "London, like all other old cities, is a vast, tangled network of streets that for the most part begin nowhere and end nowhere." Without doubt, the longer and the more uniform streets were made the more valuable they became for many reasons. But length and uniformity could only be obtained by first planning streets to a small scale or a complete plan of the whole county. In many cases, too, quite insignificant clearances at various points were only required in order to render many of our side streets suitable for relieving the present overcrowded main streets to a very considerable extent. Every surveyor knew what had been the cause of these small obstructions, and how they were still being created by the absurdities and difficulties that existed in connexion with laying out building estates in London, especially in the suburbs. For instance, no matter how irregular might be the shape of an estate which was to be developed, the owner was allowed, in order to follow the contour of his boundaries, and to cover with houses every corner of his property, to make his roads tortuous as snakes, so long as they led from one existing road to another. He was not, however, allowed to form any road which stopped at his own fence, no matter how essential such road might be for the development of the adjoining properties. Thus more and more unhealthy and badly ventilated districts were being daily created, whereas if a settled plan were adopted, the development of each property would be a matter of general importance, and while adding to the convenience of the district, the property itself would be benefited.

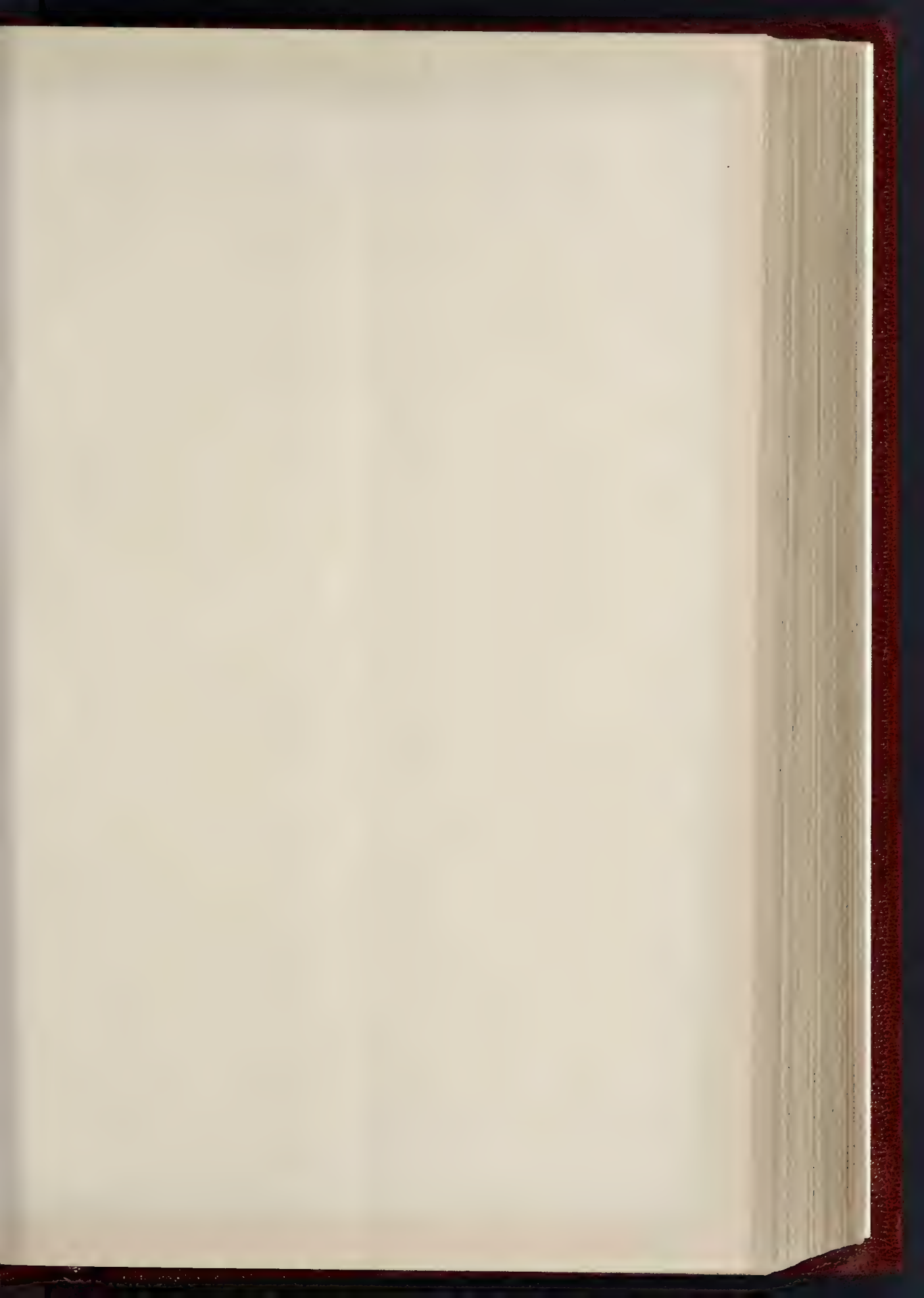
The Importance of a General Plan for Forwarding Improvements as Speedily as Possible.—If a comprehensive plan for improvement were authoritatively adopted in London, no single building in the whole county could be rebuilt without reference to the revised lines of frontage as laid down on that plan, or without becoming an integral part of the grand city that it would be the ultimate object of the plan to produce. That such a system would be of paramount importance for speedily effecting improvements would be shown by the following comparisons. The annual average number of notices for new buildings and re-buildings issued to District Surveyors during the last three years had been 21,932. As nearly all our streets admittedly wanted improving, as many central districts admittedly wanted entirely re-modelling, and as all districts newly created in the suburbs were, at present, created without any reference whatever to the general convenience, we might fairly assume that one-fourth of these 21,932 annual notices referred to re-buildings, which would each give an opportunity of advancing, under a comprehensive plan, the complete scheme for the improvement of London. On the other hand, the approximate total number of houses that would be removed by the Council Broadway improvement is 1,250, and what with legal and parliamentary delays, that improvement might take about five years to complete, from the time it was first made public. That gave an annual average of 250 houses removed by one costly improvement, compared to 5,500 opportunities for improvement which would annually and automatically arise immediately a comprehensive plan were adopted. Again, it must be remembered that in the one case, every opportunity would come without legal expenses or delay connected with compensation for disturbances; whereas, in the other case, legal expenses and delays, and expensive compensations for disturbance, occurred in the case of each property taken. If, moreover, a comprehensive scheme were delayed, not only would 5,500 automatic and cheap opportunities for improving London be lost every year, but the very rebuilding on these sites would form the same number of impediments to be removed, each ten times as costly as the opportunities that were lost. It was true that Ludgate-hill has taken about thirty years to widen, and that the case of that improvement was used as an argument against the so-called "automatic" principle. The case of Ludgate-hill, however, was an abnormal one. The greater cost of the properties more recently acquired there had been due to the fact that Ludgate-hill had been allowed to remain, practically, the only main line of communication through that part of London. All the enormously increased traffic was forced through that artery, with the result that its frontage

sites had increased in value to an unnatural extent.

The Importance of a General Plan for Making Improvements as Cheaply as Possible.—Not only did the foregoing arguments prove the greater speed at which improvements could be made under a comprehensive scheme, but they also proved how a great saving in cost could be effected. There were many other economic reasons for a comprehensive scheme. For instance, when any isolated improvement was put in hand, it was necessary to calculate the approximate cost of the whole work, to borrow money to pay for it, to agree to complete it in a given time, and to refund, within a certain number of years, all that had been borrowed. In that way the cost of improvements was greatly augmented, for it not only included the cost of the actual work, but a large annual amount for sinking-fund, interest, and the accompanying expenses. If a comprehensive scheme was ever adopted, that running into debt would be totally unnecessary, for the Council would then be enabled to put just so much of the scheme in hand as the funds available for that purpose from the year's income would permit. Again, one of the great impediments to street improvements, up to the present time, had been the terrible cost of acquiring properties, and it had been found again and again that whenever an improvement had been decided upon, speculators had bought up the property, had had drawings prepared for new buildings, had improved existing buildings, and put all possible legal impediments in the way for the sake of making the authorities pay largely augmented compensations. The economic importance of adopting a comprehensive scheme was here again apparent, for it would be impossible for any individual or even any syndicate to purchase all the land which would be affected by the whole scheme, consequently the Council would have so much choice that they could purchase small portions here and there whenever the owners wanted to sell or were willing to sell at a reasonable price. Mr. Chamberlain's experience on that point during the municipal improvements in Birmingham, as stated by him in his evidence before the Royal Commission on the Housing of the Working Classes, conclusively corroborated the correctness of that view. It was also absolutely essential that a settled scheme should be adopted for another reason. As each new street was laid out, quadrants and places should be constructed with junctions left exactly where future new streets would eventually join them. A striking illustration of the want of that foresight might be found in the case of the English Opera House recently erected in Cambridge-circus and Shaftesbury-avenue. That building had been placed exactly where a new street, which might become as important as Oxford-street or the Strand, should cross that circus.

As already stated, large and most valuable sites were still occupied with slums of the poorest description. Under a settled scheme the whole of these sites would gradually be put to their proper uses, and the recompense that would then arise from the sale of surplus lands would go far towards the economic success of the improvement. A striking example of increased value had occurred at Chelsea, on the estate belonging to Earl Cadogan, who was advised on high authority to let a piece of ground at a ground-rent of 85l. per annum. Because the whole neighbourhood had been developed in a statesmanlike manner, land had increased so much in value that the ground-rent of the same piece of ground had been, within five years, improved by the leaseholder to 900l. a year. Not only so, but certain adjoining land, which was held in trust for the public, had increased in value by the action of the noble neighbour to at least 300 per cent. If a comprehensive plan of improvements were adopted, all the undeveloped land in the county would, as it became ripe for development, also be automatically, and thus economically, opened up in accordance with the scheme. Both the community and the landowner would benefit by that, the former by having its streets made in the most convenient position from a public point of view, and the latter by being guaranteed a greater number of important thoroughfares across his property.

The Importance of a General Plan for Aesthetic Reasons.—"The works of those," said Sir Joshua Reynolds, "which have stood the test of ages, have a claim to that respect and veneration to which no modern can pretend." That spirit of veneration, together with the knowledge that whatever improvements now made would be carried out in a time when ancient architectural monuments would be as jealously guarded as ancient sculptures and paintings, was a consoling







DETAILS OF PAVEMENT, SIENA CATHEDRAL
FROM COLLECTION OF DRAWINGS BY MR. T. ROBERTS KIRCH, A.R.I.B.A. SOANE MEDALLIST FOR 1892

thought, when we remembered the delays that had occurred in our street improvements. Was it possible that any scheme *could* produce sufficient improvements to an ever-increasing metropolis like London, without of necessity losing away with well-known landmarks, which, be they ever so faulty, had naturally become endeared by familiarity? Undoubtedly. By studying a comprehensive scheme it was soon discovered that sufficient lengthy arteries connecting the most important centres of business and habitation could be provided in such a way as would not only obviate the interference with our present main streets, or with architectural heirlooms and landmarks. For that reason alone such a scheme should commend itself to many, but it would also succeed in raising municipal enthusiasm. What had been up to now the despair of all reformers of London municipal life? Had it not been the huge size of the city and the supposed impossibility of uniting for one common object the inhabitants of its distant parts? Could anything be more calculated to raise the pride and enthusiasm of all Londoners, and weld them together for one common object than a really great scheme of improvement?

In conclusion, the author pointed out, by the aid of two maps, his proposals for the improvement of London, which were based on six general principles, having for their object—1. To open up portions of our town parks and some other open spaces; 2. To open out the most crowded districts, and admit more light and air; 3. To create many more great arteries connecting the most important centres of business and habitation; 4. To provide additional bridges over the Thames; 5. To facilitate the approaches to the several railway termini; and 6. To open out as much as possible our public and ancient buildings, and to provide sites for new.

The President, in inviting discussion, said that Mr. Cawston had certainly taken a very comprehensive view of the subject, which was one of great importance to Londoners. The Institute was favoured on that occasion with the presence of several members of the London County Council, amongst whom was Mr. Frederic Harrison, the Chairman of the Improvements Committee of the Council. Perhaps Mr. Harrison would kindly favour the meeting with his views on the subject.

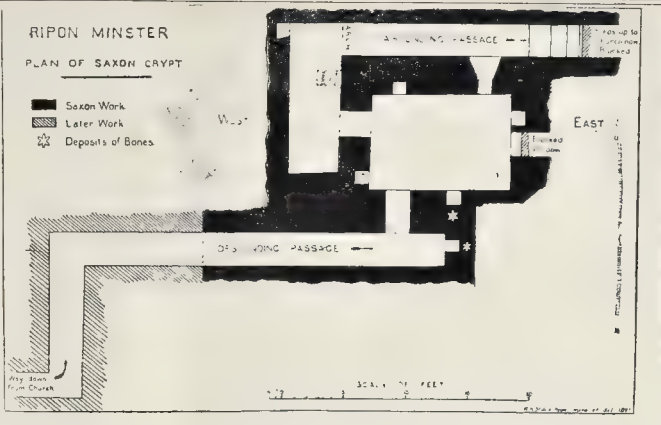
Mr. Frederic Harrison said he came there as a lecturer rather than as a teacher. While he thanked the Institute for allowing him and some of his colleagues of the Council to be present that evening, he did not feel that he was in a position to enter upon any discussion of the very important points touched upon in the paper. He wished to say, however, that it must not be supposed that there was any foundation for the idea that the London improvements which had been carried out during recent years had proceeded on no settled plan. It was quite true that no settled plan had been submitted to the public, for a very excellent reason that if it were to be published it would lead to speculation in the property affected, and would greatly add to the cost of carrying out the proposed improvements. It might become his duty in his capacity of Chairman of the Improvements Committee of the Council to give evidence on this question before Parliamentary committees during the present session, but he must beg to be excused from entering into the merits of the various proposals referred to by the author of the paper. In conclusion, Mr. Harrison referred to the limited powers of the London County Council, which rendered it necessary for the body to go to Parliament to obtain an Act before it could appropriate a single penny for the carrying out of a public improvement, and he also referred upon the financial aspect of the proposals made by Mr. Cawston, which would require, perhaps, an outlay of from 100,000,000. to 2,000,000,000, and he feared that there was no chance of such an outlay being incurred just yet while for street improvements in London.

Dr. G. B. Longstaff, Chairman of the Building Committee of the London County Council, said that while he agreed with his colleague, Mr. Frederic Harrison, as to the financial aspect of questions dealt with in Mr. Cawston's paper, there was no doubt something to be said in favour of his idea that we should look ahead and carry out new works in contemplation of their extension for the future on a systematic plan. The Committee with which he was officially connected had lately spent a great deal of time, as had also the Council of that Institute, in the framing of a plan which they conceived to be an ideal building plan for the Metropolis. It had occurred to his committee, though their proposals had not yet been made public, that something might be done towards

RIPON MINSTER

PLAN OF SAXON CRYPT

■ Saxon Work
 ■ Later Work
 * Deposits of Bones



a scheme which would be really automatic. The great difficulty in London at the present time was that those provisions of the Metropolitan Local Management Acts which regulated the setting-back of frontages did not apply to all sites. He thought that that was one of the greatest evils with which we had to contend in London, and he hoped that it might be possible hereafter to legislate for the setting-back of frontages on old sites as well as on new ones. Dr. Longstaff went on to discuss the true significance of the figures as to death-rates of large towns quoted by the author of the paper, and said he did not think that there was any possibility of further diminution of the death-rate in London.

Mr. Ralph Nevill strongly criticised Mr. Cawston's paper, especially deprecating his proposals to interfere with the gardens of the Inns of Court.

Mr. James Neale also criticised the paper, and said that Mr. Cawston in no way represented the views of the Art Committee or of the members of the Institute as a body. He characterised Mr. Cawston's proposals as most impracticable.

Mr. Alfred Waterhouse, R.A., in proposing a vote of thanks to Mr. Cawston, said he was glad to hear that the County Council was carrying out London improvements on a settled, well-defined scheme. That would be news to most of them.

Mr. H. H. Bridgman, in seconding the vote of thanks, said that the piecemeal carrying out of street improvements had not been found to be economical in the City. Ludgate Hill was a case in point.

Mr. Francis Hooper, in supporting the vote of thanks, said that modern Paris was largely what it was owing to the gradual operation of the *loi d'alignement*, which came into operation as far back as 1607. That fact was some argument in favour of the proposal for the gradual carrying out of street widenings proposed by Mr. Cawston.

Mr. Leonard Stokes submitted a plan for obviating the block of traffic at Hyde Park Corner by the formation of roads at different levels crossing each other by bridges and separating the cross, through, and local traffic.

The President, in closing the discussion, referred to the necessity of some such improvement at Hyde Park Corner as that proposed by Mr. Stokes, but he strongly deprecated Mr. Cawston's proposals for "opening-up" our town parks and open spaces if "opening-up" meant cutting roads across them.

The vote of thanks to Mr. Cawston having been carried, he briefly replied, and the meeting terminated.

Illustrations.

RIPON CATHEDRAL.*

THE Abbey Church of Ripon has been a cathedral twice in its history; the original monastic church of Sir Wilfrid becoming a cathedral upon the appointment of Eadhed, or Eata, to be the first Bishop of Ripon, A.D. 678, by the then Archbishop of Canterbury, Theodore of Tarsus, after Sir Wilfrid had left his see of York. Eadhed had no successor, and the cathedral

became an abbey of Augustinians, then a parish church, afterwards a collegiate church, and again in 1836 a cathedral upon the appointment of Doctor Longley to be the second bishop, and he later on succeeded the founder of Ripon Abbey, St. Wilfrid, in the mother see of York.

It is a circumstance of almost unique interest that there should be sufficient remains of a portion of the Cathedral of Eadhed of undisputed Saxon workmanship for his successor the fourth and present Bishop, to recognise as an unaltered and integral portion of the original church, and though an interval of over eleven hundred years occurred between the first and second bishop, Ripon Cathedral, as we now possess it, bridges the centuries and reaches beyond the foundation of the bishopric to the time when Wilfrid, in the seventh century, erected the church of which the crypt under the central tower now remains intact.

The historical figure of Wilfrid should not be passed over without remarking that he was one of the principal agents in effecting the adhesion of the English Church to the customs and allegiance of Rome at the great Synod of Whitby in 664, and that foreign influence was as manifest in his architecture as in the making of his tonsure, the Roman method of which was one of the great matters of discussion with the Irish Bishops at Whitby.

A settlement of Irish monks from Melrose existed at Ripon shortly before Wilfrid's time, and upon his victory at the Synod of Whitby, they retired to Iona, and King Alchfrith bestowed their monastery upon Wilfrid. Wilfrid was an Englishman, supposed to have been born near Ripon, and acquired his love of Italian methods during his frequent sojourns in the south. Before the days of the great Norman building Bishops of the eleventh century it is interesting to observe in Wilfrid an English Bishop with architectural taste and enthusiasm. He built two basilicas, one at Hexham and the other at Ripon, besides restoring and beautifying the Cathedral of St. Peter, at York, on his accession to the See. Of his church at Ripon, Eddi, one of his chaplains who resided in the monastery, tells us that it was "a basilica of polished stone from its foundations in the earth to the top, supported on high by various columns and porticoes." And similarly of his church at Hexham that "it was supported by various pillars and porticoes, adorned with a marvellous length and height of walls, and with passages of various turnings; nor was it ever heard that such another church was erected on this side the Alps." Workmen were brought from Italy to build in the Roman manner, as the Saxon churches of that time were uniformly of wood and thatch. These descriptions and facts are entirely applicable to the work of the crypt which remains at Ripon. It is a chamber below the crossing at the position of the high altar of the earlier church, 11 ft. 3 in. long by 7 ft. 9 in. broad, covered with a cylindrical Roman vault 9 ft. 4 in. high. A round-headed window is in the middle of the eastern wall, and small niches also with round heads cut out of one stone are in each wall. Narrow passages surrounded the crypt upon the north, west, and south sides, but the latter has been blocked eastwards and extended westwards, skirting the foundation of the south-west pier of the lantern tower, and giving the present access from the nave. The original steps in the northern passage can be traced still. Mr. Micklethwaite has pointed out that Wilfrid's Church, after the Italian manner,

* This series of illustrations of the Cathedrals of England and Wales was begun in our issue of January 31, 1891. A list of those already illustrated, with particulars of future arrangements, will be found on page 102.

had the altar at the west end instead of at the east end of the church, and that the window in the east wall of the crypt was for the purpose of obtaining a view of the relics contained in the crypt from the nave, the passages descending right and left. This arrangement coincides with that of St. Peter's at Rome to-day.

There are many traditions, and theories somewhat akin to them in probability, of the purposes of this very curious crypt that we need not trouble ourselves with, the facts of greater interest and complete certainty being that the masonry is of a description far in advance of and different from that of the Saxon architecture of England, the monolithic arches, the unbroken and excellently built vault, the smooth masonry, coated with a fine and very hard plaster which takes a polish, all indicating the Italian or rather un-English character of the work. The non-orientation and plan prove that the Roman mission of Wilfrid was prosecuted with a thoroughness and attention to detail and precedent that would not have been unworthy of a nineteenth century ecclesiologist.

The original Irish monastery was not on the site of the present cathedral, and it appears that Wilfrid must have built two churches at Ripon, as Leland tells us that the basilica described by Eddi was at some little distance from the cathedral and was destroyed by Eadred in 948, when he devastated Northumbria. Leland goes on to say that "Odo Archbishop of Canterbury (942-959) coming unto the northe partes bod pitie on the desolation of Ripon Chirch, and began, or caused a new work to be edified wher the minstre now is," but of Odo's building no part remained at the time of Leland's visit. Leland indeed asserts that Odo accompanied Eadred on his charying expedition, and Odo himself relates that he took the bones of St. Wilfrid to Canterbury, out of pity to their wretched plight, but as the bones of the saint were believed to be in the shrine prepared for them by Archbishop Walter de Grey at Ripon centuries later, some little mistake must have been made by Odo in his "pitie" and zeal for treasures for his church at Canterbury.

Upon the south side of the choir, underneath the Chapter House and the vestry, there is a Norman crypt of the history of which little is known, that of the subsequent later Norman work can be traced, but this crypt and the apsidal end of the vestry above must have formed part of the Norman church of Thomas of Bayeux, the first Norman Archbishop of York (1070-1100). The position of this crypt, whether relatively the same as to the present church or below the high altar cannot be easily determined; the latter suggestion would appear most probable if the position of Wilfrid's Saxon crypt under the lantern could be reconciled with it.

The peculiar value of the architecture of Ripon Cathedral to the student is the evidence of the new vigour of English life and thought that converted the Norman into the Gothic, and in its Transition period united the characteristics of both conquerors and conquered in a national style. Sir Gilbert Scott, in his lectures on "Medæval Architecture," has illustrated and explained the special beauties of the work of this epoch at Ripon, and the student can earnestly recommend to study the design of the nave, transepts, and choir of the Transitional Norman Church at Ripon as an illustration of how rapidly a living architecture progresses under original conditions, unhampered by, and yet availing itself of its own past.

Archbishop Roger Pont d'Evêque (1154-1181), the partisan of Henry II. against Thomas à Becket, who described him in language worthy of a modern amateur architectural critic as "malorum omnium inventor et diabolus ille," began, *de novo*, the rebuilding of St. Wilfrid's basilica. The western and eastern bays of his nave, the transepts and the part of the choir that remains to us have all the finer qualities of the Transition style, a heavy form begins to invade the detail and a delicacy of proportion takes the place of the massive weight of the very slightly earlier work to be seen at Fountain's Abbey close by. The solemn majesty of the latter attained by the Cistercian abstinence from ornamental features and by the huge scale of the arcades and walls, is vastly different from, but would not have robbed the work of Roger at Ripon of its own breadth and dignity in comparison. The Ripon nave was of great width, being over 40 ft. between the walls, and had neither aisles or open arcades. The lower story of the wall was plain and featureless, a lofty blind wall arcade rose from a strong course some distance above the ground, divided into bays by vaulting shafts, and consisting of an acutely pointed arch enclosing two open arches springing from a detached central shaft. The

tympanum of the enclosing arch has a pierced quatrefoil, the blind wall at back forming a triforium passage within the arcade. The clearstory above consisted of groups of three lancet arches carried on detached piers, all of equal height. The vaulting shafts rise some distance against the wall above the clearstory and carried the wooden ceiling. The first and last bays on each side of the nave which exist enable a clear idea to be obtained of the impression produced by this gracefully decorated single nave. Two arched bays at the west end open into the towers. These in Roger's time occupied the same position as the present later towers, so that the nave extended at the west front to the full width of the later aisles. The arches between the north and south walls of the towers and the nave are of later date than Roger's nave, being evidently rebuilt, but the triforium story above them and the clearstory are his work, and correspond with the design of the transepts. The nave opens into the tower with a lofty semi-circular arch, boldly moulded, springing from a delicate cluster of columns. The north and south arches of the crossing were higher than the west and east ones, not only because the sides of the tower were of unequal size, but the springing line has, in addition, been raised several feet.

Among many interesting points in the ground-plan of Ripon Cathedral are the piers of the central tower and their curious irregularities caused by the partial carrying out of their Perpendicular casing. The Norman arches remain on the north and west sides, and the south-west pier has been cased, whereas the north-west pier remains in much its original state. The north arch has a considerable deflection, as will be seen by the plan. This is not observable outside in the tower itself, the difficulty having been surmounted by corbelling it out. The eastern arm bends slightly to the work of the main axis of the nave, and this is more marked on account of the centre of the roof-screen between the eastern tower piers being considerably south of the centre line of the nave, which latter has been built, as far as its arcade is concerned, on the earlier nave walls of Archbishop Roger's Church.

The north transept remains a nearly perfect specimen of the Transitional period, but the south transept has had its arcade remodelled at the same date as the rebuilding of the tower piers.

The two eastern bays of the eastern arm of the church are of Decorated date, with a very fine eastern front, with bold buttresses and generally severe treatment on the exterior. The other bays on the north side are Transitional in style, while those on the south of the choir are Perpendicular, part of the reconstruction after the fall of the eastern central tower. The piers of the Decorated work have been very closely copied from the Transitional work which was found remaining, giving this portion of the church an earlier look than it really is.

The nave and its aisles are very spacious, being 87 ft. in width from wall to wall. At the west end there is an interesting bit of detail showing the design of Archbishop Roger's nave pretty clearly, with the Perpendicular work of the nave abutting against it on one side, and the Early English work of the western towers on the other.

The great transepts, also of Archbishop Roger's work, are of great interest. The triforium and clearstory of pointed arches and detached columns, the large groups of corbelled vaulting shafts, and the plain treatment of the north and south walls, the chapels in the eastern aisles, and the beautiful doorways in the western corners have all much simple beauty. The width and low proportions of the triforium arcades and the large semi-circular headed windows suggest a foreign feeling of design, but all has much that is distinctly original and English, and in comparison with Becket's shrine at Canterbury gains in national character. There is some delicate leaf carving to the capitals of the transept doors and in the chapels of the north side. The north door has a trifoliate enclosed arch springing from moulded corbels. The elevation of the north transept is the most characteristic external work of Archbishop Roger's that remains. The gable has two stories of plain semi-circular headed windows, and is flanked by lofty square turrets, which have pyramidal spire tops, with rude spindles at each angle as pinnacles. In the top of the turrets are windows, enclosed in a semi-circular arch, with a balluster mullion. This work is more Norman in feeling than the internal face of the transepts would suggest, and the turrets much resemble those of the west front of Tewkesbury. The north and west faces of the lantern tower are Roger's work, of a similarly severe Norman type. The south and east faces, together with the piers and arches below them in

the crossing, were rebuilt, after a partial fall of the tower, before 1459.

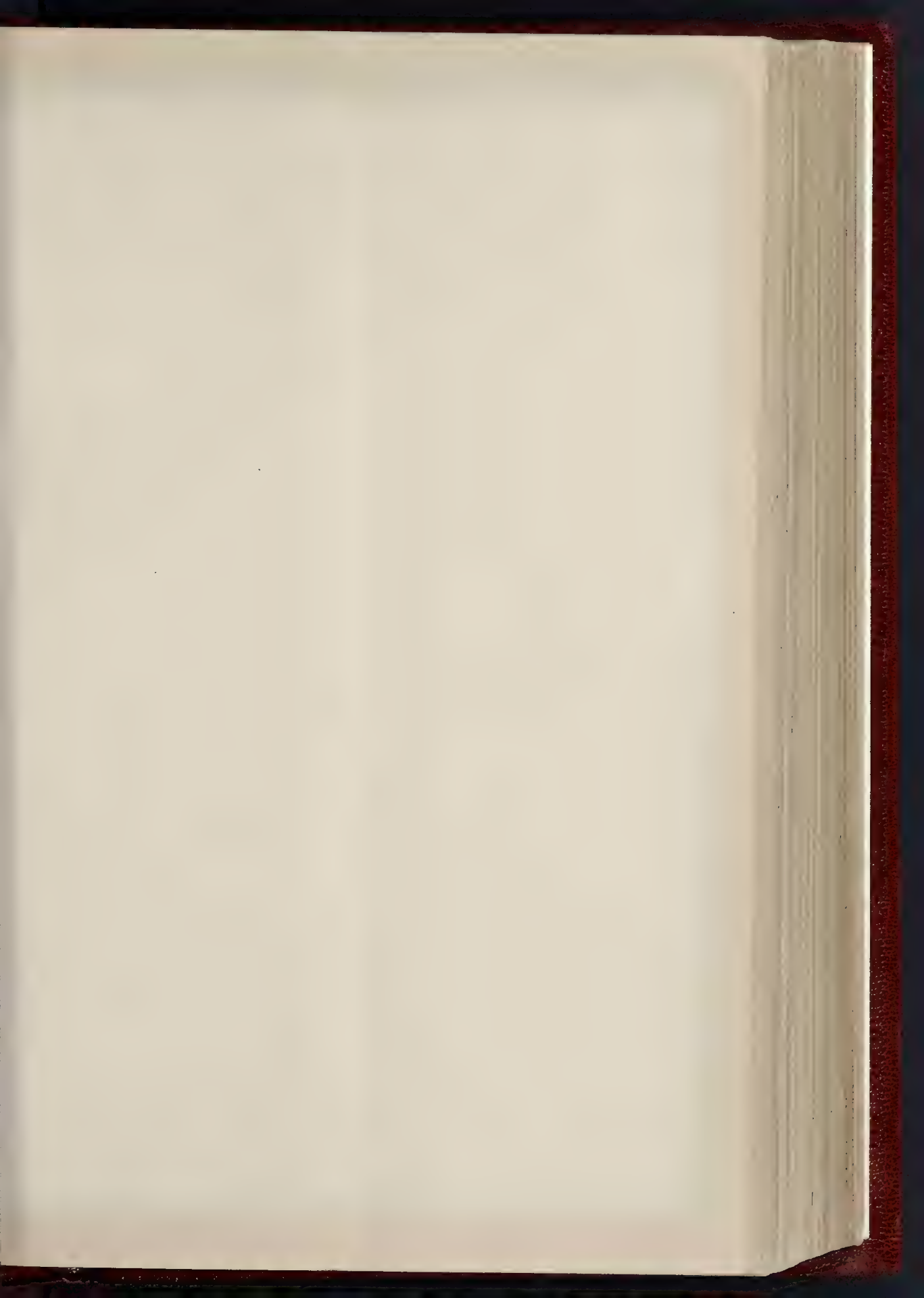
The north transept is the Markenfield Chapel, and there was formerly here a chantry of St. Andrew. Of the Markenfield tombs, that in the aisle, with its eastern end against the east wall, is of the greater interest. There is some very delicate heraldic carving on the shields around the tomb, unhappily much defaced, and the effigy of Sir Thomas Markenfield (*temp.* Richard II.) wears a curious collar of "park railings," and a badge with a stag couchant, of which we give a sketch.



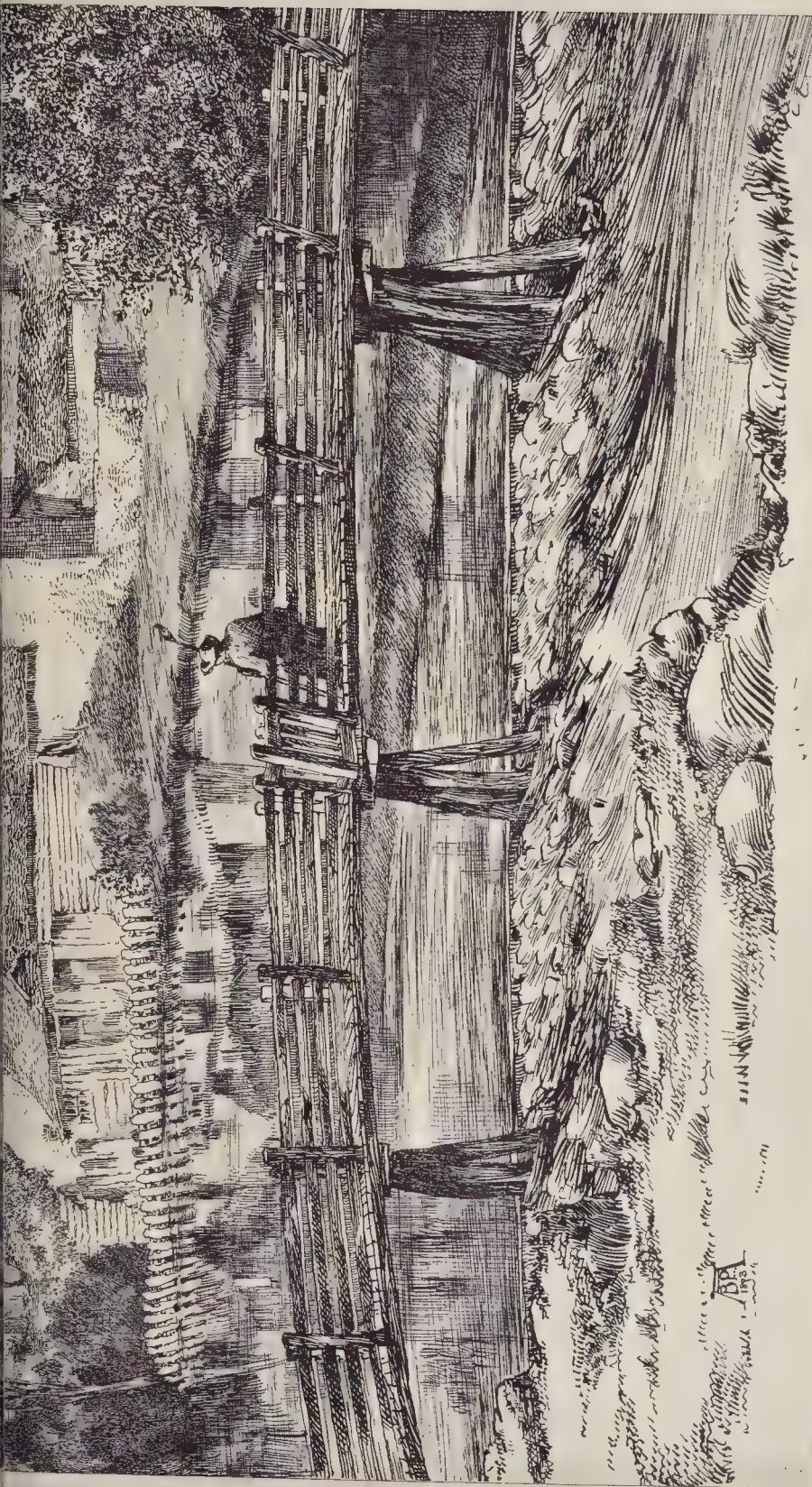
The other Markenfield tomb, against the north wall of the transept, is late and poor in detail. Just west of it is an early slab with a cross in relief.

The choir of the church of Archbishop Roger was evidently co-extensive with the existing one, so that the Cathedral has not been materially lengthened since he completed it; but most of the south side of his choir was destroyed by the fall of the tower, and the three eastern bays, excepting the arcade piers, had been rebuilt in the early Decorative style about 1288-1300.

The three western bays on the south side which were ruined about 1459, were rebuilt in the current perpendicular style. It is, however, remarkable, that in the three periods during which the choir was building, an enforced harmony with the earlier design was observed; the heights of the strings and the spacings of the bays were maintained, while the semi-circular arch which Archbishop Roger employed for his clearstory in the Transitional days is adhered to in the decorated and fifteenth-century work. The preserving of his piers to carry later arches is also remarkable. The design of the choir corresponds with that of the transepts, and its vaulted choir aisles returning on the east sides of the transepts must in conjunction with the wider aisleless nave have had a fine contrasting effect. The slender piers of the crossing, having their arches carried outwards to the width of the nave, call to mind the late Mr. Street's original treatment of modern churches for the same purpose of combining a wide congregational nave with a narrow choir. After the fall of the tower, the north-west bay of Roger's choir was sacrificed to a solid buttressing wall, and when the later perpendicular stone screen was erected against it, the choir was effectively shortened by half a bay. The vaulting shafts in the choir and its aisles should be remarked, as their bases have an interesting corbel inserted under the lowest circular moulding to carry it back to the square die upon which it rests; it is an original device for avoiding the frequent Norman angle of the base is the more suitable as a corbel. The shrine of St. Wilfrid, built by Archbishop Walter de Grey (1215-1255), owner of the well-known and beautiful tomb in the south transept of York Cathedral, stood in the eastern bay of the north choir aisle. In the south aisle wall is a long

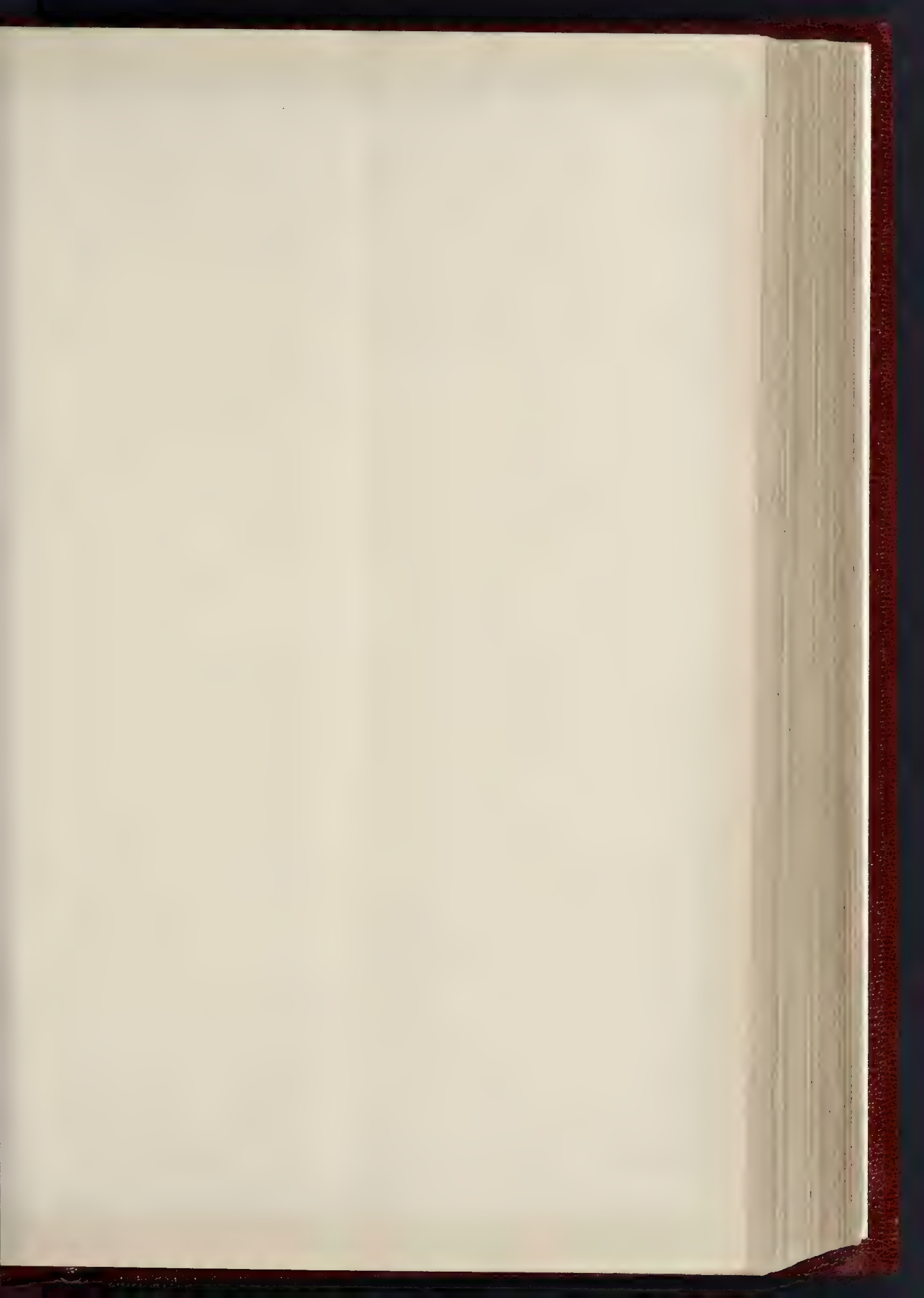




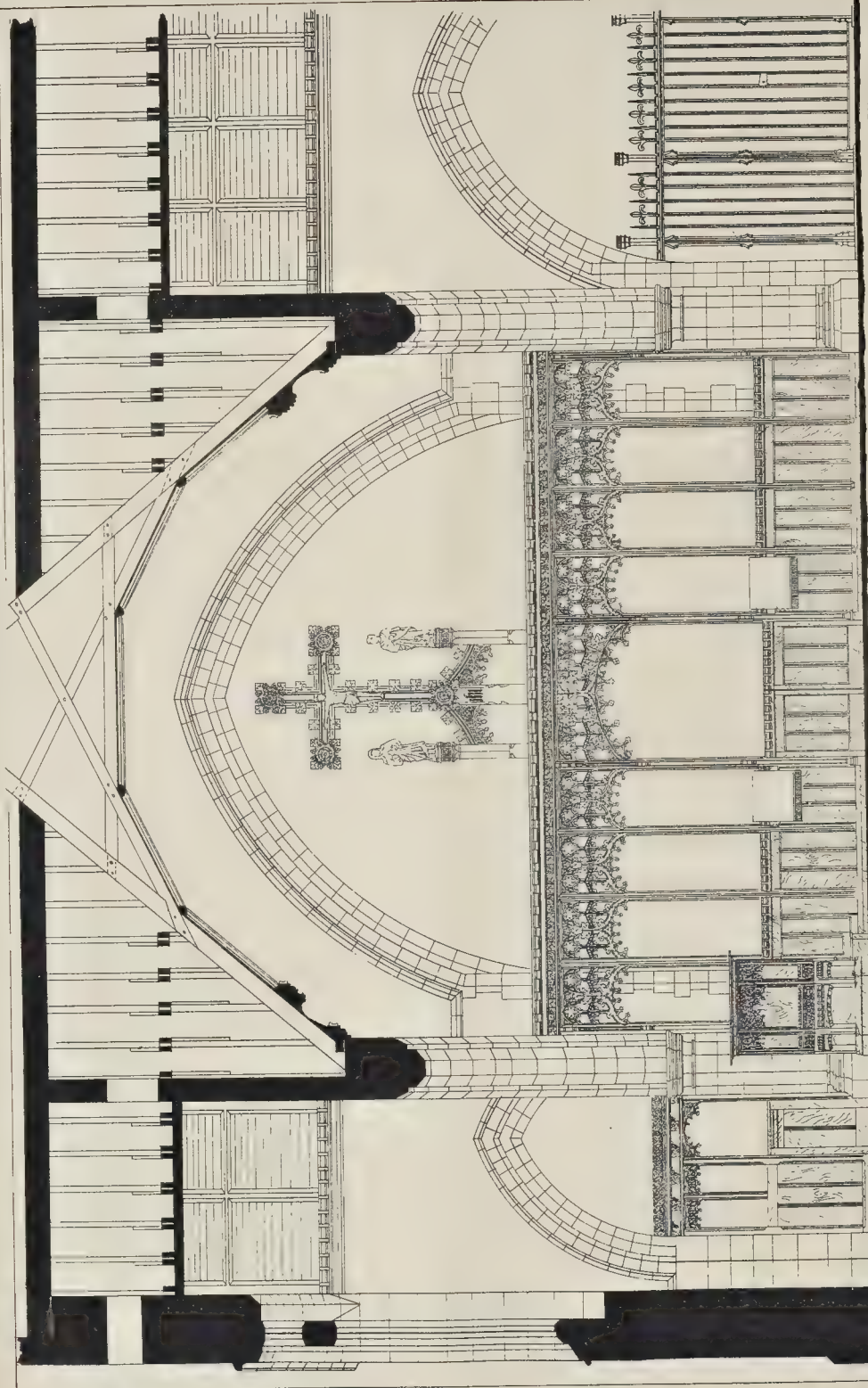


Cathedrals of England and Wales.
No. 27. RIPON FROM THE SOUTH EAST—DRAWN BY MR. BECHSFORD, PUBL. A. R. I. B. A.

$$H^0(\mathcal{O}_{\mathbb{P}^1}) \subset H^0(\mathcal{O}_{\mathbb{P}^1}(1)) \subset H^0(\mathcal{O}_{\mathbb{P}^1}(2)) \subset \dots$$



THE BUILDING, FEBRUARY 4, 1893.



Section through Aisle and transepts looking East

Scale of feet 0 1 2 3 4 5 6 7 8 9

J. H. M. & Co.
New York

PHOTO-LITHO. BY J. H. M. & CO. 111 N. 3RD ST. PHILADELPHIA, PA.

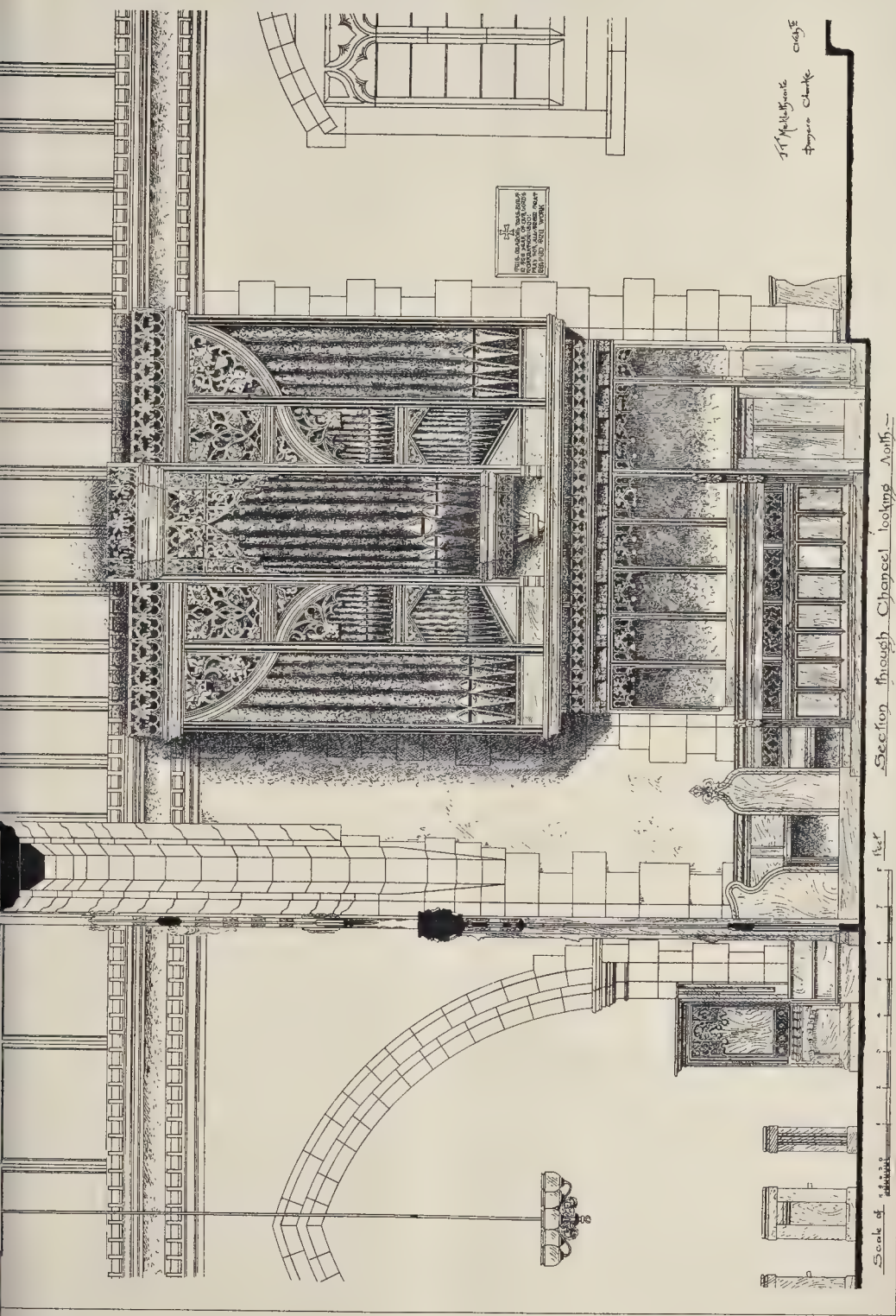
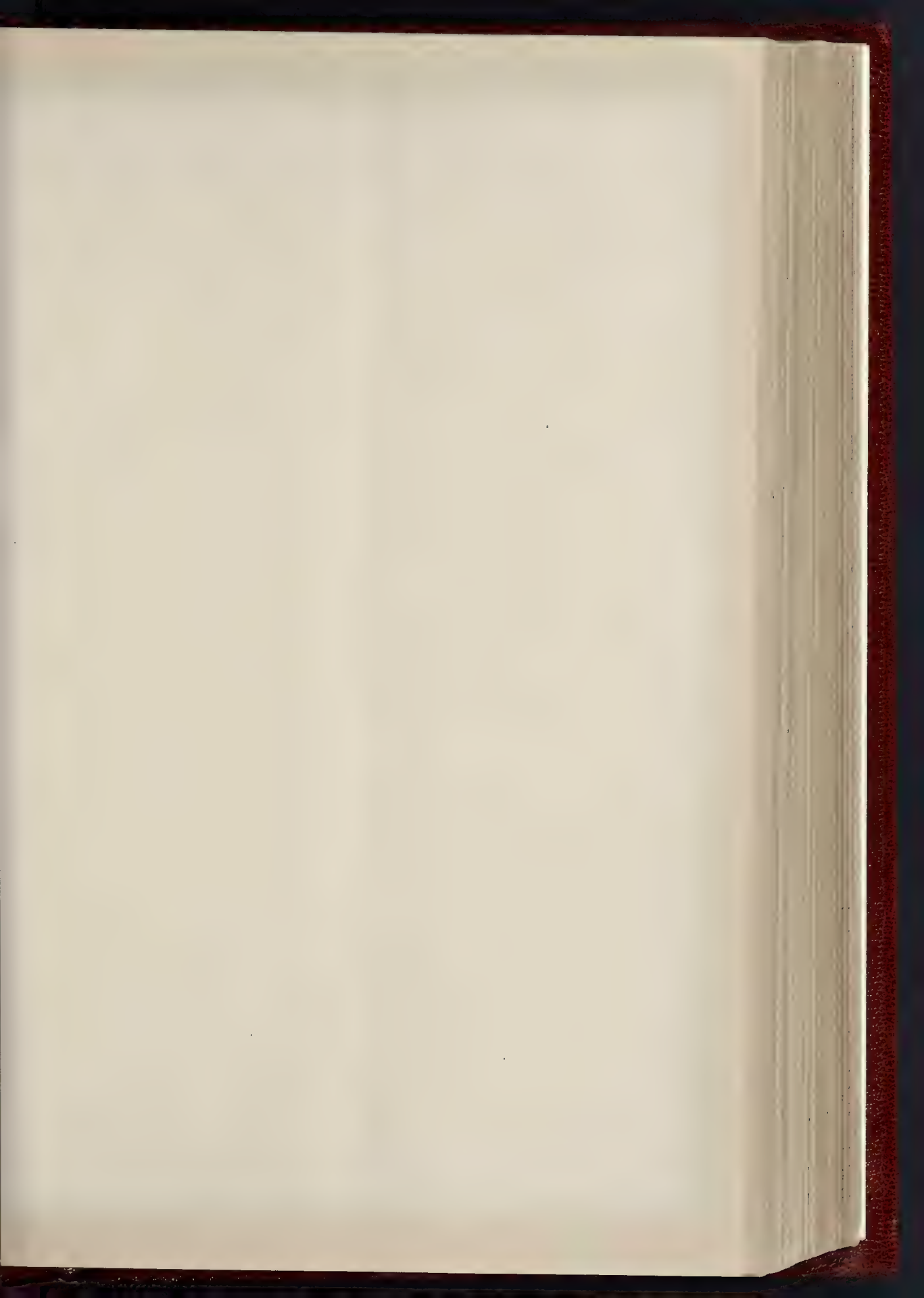


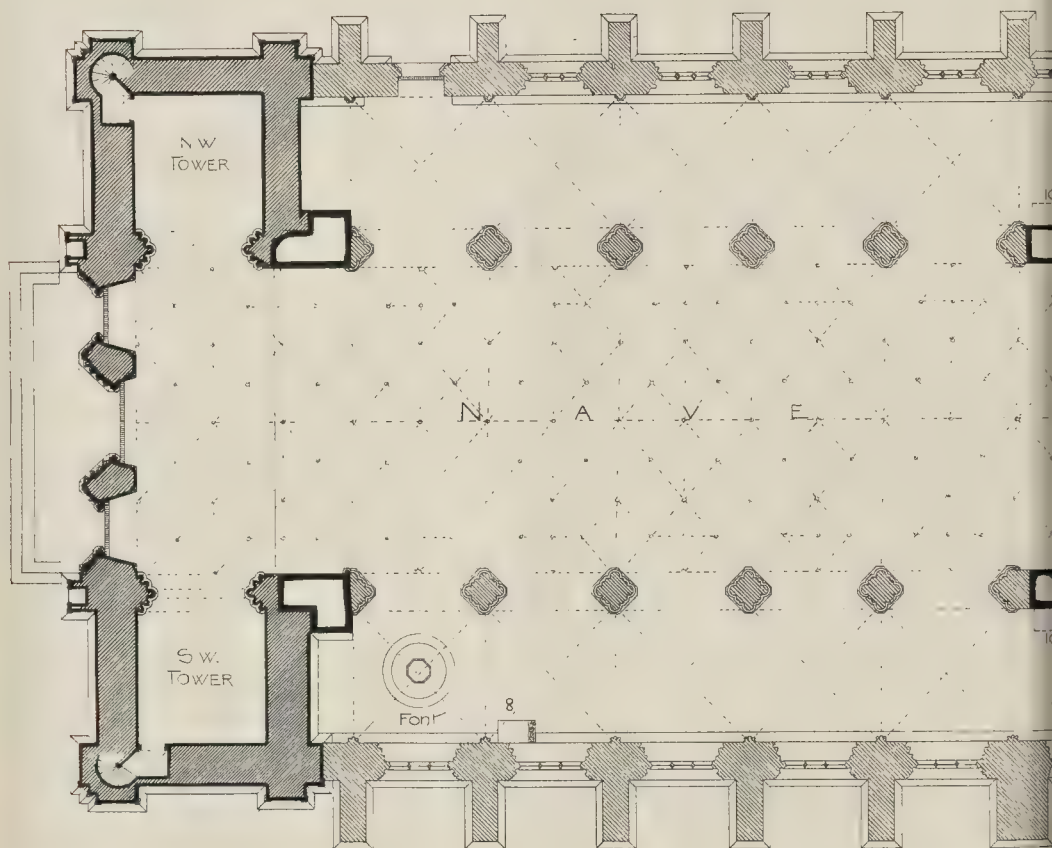
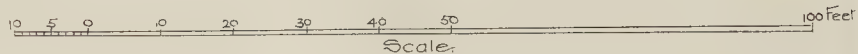
PHOTO LITHO. BY MR. J. T. MICKLETHWAIT & CO. 4, EAST HARDING STREET, LANE, E.C.

ORGAN CASE AND STALLS ST PAUL'S CHURCH, MORTON, GAINSBOROUGH —Mr J T MICKLETHWAIT AND MR. SOMERS CLARKE, ARCHITECTS








RIPON CATHEDRAL

GROVND-PLAN.

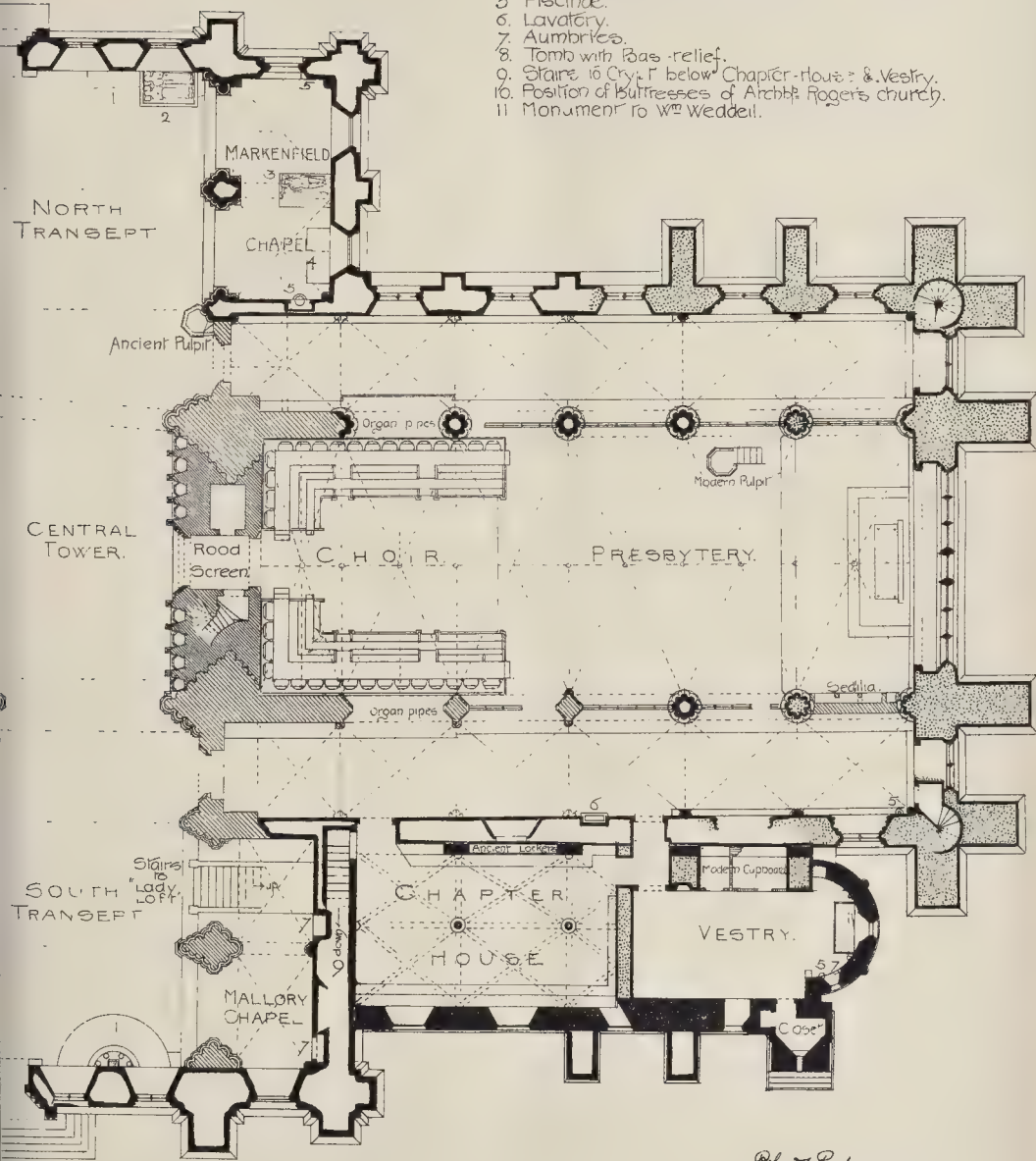


Dates.

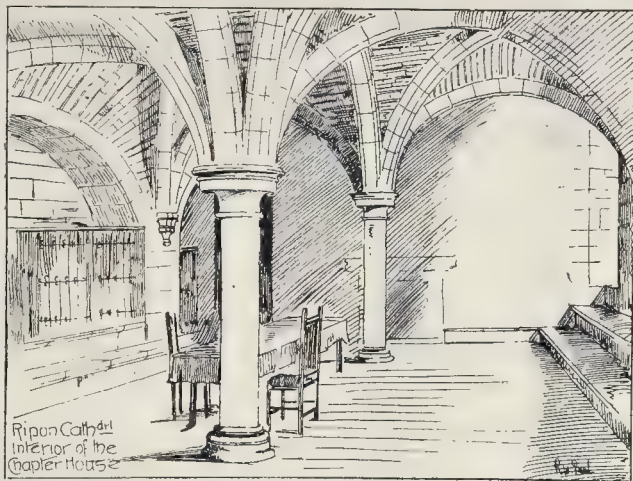
-  Norman.
-  Archb. Rogers work AD 104-113.
-  Early English.
-  Decorated.
-  Perpendicular.

Monuments, etc.

1. Slab with Cross
2. Sir Thos Markenfield & wife 1497
3. do. do. do. (Temp Richard II)
4. Sir Edward Blacket, d. 1718.
5. Piscinae.
6. Lavatory.
7. Aumbries.
8. Tomb with Bas-relief.
9. Stairs to Crypt below Chapter-house & Vestry.
10. Position of buttresses of Archbp Rogers's church.
11. Monument to W^m Weddell.



M. H. Paul
Mans of del' 1893



Ripon Cathedral
Interior of the
Chapter House

lavatory by the door into the vestry, a not unfrequent position; another doorway westwards opens into the chapter room, which, with the adjoining vestry, was built over the Norman crypt before described. The room now called the Chapter-house and used as such is, together with the vestry east of it, a fragment of the earlier church. The vaulting and columns are, however, Early English, and the wall now dividing the Chapter-house from the vestry is also of course a later insertion, and cuts through the vaulting of the first-named portion (see plan). There are some lockers here in the north wall with their fragments of carved work retaining their original colouring, and thought to have formed part of the shrine of St. Wilfred. They were found in the choir under the floor during the restoration, and consist of two panels about 9 in. by 7 in.; one a representation of the Resurrection, and the other the Crowning of the Virgin. The former is very quaint, with soldiers in various positions round the tomb, in an earlier style of costume however than the date of the work which is evidently of the Perpendicular period. There is also a figure of a bishop, in the same case, dug up, we understand, at the same time. From the chapter-room steps descend to the crypt below, and there is an interesting chamber, either a treasury or chantry, formed in the block of buttresses at the south-east angle of the vestry.

The work of Archbishop Walter de Grey is early English of the purest phase, with an abundance of its most characteristic dog-tooth ornament. He pulled down Roger's west front and towers, of which no record or trace remains, and erected upon the same foundation the very beautiful and complete composition that we now see. The lofty west gable wall, over a hundred feet in height, consists of three stories below the gable. On the ground story are three boldly-recessed porches with fine clusters of shafts, the centre porch being the widest; each group of arches is covered with a gable. Above the porches is a tier of five elegant windows of equal height with clustered and banded shafts and much dog-tooth enrichment; the upper story also has five loftier windows grading upwards to the centre, and a triplet fills the gable. The west end of the nave is flanked by two lofty towers continuing the façade on the same plan as the gable wall, and broken only by very severe buttresses, grouped at the angles and carried up vertically without any set-offs or spays. Three stories of arcades, of three arches each, the lower ones corresponding with those of the west gable, are repeated on each face of the towers, the centre arch being opened into a window in every story. A small blind trefoiled arcade enriches the basement. The parapets and pinnacles are later—of a debased eighteenth-century style.

Both the western and lantern towers formerly had spires of wood and lead, which were taken down in the seventeenth century to avoid the cost of repairs, but the simple broad masses and plain surfaces of the west front are so effective that it is not all suggested to the mind that they are required to complete the composition.

The lower tier of windows in the front was filled in with refined early geometrical tracery

that was removed by Sir Gilbert Scott's illogical purism, though he left the terrible parapets alone.

The decorated work of the choir is of a refined but vigorous type, the small caps having a leaf enrichment; the recessing to the jambs of some of the aisle windows is particularly good, consisting of two orders of arches with a square reveal between. The east window is of great size, occupying the whole of the wall; it is boldly designed and delicately moulded. The clearstory has a double plane of tracery, as at Lincoln and Ely, and is of a very beautiful late geometrical design. A traceried arcade is carried along the east wall under the window. The sedilia now occupy the eastern bay, having been removed from the second bay; they are of later decorated work of rather heavy design, but having some fine carving.

A staircase from the south transept gives access to a Lady-chapel loft over the chapter house and vestry, into which the south choir aisle windows look. This is a simple apartment, now used as the chapter library, and has square-headed decorated windows of three lights each along the south side, and a square projecting window of five lights in the east wall over the Norman apse below. This Lady-chapel was probably erected about 1330.

The stone choir-screen is a very fine perpendicular work elaborately niched and traceried, it is of great thickness, and was possibly regarded as assisting in buttressing the lower tower piers then rebuilt. The stalls and canopies which return against it are remarkably beautiful specimens of fifteenth-century woodwork, a complete series of sublimely of great interest and technical merit exist, also some good stall ends, notably an elephant and castle occupied by soldiers. The backs of the stalls have openings cut in them to give a view from the aisles to the altar.

There are only a few remains of the ancient stained windows, some fragments probably from the east window having been glazed into the south-west window of the nave; they are, however, of considerable beauty and interest.

The perpendicular nave is of the type of that of a fine parish church, a lofty and well-proportioned arcade carried on clustered piers of picturesque plan supports a large clearstory of traceried windows with a passage across their sills in the place of a triforium. The design is simple and good, and does not destroy the scale of the lofty and wide nave planned by Roger. The aisles are perpendicular, and connect the western towers, till then projecting beyond the church, with the transepts.

The aisles are of slightly differing date, though similar in design, the south being bolder and the north more refined in treatment. Externally the northern walls and buttresses have had more elaborate treatment than the south, but the pinnacles upon the battlements have vanished. The effect of the partial rebuilding of the tower is of a later period still, the piers and arches being coarse and weak in detail. The partial character of the rebuilding is singular, as the enlarged south-west pier of the crossing only carries its proper arch across the south transept, leaving a

projecting pier in the nave to carry a larger arch that has never been built.

The extensive restorations undertaken by Sir Gilbert Scott have been most valuable to the building: he added wooden ceilings in the place of lath and plaster and papier-mâché ones, and put the choir into a simple order that makes one wish that he had often worked under similar limitations; and excepting the unjustifiable removal of the beautiful fourteenth-century tracery from the west front the general verdict on the net result of the nineteenth-century work at Ripon will be satisfactory.

ORGAN CASE AND STALLS, MORTON CHURCH, GAINSBOROUGH.

THESE drawings show the design and arrangement of the organ case, chancel screen, and the other furniture of the chancel of this church, which has been built from the designs of Messrs. Somers Clarke and J. T. Mickelthwaite.

We gave an exterior view of the church in *Builder* for October 3, 1891. For a plan of the east end see page 92.

THE PAVING IN SIENA CATHEDRAL.

THE marble paving of Siena Cathedral is quite unique, being covered with inlay representations from designs by eminent masters: scenes from Old Testament history by Domenico di Nicolo and Beccafumi of about the first half of the fifteenth century; the symbols of Siena and other towns allied with it, and a host of other figures by masters of less note.

The subject of my sketches is some of the borderings enclosing these pictorial representations, and used, if I remember rightly, in some instances, to emphasise the main lines of the plan across archways from pier to pier or respond.

It will be seen how spirited the designs are. The Tablet, with supporting "cherubim" is inserted over one of the Scriptural subjects in the North Transept, while the other—"stag and flower vase" and "pecking bird"—designs are from the South Transept.

The execution varies. The oldest scenes are simple outlines engraved on the white marble and filled with black stucco. Shading was then introduced by the use of grey and also coloured marble, so that the inlay gradually developed into an elaborate mosaic. Most of this interesting and beautiful paving is covered by boarding, which, however, is removed once a year—on August 15 (Feast of the Assumption), and by special permission on application to the Opera del Duomo, close by the Cathedral.

T. ROGERS KITSELL.

THE ARCHITECTURAL ASSOCIATION:

PLANNING OF THE SMALL SUBURBAN HOUSE.

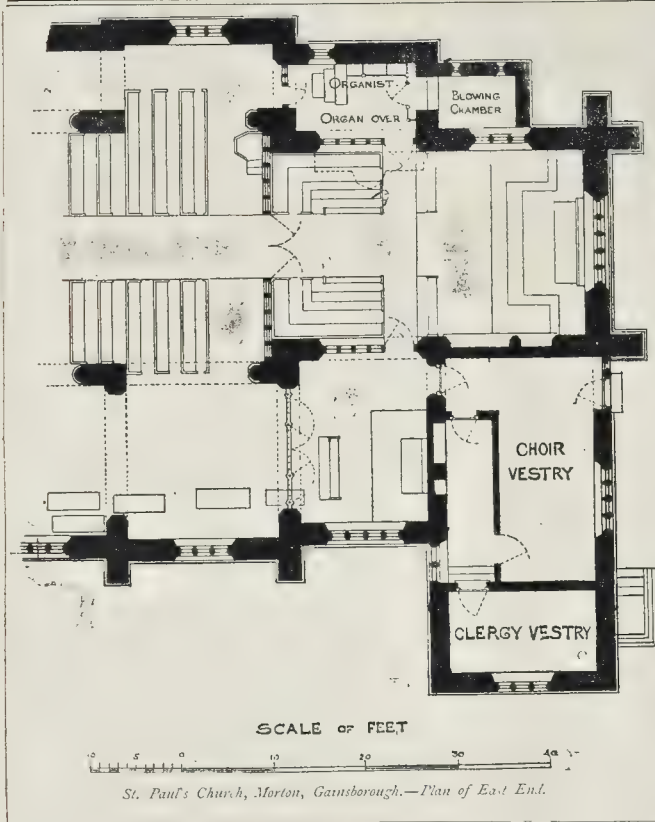
THE seventh ordinary meeting of this association for the present session was held on Friday, the 27th ult., in the hall of the Royal Institute of British Architects, Conduit-street, the President, Mr. H. O. Cresswell, in the chair.

Two gentlemen were nominated for election as members, and five were elected, viz., Messrs. H. W. H. Palmer, F. B. Chester, J. L. Findlay, C. J. S. Holcombe, and A. E. Hughes, junr.

Mr. F. T. W. Goldsmith, hon. sec., announced that the first sessional visit would be made by members on Saturday, February 11, to the Church of St. Bartholomew-the-Great, West Smithfield, when Mr. Aston Webb had kindly promised to attend and to explain the works which he had carried out there. The second sessional visit was fixed for Saturday, February 25, to the new building for the Institute of Chartered Accountants, when Mr. John Belcher, the architect of the building, would receive the members.

The President called attention to the fact that Mr. Crace's lectures on "Colour Decoration" were about to commence, but there was not yet a sufficiency of names entered for them. Unless the requisite number of names could be obtained the lectures would not be given. The President also announced that members entering the studio now could be admitted for 3*l.* 3*s.*, instead of 5*l.* 3*s.* for the rest of the session.

Mr. Sydney Vacher then read a paper on "The Small Suburban House." He commenced by remarking that, although, in domestic architecture for the middle classes, we had made enormous strides since Mr. Norman Shaw, R.A., first began to show us how English



domestic work could be treated, plenty remained to be done. Incomes were being dispersed, the towns were becoming more crowded, and every year more and more people migrated to the suburbs, and they were learning the comforts of a well and conveniently planned house. The general taste of the people was rising year by year, and the architecturally beautiful house was more in demand. The small suburban house had generally to be built at the minimum of cost, and had to contain quite the maximum of accommodation. To do such work thoroughly and well required, besides experience, a great deal of care and thought—quite as much as larger and more important buildings. The types of suburban house which he proposed to consider were those let for rentals of from 75*l.* to 130*l.*, or even 150*l.* per annum. The requirements were almost identical; the more expensive might have a fair hall, with a fireplace and two or three more bedrooms, and the other rooms generally larger in proportion; the garden might also be larger, and the situation nicer, but the general accommodation would be much the same: three reception-rooms and all offices on the ground floor; as many bedrooms as possible on the first floor; bath-room, water-closet, housemaid's closet, and linen-closet on the first floor; and the remaining bedrooms, and box-room and tank-room, in the roof. Mr. Vacher said they should be thankful houses came before them when first commencing practice in the form of surveying commissions; he then reviewed the history of certain classes of property, and went on to describe the shortcomings and delinquencies of the jerry builder, who, he said, was largely a creature of the grasping landowner, and who certainly seemed to hit off the popular taste for the cheap and nasty. It was a comparatively easy task, he continued, to say what to avoid, but it was a more difficult task to tell his audience what was good and what should be their aim in designing a suburban house. First of all they should bear in mind that the client might, for some unforeseen reason, have to realise his expenditure by getting rid of his house after it has been built. Let the architect, therefore, produce work that should be a com-

mercial article, not too advanced. With regard to accommodation, the suburban householder expects always three reception rooms and the offices on the ground-floor; and four or more bedrooms on the first-floor; with bath-room, drawing-room or rooms, and as many attic bedrooms as he could get. To plan a good house it was absolutely necessary to study the site which would suggest and govern the arrangement of the rooms. Certain necessary requirements must be fulfilled before any plan could be considered satisfactory. It would not do to say that a scheme of planning was pretty if space had not been arranged for a store-room, or if the only place for the linen cupboard was in the attics, or if there were no box-room or proper tank-room. Though these seemed to be mere accessories, very much depended on them, and it was largely due to these rooms whether the house was to be a comfortable one for a good housewife to live in. The first requirement to be thought about was airiness and sweetness, for in most houses it was next to impossible to prevent the smells from the kitchen pervading everywhere. On that account he much liked the plan with the passage through the house from the front door to the back or garden door; in summer time the current of air through the house made everything pleasant and nice. The plan he had in his mind was the usual two rooms on one side of the passage, and library on the other, with offices behind, and the entrance to them under the staircase. Though a common plan, it was capable of special treatment. He did not like a plan that simply delivered one into the house with rooms all round, especially if the light to it or the staircase was from the half landing window. There was always a sense of closeness in such a house. If the architect could manage to get a hall, a ground-floor window in it was absolutely necessary, and it should be a bay if possible. A hall lit from anywhere above 6 ft. from its floor was a failure, and the space had better be utilised in making the rooms larger, for he would say that the rooms should be as large as possible. He would always sacrifice breadth for length, for by that means an appearance of

size was gained. As for the reception rooms, he could say but little, except that they should be as large and as prettily shaped as possible. In other words, the surfaces of the walls should be broken up so as to get variety, but above all things it should be borne in mind that these rooms had to be furnished and lived in; therefore it was desirable to try and arrange the furniture, especially in the drawing-room and library. The space round the fireplace should be broad, free from draughts, and as large as it was possible to get it. On a winter day, with a big fire, often the cosiest place was quite by the side of the fire, but out of the direct rays of the heat. In angle-nooks, where windows could be obtained, they should never be omitted, but they should be placed high up, with the sill at least 4 ft. 6 in. or 4 ft. 9 in. from the floor. As to the lighting of the reception rooms, especially in small houses, the windows should be kept as large as possible,—proportionately too large. That was, he believed, the secret of the success of many houses. The client might say that it would make a cold house in winter, but that would not be the case with thick curtains and good fires, and the advantage of large windows for the remainder of the year was everything. Even all the year round the large window area gives a cheerfulness and airiness to the house that made the house a success. They should not be frightened with narrow rooms, provided they were long, especially if a bay could be obtained in the site. A sense of size was everything towards comfort in the living rooms. Upstairs the bedrooms had to take their chance; the architect would have to consider how they would come when he was planning the ground-floor, and would remember that it was economical building, as well as good building, to put walls over walls, and not to have to carry the first floor internal walls on girders. The bath-room should not be less than 6 ft. 6 in. by 8 ft. to make a pleasant one, and unless it was impossible to plan otherwise they should never put the water-closet in it. Of course, the architect would be careful to make the approach to these rooms as unobtrusive as possible. Neither should the linen-closet be put in a bath-room, but it should not be forgotten that a linen-closet on a landing, or in a passage as near the principal bedrooms as possible, was essential, and it should be kept large. It should be papered with white glazed paper and made pretty. A good housewife took pride in her linen cupboard. He did not believe in running the hot water pipes through it, for they discoloured the walls and seemed to throw off tiny blacks unless covered; nevertheless, the linen cupboard should be in such a position that no damp could possibly get to it. The box-room was necessary to be as large as possible. With regard to flues, it would be well to see that an 8-in. stone ball was let down each flue when completed, and before the scaffolding was struck, to clear the flue of lumps of mortar that might have fallen and stuck; and to all top fireplaces, grates of projecting heads should be placed, that was, heads projecting in front of the bars of the grate. That would generally prevent the fires from smoking into the room. He was fond of windows over fireplaces, but each fireplace of that kind would necessitate an iron flue door outside, for sweeping. Let them beware lest the sweep insecurely fixed that flue door, for the wind would get it open, and then the chimney would smoke seriously until the mischief was found out. He generally covered the opening with a York stone lintel, and he had found no difficulty about the flue drawing from the ground floor, but on the first floor he should always use a grate with a projecting head. That arrangement was cheerful in a room, but they should not make the mistake of putting the top of the sill too high; he thought it should not be more than 4 ft. 3 in. or 4 ft. 6 in. from the floor. He preferred as a general rule to make the mantel-shelf quite high up on the wall, as it seemed to give dignity to the fireplace. Tiles for flooring of halls or passages inside a house seemed always cold and unsatisfactory; wood seemed infinitely preferable. He thought cornices were much richer looking if they were painted, and all paint-work finished with a coat of varnish, and the ceilings papered; in such rooms as the library or dining-room they need not be afraid of dark ceiling papers,—real dark papers. He would advise them to arrange for the hanging of curtains in the decoration of the rooms, either by bringing out the cornice, or working a special cornice over the window, carried up to the ceiling and fitted on the under side with curtain train-gear. If this were done with the contract it was no more expensive than the commonest poles fitted afterwards by the upholsterer. The ordinary system of running ornamental cornice round the

room and over windows, and then hiding the part over windows in cheap houses with curtain poles, and in expensive houses with elaborately-draped ornamental boxings, was unsatisfactory from an æsthetic point of view, and was expensive. He would also advise the use of curtain blinds instead of ordinary roller and spring blinds, and the gearing for them might be provided in the building contract. It was very simple, merely $\frac{3}{8}$ in. twisted copper wire with screws soldered on at each end and fitted with nuts to angle-iron at each end of the window. By providing windows over the fireplace of the reception room, and gearing for curtain blinds, they would get over two of the worst features of modern furnishing, trade pattern overmantels, and the roller blinds. The offices were as important as any part of the house, for it was getting very difficult to find satisfactory good servants, and it was not always easy to keep them; therefore, the house should be arranged so that it could be worked with as little labour as possible, and the servants' quarters should be made as comfortable as they could be. On account of expense it was generally necessary to keep the kitchen down to the smallest dimensions; 12 ft. 6 in. by 14 ft. 6 in. clear was the smallest for good houses, but as the kitchen had to be the servant's sitting-room, if possible it should be provided with a bay window, where they could sit and work; and it should be made cosy. A flue to the scullery was necessary, for either a supplemental small range or a gas oven should always be placed there. The scullery should be provided with a glazed stoneware sink, and a wood curb around it would save a great many plates from being broken. As to ventilation, there should always be a flue next to the kitchen flue to carry off smells and heated air; this flue should be at least 14 in. square. (He also tried to get a similar flue to the fireplaces of reception rooms on the ground floor, and fitted them with Sheringham Ventilators.) The scullery should always lead direct from the kitchen, with no passage between, and he liked to have the coal cellar and larder leading off the scullery and, if possible, a space set aside for cleaning knives and boots, divided off by a screen. The servants' water-closet should, if possible, have the entrance under cover, and be screened. The store-room should be near the kitchen and the wine-cellar should lead out of the pantry. When it could possibly be avoided the pantry should never be made a passage from the kitchen; both the pantry and the kitchen must be separate rooms with doors of their own. A pantry next the dining-room, with a serving hatch from the kitchen to pantry, made a very workable plan. He did not like cellars, especially for larders, as it was so difficult to get a current of air through them, although with small frontages they were often necessary. As to the sanitary work generally, three water-closets were essential, one on the ground-floor for the gentlemen, one on the first-floor for the ladies, and one in the offices for the servants. As to the former, it was perhaps preferable to place it near the garden door rather than near the front door. He strongly advocated the use of a valve closet without any overflow from the porcelain basin, and with no lead trap under, delivering straight outside, with a double curve as straight as possible to the soil-pipe, which should be open at the bottom and top, and carried up at the top above all windows, as in Mr. Norman Shaw's method, published in 1877, which was the healthiest and most sanitary he knew, notwithstanding the *dicta* of the "sanitary experts," who insisted on sealing up everything hermetically and putting lead traps under the closets. He disliked wash-out closets. Having dealt with the arrangement of the hot and cold water supply, the lecturer, in conclusion, stated that he considered the interior decoration of the house of first importance, and referred to various matters of detail into which we regret that we have not space to enter.

In the discussion which followed, a great deal was said as to sanitary details, and it seemed to be agreed by most of the speakers that soil-pipes were generally made too large; a soil-pipe of 2½ in. bore was, in their opinion, quite large enough. Mr. Vacher's remark in the paper that the bed-rooms might be left to take care of themselves, and his advocacy of windows over fireplaces, were criticised; but in the course of his reply Mr. Vacher explained that he did not mean that the bed-rooms should not be carefully planned with a view to their use and the disposal of the bed and other furniture, but that they might be grouped together as convenience might dictate. As to the window over the fireplace, he liked it because it was an effectual barrier to the use of a trade-pattern over-mantel.

THE ROYAL COMMISSION ON METRO- POLITAN WATER SUPPLY.*

The Chalk Areas of Kent.

We have already given Mr. Topley's estimates of the Chalk areas of Kent east of the Kent Water Company's district, and the estimates formed jointly by Messrs. Topley, Whitaker, Easton, and Batchelor of the extent to which the Chalk water is now utilised.† From the further details supplied by Mr. Topley we select the following:—

The area between the basins of the Darent and the Medway (49 square miles out of a total of 490) has already been partially taken into consideration in estimates of future supplies for the Kent Water Company. The total estimated percolation of the Medway, Swale, and Stour is 104,500,000 gallons. In the area between the basins of the Stour and the Dour the percolation would amount to 7,000,000 gallons daily. This small area is particularly interesting, because its south-western half contributes to the springs which break out under the cliffs from Dover to St. Margaret's. Its north-westerly surface boundary appears almost to coincide with the underground water-shed, as determined by recent well-measurements by Mr. Easton. The total percolation being 7,000,000 gallons daily, the part contributing to the cliff-springs would give about 3,500,000. The amount of water actually issuing from the springs is, however, vastly in excess of this. Mr. Easton's estimate of the yield of one spring near St. Margaret's Bay, taken early on December 1 of this year, gives 2,750,000 gallons daily. Another large spring near Frenchman's Hole runs almost as strongly. This flow is, perhaps, slightly above the mean annual flow, but the Chalk springs are now rising, and the outflow will be far greater in some weeks' time. These gaugings of the springs under the cliff, however, can give only a part of the water which the area yields. Only the larger springs can be measured, and all these springs are merely the water issuing between tide-marks. The gaugings take no account of the water which must issue below low-water mark. The boring at St. Margaret's Bay proves that water, under pressure, exists in the Chalk, as the water flowed over the top of the tube just above high-water mark. If a gallery were driven a little inland from the cliffs, and a little below high-water mark, a quantity of water far in excess of that gauged on the shore could be collected. This area may be taken as a test district, and by comparison with it we may form some idea of the great amount of water to be obtained from other chalk areas in East Kent, where the chalk water enters the sea or tidal streams. It proves that the quantity of water yielded by the chalk here is much in excess of what experiments on percolation would lead us to expect; and this fits well with the evidence already given by Mr. Easton as to the Brighton area. Both here and at Brighton, however, the chalk is practically bare of drift; there may also be much water absorbed by condensation from sea-mists, in addition to the rainfall as recorded in rain-gauges. But even taking all these facts into account we are justified in concluding that the proportion of rainfall percolation into the chalk is far greater than that allowed for in these estimates, which is only about 7 in. on an average, or about a quarter of the rainfall. If the typical chalk areas of Dover and Brighton yield two-thirds of the rainfall, probably one-half of the rainfall would not be too much for the entire chalk area; all estimates of probable quantity mentioned may therefore be increased at least 50 per cent., and even then they will, perhaps, be under the mark.

Shape of the ground.—The crest of the chalk escarpment is generally over 600 ft. in height; from this crest the ground falls sharply on the south, to the outcrop of the Gault, but descends with a more gentle slope to the north and north-east, towards the lower ground occupied by the Tertiary beds. At the extreme east, from a little south of Deal to near Folkestone, the Chalk ends abruptly as sea-cliffs. The Chalk is about six miles broad in the Medway basin, from the escarpment to the Tertiary Beds; but further east, in the basin of the Stour, it covers a wider area, and has a breadth of about twelve miles from the escarpment above Folkestone to the Tertiary Beds near Sandwich.

Superficial beds over the Chalk.—The drift overlying the chalk consists mainly of clay with flints, and loam, there being but little gravel,

except in the bottoms of the larger valleys, which are, or once have been, Nailbourne valleys, the streams running only after wet seasons. There are some small areas of sand (Lenham beds) near the chalk escarpment east of the River Stour; but as these are often partially underlain by clay with flints they are included in the superficial beds. Besides the Chalk areas covered with drift, we must reckon, as contributing to underground supply, those parts covered with outcrops and spurs of the Tertiary beds, as well as the margins of the larger Tertiary districts; for the drainage of such small areas is to the chalk, either by direct percolation or by small surface flows.

Rainfall and percolation.—The average rainfall over this area may, perhaps, be taken at 26 in. It may be rather less over the lower ground, but it reaches 30 in. on the higher areas of the chalk. Mr. Symons, in his statement before this Commission, gives only one station within the area with which we are now concerned, that is, Knight's Place, Rochester, 320 ft. above the sea; the rainfall here is 26 in. In Mr. Symons's rainfall tables for 1866-1880, the following figures are given:—Charing, 507 ft., 30.59 in.; this is near the crest of the chalk escarpment; Canterbury, 52 ft., 29.01 in.; Margate, 60 ft., 24.06 in. Below the chalk escarpment he gives Hunton Court, Maidstone, 80 ft., 26.44 in. At Hythe, 12 ft., 36.81 in. is recorded for the same period (1866-80); but it is known that there were serious errors at this station, the rainfall here recorded being much too large. In calculating the probable yield of chalk water from east Kent, Mr. Topley has assumed a percolation of 8 in. over bare chalk, and of 6 in. over covered chalk. He takes these figures because they are those used by him in former evidence before the Commission. He then, however, stated his belief that they are too low. Fuller investigation, especially as regards the area between Dover and St. Margaret's, greatly strengthens this belief, and he has no doubt that the estimates of percolation here given may safely be increased 50 per cent. If it were proposed to exhaustively pump the district, we should not count on the mean percolation for supplies, but should look rather to the percolation of dry years. But even then the estimates here given are quite within the mark.

Underground water.—The underground water of this area is disposed of in four ways:—

(a) By springs at the foot of the chalk escarpment; these, however, are fed only by the rain which falls near the escarpment. Folkestone, and in part Maidstone, are supplied from such springs.

(b) By streams, permanent in their lower parts, intermittent higher up the valleys, where they run only in wet seasons; such streams are here called "Nailbournes."

(c) By springs on the low ground near the Tertiary beds where the plane of saturation intersects the surface; and by springs along the sea-cliffs.

(d) By a general underground travel of water sea-wards.

This last is for the most part an inference. We know, however, that the chalk beneath sea-level is water-logged, and that the pressure of the inland water must be forcing the fresh water out; that springs issue along the foot of the chalk cliffs between high and low water-mark; and that water must be travelling beneath the Nailbourne valleys.

Springs along the coast.—Springs break out in great abundance at the foot of the Chalk cliffs between Dover and St. Margaret's Bay. Large areas of bright green weed occur amongst the ordinary *Fucus*. These show that fresh water breaks out in sufficient abundance to prevent the growth of the common sea-weed; in other places, where the fresh water is less abundant, the weeds grow together. The springs occasionally break out about high-water mark; but more commonly they occur between tide-marks, sometimes as fairly definite springs at one place, but more often at a multitude of places. They are thus generally difficult to gauge; but Mr. Easton has recently succeeded in gauging three—one at the south-western corner of St. Margaret's Bay, now yielding 2,750,000 gallons daily; one at Frenchman's Hole, yielding 1,500,000; and one further west, which yields over 1,000,000 gallons. These three springs alone yield over 5,000,000 gallons; but the other springs, small and large, must give a large quantity in addition to this. There are powerful springs in the Dour Valley, near Ewell, the sources of the River Dour. West of Dover there are springs, the best known being Lidden Spout, which breaks out at some distance above high-water mark. The under-cliff (known as the Warren), on the east of Folkestone, is mainly due to springs which issue from the chalk

* For previous reports of the evidence given before this Commission, see the last two volumes of the *Builder*, as per references given in footnote on page 518 of the number for December 31, 1892.

† See *Builder* for December 31 last, page 523.

near the top of the gault. A gallery has been driven at the back of the under-cliff to intercept the springs, and thus to prevent further slipping. A large quantity of water issues from the mouth of this gallery.

Springs under the Chalk Escarpment.—From Folkestone to the River Medway strong springs issue in many places. That above Folkestone yields 500,000 gallons daily to the town supply. The River Stour rises at a strong spring at Postling; there are also strong springs at Horton, at Brabourne, and near Brooke. On the west side of the River Stour there are springs at Eastwell, Westwell, Charing, and at Lenham (the head of the western branch of the Stour). In the Medway Basin there are springs at the foot of the chalk escarpment at Hollingbourne and Thurnham. Further west are the springs at Boarley and Cossington, which supply Maidstone with 600,000 gallons of chalk-water; beyond these, nearer to the River Medway, there are springs at Totington. On the west side of the river, springs break out at Birling Place and at Trottescliffe.

Springs on the Northern Slope of the Chalk.—These, as already mentioned, are described in detail by Mr. Whitaker. The springs at Wingham are especially noteworthy; one at Dambridge was running about 3,000,000 gallons per day in November 1892; the flow of Wingham Well could not be measured, but it seemed to be quite as large as that at Dambridge. Such springs frequently break out in deep conical holes in the alluvium; they are locally known as "Nicker pits." Strong springs break out at Littlebourne. There are numerous springs near Canterbury, which are described by Mr. Dowker in his book on the water supply of East Kent. Some of these are certainly chalk springs; others are believed by him to rise from the chalk through the lower tertiary beds. At Faversham, Ospring, Teynham, and Sittingbourne, there are also strong springs. A powerful spring breaks out at Newington from the lower part of the tertiary beds; but this is, no doubt, chalk-water, and is so described by Mr. Bland. Springs rising through the marshes near Rainham seem also to be from the chalk. The springs on the bank of the Medway, under Rochester Castle, are interesting, as showing the quantity of water in the chalk, notwithstanding extensive pumping at the Rochester Waterworks and at numerous cement works in the neighbourhood.

Nailbourne Valleys.—Besides the permanent springs referred to, there are occasional flows in the main chalk valleys. These usually break out in the first instance high up the valley. The Little Stour is now running as a surface-stream in its higher part, near Lyminge. The water at Northbourne at the time of our visit (November 6) was rising, being then one foot below the surface. The Dour sometimes rises as a Nailbourne at Drillingcote, three miles and a-half above its ordinary source. The valleys near Denton and Petham are also Nailbourne valleys; the former is a tributary of the Little Stour, the latter flows into the main Stour, above Chatham. The waters of these valleys must, when not flowing as surface-streams, be running to some outlet in the main river bed, the estuary, or the sea.

Methods for obtaining the Water.—A proposal has been made to construct a tunnel near where the chalk passes under the tertiary beds at or near sea-level, and so intercept the water flowing seawards. From the River Medway to near Broughton-under-Blean, about twenty miles of tunnel might be driven, with pumping stations at intervals. These works would drain the chalk of the Medway and the Swale. From the River Stour to near Deal, about fourteen miles of tunnel would drain the Stour basin. Six miles of tunnel from Deal to near Dover would collect the water flowing direct into the sea. A large proportion of the chalk-water would be thus intercepted. Below this level no doubt there would be more water, for the abstraction of which wells with adits would be required. From the bottom of the main gallery bore-holes should be put down into the deeper beds of the chalk; and in the western part of the area these borings should be continued through the chalk and gault to the lower greensand, which would be reached at a depth of from 800 to 900 ft. below the gallery. One advantage of these bore-holes, besides the amount of lower greensand-water obtained, would be the information they would afford as to the water-bearing capacity of the chalk below the line of gallery. Where there are indications of such water in quantity, deep wells with adits might be made. Any such extensive scheme of obtaining water as is here suggested would, of course, largely diminish, and would, perhaps, often entirely stop, the run of

water to chalk-wells now supplying the towns and manufactories of the district. Arrangements, and, therefore, have to be made for supplying the districts thus robbed of their water. By far the larger part of the surface chalk-water of this district now goes direct into the tidal area. Very little of it is used. There are a few mills and some water-cress beds; there are also the local waterworks which have been already named in the *Builder*.

Well-measurements.—The earliest systematic well-measurements were made in this district by Mr. Bland, who published, in 1832, the details of three lines of sections, two of them running right across the chalk-area from north to south. These measurements showed a gradual fall of the water-line from near the chalk escarpment northwards, averaging 45 and 47 ft. per mile in the two lines of sections. Some of the wells were measured twice, in June and December, 1827, and in May and December, 1828. The greatest variation recorded is 15 ft., but, no doubt, some wells would give a greater seasonal variation than this. Mr. Dowker states that at Elmsted Vicarage, on the Stour chalk-area, the water-level varies about 50 ft., being usually highest in May and lowest in December or January. During the last few weeks numerous well-measurements over the chalk-area east of the Medway have been made by Mr. Easton, who will place the results before the Commission.

Lower Greensand.—This formation occupies an area of 130 square miles in the basins of the Medway and Stour (Medway, 93.8; Stour, 36.2). Almost the whole is highly permeable, the small area of clayey sandstone beds near Maidstone being insignificant. Powerful springs occur in many places; but it is doubtful if these could well be utilised. They are largely used by mills; and water got from wells on the Lower Greensand itself is sometimes polluted.

Salt-water in the chalk.—Where, over a large area near the sea or a tidal river, wells and borings fail to obtain supply of fresh water, whilst in many cases they yield salt-water, there is clear evidence that the travel of inland chalk-water is impeded, and that such areas are useless for water supply. This is certainly the case along the coasts of Essex and part of Suffolk. But we are not justified in drawing the same conclusion from isolated instances in which salt-water has been found in wells or borings.

The Commission will sit again on the 15th inst.

LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon last at Spring-gardens, the Chairman, Mr. John Hutton, presiding. **Resignations of Memberships.**—The Clerk, Mr. De la Hooke, read letters from Captain James and Mr. Eneas Smith, resigning their seats on the Council. The seats were declared vacant.

Northern Approach to the Woolwich Ferry.—The Bridges Committee presented the following report and recommendations:—

"In accordance with the instructions of the Council of the 18th October last, we have to submit particulars of various modes of embanking the river to enable the Stanley-road approach to the ferry to be widened so as to accommodate the increased traffic—1, a wall formed of timber piling, which is estimated to cost 6,000*l.*; 2, a concrete wall faced with blue bricks, which is estimated to cost 28,500*l.*; 3, a concrete wall faced with granite, which is estimated to cost 29,500*l.* The great difference in cost between the timber pile wall and the concrete walls is largely due to the unsatisfactory nature of the soil. As we informed the Council in our previous report, the ground where the wall will have to be built is of a loose and treacherous nature. A strong and substantial wall is, therefore, necessary in order that the road may be supported and prevented from slipping forward into the river. A wall made of piling is not sufficiently strong for this purpose. A few months back a portion of the existing river wall fell into the river, and soon after the cylinders of the pontoons were fixed it was found that the earth was carrying them into the river. To prevent this, ties had to be fixed to them and anchored some distance back. It therefore appears to be desirable that a concrete wall should be constructed. The value of the land that will be reclaimed has been estimated by the Valuer at 1,000*l.* In connexion with the widening of the approach, it is expedient to enlarge the area available for vehicles at that portion of the approach immediately adjacent to the ferry bridges. This can be done by the removal of the wall between the ferry approach and the upper road which forms a diversion of Stanley-road, and by sloping the surface from the land end of the bridges to the footway on the south side of Stanley-road. If this alteration were made it would, we think, be a decided improvement, and accidents frequently occur through vehicles coming in contact with the wall in the road.

When the river is high, the bridge is raised so as to slope towards the shore, and horses drawing a heavy load are at times unable to keep it under control. This work will cost about 6,500*l.* We have consulted the Finance Committee with regard to meeting the expenses of the works, and it has been arranged that the cost shall be included in the Money Bill of 1893, in the event of the Council adopting our recommendation. We recommend—

"(a) That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the Stanley-road approach to Woolwich Ferry be widened by the construction of a concrete wall with granite facing, at an estimated cost of 29,500*l.*"

"(b) That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the portion of the road which is immediately adjacent to the land end of the ferry bridges be improved and levelled, at an estimated cost of 6,500*l.*"

On recommendation a being put, Mr. Doubleday moved an amendment referring the matter back for further consideration, on the ground that the proposed work was too costly, and that a wall of timber piling would be sufficient. Mr. Stevens, Mr. Goodman, Col. Hughes, M.P., and the Chairman of the Bridges Committee defended the recommendation of the committee, which, with the succeeding recommendation, was ultimately agreed to.

Technical Education.—The consideration of the report of the Special Committee on Technical Education was again adjourned for a week.

Tenders.—On the recommendation of the Parks and Open Spaces Committee, tenders were accepted for the erection of conveniences for men in Finsbury Park, and for the supply of iron hurdles. We give the lists under our heading "Tenders."

The Adelphi Theatre.—The report of the Theatres and Music-halls Committee recommended that notice be served upon the owners of the Adelphi Theatre to carry out, within four months, certain structural and other alterations in the buildings. The recommendation was agreed to.

Sanger's Amphitheatre (Astley's).—The same committee reported that this theatre is in a very defective and unsafe structural condition, and "totally unfitted for the reception of the public." The committee had reminded the licensee of the theatre of the grave responsibility which rested upon him in continuing the performances, and had informed the Lord Chamberlain of the facts. Since then, the licensee had taken some temporary measures to provide against the risk of fire. The action of the Committee was approved. After transacting other business, the Council adjourned at 7 o'clock.

NATIONAL ASSOCIATION OF MASTER BUILDERS OF GREAT BRITAIN.

THIS Association held its thirtieth half-yearly meeting at the Midland Hotel, Derby, on Tuesday, January 24. Mr. J. C. White, the President, was in the chair, and representatives were present from London, Liverpool, Manchester, Birmingham, Nottingham, Leeds, Bradford, Northampton, Hull, Shrewsbury, Bath, Leicester, Derby, The Potteries, Walsall, Huddersfield, Preston, and Portsmouth.

The Chairman reported that the usual half-yearly statements of hours worked, state of trade, and supply of labour in the principal towns of the United Kingdom, had been issued to the local associations; that during the past half-year there had been a special meeting of the Council, held at Birmingham, by request, to discuss the strike at Cardiff; and that the Council had nothing definite further, at present, to report on the question of the long-debated Form of Conditions of Contract, except that a general agreement had at last been arrived at between the Royal Institute of British Architects and the Institute of Builders, subject to the opinions of the legal advisers of the respective institutions on the legal bearing of the clauses, and the draught was now in the hands of those gentlemen to settle between them the wording of the clauses in any case in which they may contravene the law. As soon as copies of the confirmed agreement could be obtained, they would be laid before the members.

The reports and accounts were received and adopted.

Mr. Robert Dennett (Messrs. Dennett and Ingle), of Nottingham and London, was elected President, in the place of Mr. J. C. White, of Liverpool, who retired, and Mr. Dennett thereupon delivered an inaugural address, in which he reviewed the position of the building trades generally, and referred to the proposal to erect dwellings and buildings in London by the County Council without the intervention of a contractor, a proposal which, he said, might be taken as an illustration of the lengths to which reformers or rather

theorists were prepared to go. He also discussed the subject of hours and wages.

Mr. John Bowen, Birmingham, and Mr. T. F. Rider, London, were elected Vice-Presidents, and Mr. J. C. White, Liverpool, was elected one of the Hon. Vice-Presidents for the ensuing year.

Mr. Jos. Stevenson Jones, Liverpool, was re-elected Hon. Auditor, and Mr. C. W. Green was re-elected Hon. Auditor, and the following gentlemen were elected Members of the Council:

—Birmingham, Messrs. C. H. Barnsley and W. Sapcote; Bolton, Mr. J. H. Marsden; Bradford, Messrs. W. Moulson and W. Holdsworth; Bristol, Mr. A. Krauss; Cambridge, Mr. J. Bell; Derby, Mr. J. Walker; Edinburgh, Mr. T. Bonnar; Glasgow, Mr. R. Bennett; Hull, Mr. R. Beevers; Leeds, Messrs. C. Myers and B. Mawson; Lincoln, Mr. W. H. Close; Liverpool, Messrs. J. B. Johnson and H. E. Dallow; London, Messrs. F. May and J. Burt; Manchester, Messrs. W. Southern and Alderman W. Brown; Northampton, Mr. W. H. Smith; Nottingham, Mr. Enoch Hind; Potteries and Newcastle, Mr. J. Bowden; Preston, Mr. J. Walsley; and Wigan, Mr. C. B. Holmes.

A vote of thanks was accorded to Mr. J. C. White for the services rendered by him during the time he was President, to which Mr. White responded.

A vote of thanks was unanimously accorded to Mr. Stanley G. Bird, for the evidence given before the Royal Commission on Labour.

The following resolution was passed:—

"That in reference to the claims of the Labour Party for the insertion of clauses in building contracts for public works, relating to payment of trades' union rates of wages, prohibition of subcontracting, and erection of work without a contractor; that it is incumbent upon this Association, and every local association, that all such action should be scrutinised, and, where necessary, opposed and otherwise directed, so as to remove, and as far as possible prevent, any injustice to the trade and loss to the public, by hastily-considered measures; and that a copy of this resolution be circulated, with a request that officers of local associations will especially note inaccurate leading articles in the press, and promptly correct any misleading assertions."

It was decided to hold the next half-yearly meeting at Huddersfield.

SURVEYORS' INSTITUTION:

STUDENTS' PRELIMINARY EXAMINATION.

Of the candidates who presented themselves at the preliminary examination of the Institution, held concurrently in London and Manchester on January 25 and 26, the following satisfied the Examiners:—

Adams, H.	Grove, A.	Oxley, A. J.
Bell, R. M.	Grove, R. T.	Pearce, C. F.
Bentley, H. E.	Hankey, G. L.	Pearse, O. B.
Berry, T. D.	Harrison, G. J. R.	Robinson, J. B. W.
Birch, F. J. L.	Hawkins, A. M.	Rome, A. E.
Brown, A. F.	Hooper, E. W.	Roos, J. T.
Burgess, H. H. P.	Howland, A. F.	Shaw, S. H.
Clarke, J. W.	Huskingson, E. A.	Shepherd, W.
Cobb, H. W.	Little, A. S.	Smith, A. P.
Cole, R. E.	Lofts, A. K.	Smith, H.
Cowell, W. L.	Lorden, L. W. C.	Southorne, C. H.
Cowin, N. T.	Lovegrove, C.	Thompson, R. O. B.
Crowthor, K. N.	Luck, G. E.	Tomlinson, L. R.
Dickson, G. H.	Marshall, A. G.	Trueman, R. S.
Eastwood, G. H.	Martin, S. A.	Wallis, W. F.
Eldridge, P.	Müller, J.	Ward, F. E.
Evans, B.	Morrall, A. R.	White, W. J.
Evans, E. S.	Nettlefold, G.	White, W. J.
Foster, E. C.	Oldman, M. C.	Williams, L. I. S.
Green, A. E.	Overell, P. W.	Wilson, J.

* Passed at head of list.

COMPETITIONS.

LODGING-HOUSES, NEWCASTLE-ON-TYNE.—The Corporation of Newcastle-on-Tyne have appointed Mr. Chas. Barry the assessor in this competition.

ST. PANCRA'S MUNICIPAL BUILDINGS.—The assessor in this competition has awarded the first place to the design by Mr. W. Harrison, of 64, Cannon-street; the second to that of Messrs. Gibson & Russell of 11 Little-Queen-street; and the third to that of Messrs. R. Malcolm Stark & Rowntree, of 189, St. Vincent-street Glasgow.

THE ENGLISH IRON TRADE.—Quietness is the prevailing characteristic of the English iron market, and prices generally show little variation. Scotch makers' iron is firm; but Cleveland pig is again weaker, and No. 3 G. M. B. is quoted 3d. per ton less on the week. Finished iron, tinplates, and steel are all in sluggish sale. Shipbuilders and engineers complain of scarcity of orders. The coal trade exhibits a decided falling off.—*Iron.*

ARCHITECTURAL SOCIETIES.

ARCHITECTURAL SECTION OF THE GLASGOW PHILOSOPHICAL SOCIETY.—On Monday last a meeting of the Architectural Section of the Glasgow Philosophical Society was held in the Society's rooms, Bath-street, when a paper on "Public Library Planning" was read by Mr. George Washington Browne, A.R.S.A., Edinburgh.

NORTHERN ARCHITECTURAL ASSOCIATION.—On the 24th ult. the members of the Northern Architectural Association Students' Sketching Club held their annual exhibition of drawings in the Assembly Rooms, Barras Bridge, Newcastle. The exhibits included drawings submitted in competition for prizes offered by the Royal Institute of British Architects, and included the "Soane Medallion," the "Pugin," and the "Owen Jones" Studentships, the "Institute silver medal," and the "Association silver medal." Mr. C. S. Errington was awarded the first prize for sketches, and Mr. Tweedy secured the first prize for measured drawings. After the exhibits had been inspected, a "social" took place, Mr. J. H. Morton, F.R.I.B.A., presiding.

GLASGOW ARCHITECTURAL ASSOCIATION.—A meeting of the Glasgow Architectural Association was held in the rooms of the Association on the 24th ult., when Mr. John James Burnet, A.R.I.B.A., delivered a lecture, the subject being "The Relation of the Architect to the Craftsman." After briefly referring to the question of the training of architects and the discussion as to whether architecture was a profession or an art, the lecturer discussed the various points between architect and craftsman. In this connexion it was noted that there were two classes of contractors, the one class who were craftsmen, and the other who merely employed craftsmen, and who, in the opinion of the lecturer, were on the decrease. The system of open tendering, while having its drawbacks, was not entirely an evil, the lecturer demurring to the reflection often passed on architects and clients that really good work by this means often found to be underpaid. In conclusion, the question of machinery was touched upon, a general knowledge of which, so far as concerned the building trades, was considered by the lecturer as of importance to the architect. A discussion followed, and at the close a hearty vote of thanks was awarded the lecturer.

Books.

The Standard Electrical Dictionary. By T. O'CONNOR SLOANE, A.M., E.M., Ph.D. London: Crosby Lockwood & Son. 1893.

It is unusual to find an index to a dictionary, the alphabetical order generally answering that purpose; but in the book before us Dr. Sloane has thought fit to add one, in order to avoid cross references. By this means, and by in every way studying conciseness, he has managed to write what is really an encyclopedia of electrical science in the compass of a dictionary. The information given is sound, and clear so far as space will permit. Had the author seen fit to omit definitions of things which have really little to do with electricity, such as the phonograph, and matters which belong to science generally, as "co-ordinates," or "the conservation of energy," he might, perhaps, have utilised his space to even better advantage; but the sciences are so closely related one to another, that it is difficult to lay down with precision the limits of any one science. Since Dr. Sloane is an American, though the book is printed in England, it would be unreasonable to quarrel with him for American spelling, however irritating it may be to English eyes. The book is well printed, well illustrated, and well up to date, and can be confidently recommended to those who like to have their science in alphabetical order.

Practical Electric-Light Fitting. By F. C. ALLSOP. London: Whittaker & Co. 1892.

MR. ALLSOP has done good service in writing this excellent practical treatise, excellent alike in matter, printing, illustrations, and arrangement. The author's aim is to be useful to the fitter, and afford information and practical hints to the householder who uses the electric light; not to write a scientific work or a text-book for students. Nevertheless he has found it impossible to altogether exclude such matters, and, where he has touched them, he is at once clear, and, save for one slip on page 7, accurate. In the second chapter the merits of the various systems of distribution are adequately discussed, and

the following chapters give detailed descriptions of switches, cut-outs, wall-plugs, and such matters pertaining to a house installation. From this the author passes to the consideration of cables, joists, and methods of running the wires, and the arrangement of circuits. There are two illustrations of systems of house wiring, but in neither of them has the author cared to observe his own rule of "leads low, returns raised," nor, which is much more important, has he taken care that all the switches shall be on the same side, a matter which will become essential if the earthing of one wire ever comes in to general use, and is in any case a most desirable arrangement. After a short chapter on meters, which is, perhaps, hardly up to the high standard of the rest of the work, the rules of the Phoenix Fire Office are quoted in full, and the book concludes with a chapter on private installations, full of compressed information respecting steam engines, turbines, dynamos, and accumulators. We are glad to see that Mr. Allsop has a healthy contempt for primary battery installations, which he mentions only to condemn. We learn from the preface that "portions here and there of the book have already appeared as a series of articles in the *English Mechanic*." We do not know, therefore, exactly when it was written, but we hardly think that Mr. Allsop would, in 1892, have recommended the switch as "the most convenient place for branch cut-outs." It is well known that the British workman has discarded adverbs, substituting a certain adjective used adverbially for them all, but it is hardly necessary that authors who write for him should do likewise; and such expressions as "arranged very similar to"; "just grip the base sufficient to"; "runs much smoother and quieter"; "jar on a sensitive ear. It is odd, too, to read of a magnetic cut-out "fusing"; nor can we agree that candle-lamps "can only be detected (*sic*) from wax candles by the purity and steadiness of the light." We might point out other lapses of this kind, but the reader who is nice on such points will easily discover them for himself; and it seems ungracious to pick out all the blemishes in so useful a volume. It is not exactly a book to be read through, but as a work of reference it is invaluable.

Domestic Electric Lighting, treated from the Consumer's point of view. By ED. C. DE SEGUNDO, Assoc.-M.Inst.C.E. London: H. Alabaster, Gatehouse, & Co. 1892.

WHEN Dr. Oliver Lodge last August proposed to call a Board of Trade Unit a kilowatt, he defended the proposal on the ground that already the kilowatt per hour was often spoken of in electrical workshops. Mr. Swinburne, in replying, wrote that "the watt is never used by engineers to denote energy." If Mr. Swinburne is right, then Mr. de Segundo, though an A.-M.I.C.E., is not an engineer, for in the work before us, p. 52, we find, "the watt is the unit of energy, or of work done." It is true that on the same page we also find, "thus for commercial purposes, electricity is measured in watts, and 1,000 watts for one hour, or 1,000 watt-hours, is termed a Board of Trade Unit, which is sold now by the public supply companies at prices varying from 6d. to 9d." But this only proves the futility of any attempt to conciliate the inaccurate. Does Dr. Lodge suppose that if his suggestion these statements made correct, Mr. de Segundo and his like would have ceased to talk of watt-hours, or to call electric energy electricity?

It may be said that it is hardly worth while to point out scientific errors in a book professedly popular and practical, but Mr. de Segundo rather provokes such criticisms by himself criticising the perfectly correct statement that "mechanical energy is transformed into electric energy" as "not scientifically accurate;" adding, on the next page, the novel law that, "by no means can the sum total of available electrical energy be increased or diminished." We wonder what Mr. de Segundo supposes becomes of the electrical energy used in his glow-lamps.

It must not, however, be inferred, because Mr. de Segundo is ignorant of the science in which he professes to instruct his readers, that the latter will find the book altogether useless. The author seems to have had some experience of house-wiring, and gives sound advice as to many details; thus he is justly severe on the senseless practice of burying electric leads in the walls. His summing up on this question is worth quoting, if only as an example of his style:—"There can be no advantage in concealing wires, however great, that is not more than counterbalanced by the risks of future trouble inseparable with such a

procedure." The tables on pp. 110 and 111 will furnish a rough guide as to cost to anyone contemplating an installation of the light in his house, and the meaning of insulation resistance is made clear by the happy analogy of water conveyed in spongy iron pipes.

The advantages of low tension are, perhaps, too strongly insisted on, and it seems absurd to say that a severe shock would be received at 50 or 100 volts.

A whole chapter is devoted to primary batteries, with especial mention of the Weymerschell, which is recommended for country installation using one or two horse-power, though, on another page, fifteen lights or under is given as the limit at which these batteries are economical, and a Davy motor is suggested for installations of thirty or forty 8-candle-power lamps.

On the whole, there is enough practical information in these hundred odd pages to make it worth a shilling to the consumer to whom it is addressed; especially if he takes the advice contained in the first chapter—to take no step without the advice of a competent consulting engineer.

Concise and Practical Advice to Engineers, Architects, Surveyors, Contractors, and Employers. By A. A. HUDSON, Barrister. London: Waterlow & Sons.

THIS is a readable little pamphlet of rather over fifty pages, addressed in the form of quasi-letters (if the expression may be used), to the several classes of persons engaged in building operations. It is really nothing more than the pith of the author's great work—great rather in size than importance—on the "Law of Building and Engineering Contracts." Indeed, the publication of this little handbook makes one suspect that the 1,000 pages of the author's previous work have been found too many for the ordinary practitioner. The work gives an excellent summary of the general relations as established by law of the several persons interested in building contracts. A student, whether of the law or of architecture, would get a useful bird's-eye view from this *brochure*, and would be able to grapple with details with much greater ease if he had this summary in his head.

Induction Coils. A Practical Manual for Amateur Coil-makers. By G. E. BONNEY. London: Whittaker & Co. 1892.

SOME twenty years back the late Professor Fleeming Jenkin, in the preface to his work on "Electricity and Magnetism," contrasted the "Electricity of the School" with the "far more scientific" electricity of the testing office. On the principle of the survival of the fittest, the latter, enlarged and made more systematic, has now become the electricity of the schools; but in a certain class of scientific works the phraseology of the old text books still survives, having absorbed indeed, but hardly assimilated, some of the ideas of the latter science, and in the odd jargon that results the book before us is written.

If anyone wishes to make an induction coil, and to avail himself of the experience of former makers, copying their excellencies and avoiding the mistakes that they at first fell into, he could hardly take a better guide than Mr. Bonney. If he wishes to understand what he is doing in the hope that he may design a coil superior to those at present existing he could hardly take a worse guide. Mr. Swinburne's 130 volt transformer, for instance, which was last year alluded to in these columns, is in effect an induction coil, and as a piece of electrical engineering far superior to any coil described by Mr. Bonney, though it will not, like some of them, give 2-ft. sparks. Such a transformer could not possibly have been designed by anyone whose notions on the subject were derived from a book of this class.

Mr. Bonney's object is, however, to tell the amateur how to make a coil, and this object he attains, leaving nothing, however obvious, to the common-sense of the coil-maker. Thus he gravely warns him that if an insulated wire has been broken and knotted together the knob must be cut out and a joint made. He tells him too, quite rightly, to untwist any kink in the wire, though the reason he gives is rather an odd one, viz., that a kink, by hardening the copper, adds useless resistance to the coil.

One specimen of the "science" of the book must suffice:—"If, therefore, we can find the voltage of the current flowing through the primary wire of a coil, and the number of turns made by the secondary wire, then multiply the turns of wire by the voltage or E. M. F. of the current, we shall get as a total the E. M. F. of the current at the terminals of the secondary." Were this

true we should increase instead of diminish the E. M. F. of the secondary by winding the primary with a wire of a higher resistance and of the same number of turns, the battery remaining the same. The chapter on batteries contains many useful practical hints, and, indeed, throughout the book whenever Mr. Bonney tells his readers what to do he is generally right, and so justifies his title of "A Practical Manual." But he should never give his reasons, for they are almost sure to be wrong.

Alden's Guide to Oxford. Oxford: Published by A. Shepherd.

THIS is a small sixpenny visitor's guide, concise and very fully illustrated. Some of the blocks are old friends and bear traces of age. They are no doubt sufficient for the purpose of identifying the buildings, but we should like to see an improvement in guide book illustrations of this kind.

The Law relating to Building Societies. By E. A. WURTZBURG, Barrister-at-Law. Second Edition. London: Stevens & Sons, Limited. 1892.

THIS is the second edition of a legal work which has attained a reputation as a sound legal treatise. It is rather a book for the lawyer than for the layman, who desires something rather less elaborate. But every solicitor to a building society will find it indispensable to him, and any layman interested in the subject will also do well to consult Appendix E, which contains a form of rules for a permanent building society. It is stated that a good feature of these rules is that very wide powers are given to the directors. In view of recent revelations, it may be doubted whether this latitude is so very desirable.

Tables of Charges on Merchandise by Railway. London: McCorquodale & Co.

STRANGELY enough, one effect of the revision of railway rates (the main object of which was to simplify the charging powers of the companies) has been to render a ready-reckoner more necessary than formerly. The old rates per ton were almost invariably multiples of 10d., i.e., 4d. per cwt.—so that most calculations could be performed mentally. In fixing the revised rates, however, this principle has been entirely ignored, the exact amount chargeable being taken instead of the nearest multiple of 10d., entailing comparatively elaborate calculations. The tables published by Messrs. McCorquodale show at a glance the charge for any weight at all rates,—from 1d. to 3s. per ton,—and will be almost indispensable to a railway invoicing clerk, and fully worth the cost (3s. 6d.) to anyone who has much to do with checking railway accounts. Attention is drawn to the clause permitting the companies to charge fractions of a quarter of a ton as a quarter of a ton in consignments of five tons or over. They succeeded in getting this unreasonable regulation inserted in their Acts in the face of considerable opposition, and at once put it into force; but we understand they have decided to abandon it. Another regulation quoted is to the effect that consignments not exceeding 3 cwt. are charged in accordance with the classification scale. The publishers might just as well have included this scale, which would only have taken up another half a dozen pages.

The Cathedral Churches of England and Wales. By W. J. LOFTIE. London: E. Stanford. 1892.

ACCORDING to the preface, this little book "has been founded upon that of the late Mr. Mackenzie Walcott with the same name." Much has necessarily been re-written and brought up to date, and ground plans of most of the cathedrals, of somewhat varying merit, have been added. There is no plan of Bristol,—an interesting one in many respects,—and the excellent plans of the surroundings given of Norwich, Durham, and Canterbury should have included Wells, which is one of our most valuable examples of a secular church with its buildings in an unusually complete state. We notice some inaccuracies in the book which it would be well to alter in future editions. At Winchester we do not remember an effigy in Bishop Gardiner's chantry (p. 69), and the windows in the nave clerestory at Bangor are not triplets but three-light perpendicular windows. The interesting glass at Oxford representing the Martyrdom of Beckett is in the south transept chapel, not in the north. No mention is made of the beautiful fragments of S. Frideswide's Shrine, now set up in the Lady Chapel, and the description of the new glass by Mr. Burne-Jones is in-

accurate as to its position. The organ is at the west end, not in the south transept. A good deal of adverse criticism on the restoration work of the late Sir Gilbert Scott might have been left out with advantage. A book of this kind should deal with facts only. It will be found a handy little volume for the visitor to our cathedrals, but it needs some revision.

Correspondence.

To the Editor of THE BUILDER.

CONCRETE FLOORS.

SIR,—It would give great pleasure to your readers to see in your last issue a letter from their old friend, Mr. T. Potter, on fireproof floors, giving us again his valuable advice and experience, "up to date" we may say; as it appears from his letter he is now in favour of a combined hollow tube and concrete floor, which I do not remember him advocating before. That he is on right lines is evident from the number of "patents" taken out lately for "fire-resisting" (an excellent name) floors, constructed with some combination of earthenware tubes and concrete.

Since writing my former letter, I have inspected one of "Ferguson's Fireproof Floors," which is on this principle, viz., two fire-clay tubes jointed in the centre fixed between rolled-iron joists with the hollow space running parallel with the joists, and thus continuous wall to wall. This, viewed in the light of Mr. Potter's letter, seems to be a step in the right direction, but I have had no experience of the floor.

Undoubtedly concrete floors must be specially adapted to individual buildings, and what is suited for one is not for another. The floors I had in my mind when writing were solid floors, and it is an open question whether they are not the simplest in most circumstances. They were executed two years ago in a small country house, where speed was an important consideration. Ordinary centring was used, but hung from the rolled-iron joists carrying the floor, so as to allow work to proceed in the lower rooms. The ground ends to the bays were roughly formed on the centres. The concrete was very carefully mixed inside the building; the aggregate consisted of six parts of tiles and brick broken rather finer than usual, and one part of Robinson's cement, the minimum amount of water being used. The boys were about 6 ft. 6 in. span, with a rise of 6 in., a thickness of 5 in. at the crown, and 11 in. at the haunches. The concrete was carefully deposited and rammed, the top was then levelled up with a finer mixture of three parts of strong sand and one of Robinson's Cement, and finished off with a layer of 1 of sand and 1 of cement. These last two layers were laid on the same day, about a week after the rough concrete was finished and were together about 21 in. thick and formed the foundation on which kemptulion was glued down, no boards being used. The underside of the concrete was finished in pure Robinson's cement, forming the permanent ceiling. This floor being formed all of one material, there is no tendency to separate in layers, and the ceiling is perfectly solid and hard. The work was executed during the winter, but the temperature was kept up by coke fires in the rooms below,—a very important consideration. The centring was all removed in twenty-four hours after the rough concrete was laid.

So much for construction. Now for cost. Mr. Potter thinks fireproof floors will always be more costly, but that the advantages are so great the extra money is well spent. I quite agree as to the advantages, the cost is being reduced every week, and it is open to question whether it is very much greater now than a wood floor of sound construction, with deafening, &c. The cost of the floor described above was 7s. 6d. per yard super, including ceiling, but exclusive of kemptulion; and in the case of a country vicarage, erected about five years ago, tenders were taken two ways, on Portland cement concrete flat floors, including 2 in. by 2 in. wood joists and boarded floor, and the other way with ordinary wood joists and deafening, and the total difference in cost was under 50s. Several of the new patent floors are said to cost 8s. to 9s. a yard super, and a first-class wood floor will cost this.

There is a growing tendency to adopt some kind of fireproof flooring, and if more information based on systematic inquiries and experiments such as suggested by Mr. Potter were available, no doubt they would soon be used universally.

J. H. MARTINDALE.
Moor Yeal, Wetheral, January 30, 1893.

ORIENTATION OF CHURCHES.

SIR,—With reference to the correspondence on the above subject, I should like to ask Mr. Spencer how he accounts for the well-known fact that St. Albans Abbey, which, according to the theory held by him should point some 22 or 23 deg. to the North of East (St. Albans day being the 17th, or, according to others, the 24th, of June), does, as a

matter of fact, point about as many degrees *South* of it, *i.e.*, it stands nearly due East-South-East?
H. E. T.

SIR.—I fear that a "scientific investigation into the Orientation of Churches" would prove but a vague and vain and fruitless inquiry; for, although many churches may have been, and probably were, orientated by the rising of the sun on certain saints' days when the foundations were set out, there must have been very many, and probably the greater number, that were set out by the rising of the sun without reference to any particular day, if we take the testimony of Durandus, who wrote upon the special point referred to.

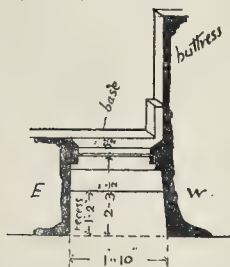
He observes that we ought to orientate our churches by the rising of the sun at the Equinoxes, and not at the Solstices as some erroneously maintain. This would preclude the possibility of any universal rule having been followed; even though many instances might be found with the saints' day orientation applying with less or greater accuracy. It would, however, still remain a doubtful question whether it were so arranged purposely or accidentally.
WILLIAM WHITE, F.S.A.

LOW SIDE WINDOWS.

SIR.—As a small contribution to the correspondence in the *Builder* on so-called "Leper" windows, I enclose a sketch plan of one at the church of Burgh-by-Sands.

It is evident from the absence of any splay on the east jamb that no view of the altar could be obtained from outside; the east jamb appears to be in its

Burgh-by-Sands.



original state, the west one may have been re-set in restoring the chancel arch over.

It might be interesting in endeavouring to account for the use of these windows to note whether the various examples have a recess below the cell inside as in the above example, also, whether these windows were originally glazed.

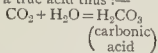
If I remember rightly the "Leper" window at Mitton, near Clitheroe, has the original shutter behind the (possibly more recent) glazing. This last example is unusual, being formed by a plain transome across the lower portion of a two-light thirteenth-century window.
E. H.

The Student's Column.

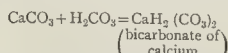
CHEMISTRY.—V.

WATER—(continued).

WATER which contains much calcium or magnesium salt in solution is termed a *hard* water. This hardness is said to be *permanent* if due to the sulphates or chlorides, and *temporary* if due to the bicarbonates of these elements. As a rule a water contains a certain amount of both bicarbonate and sulphate. All natural waters contain a certain quantity of carbon dioxide (CO_2) which has been absorbed from the atmosphere, and it is supposed that this carbon dioxide combines chemically with the water to form a true acid thus:—

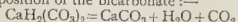


When a water containing this carbonic acid comes in contact with chalk (CaCO_3) it combines chemically with it to form bicarbonate of calcium thus:—



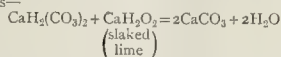
If much of this bicarbonate is present in a water it renders it hard, but the hardness caused by it is said to be temporary, because if the water is boiled the bicarbonate is decomposed, carbon dioxide is driven off, and the chalk is precipitated as a white sediment which, after a time, settles at

the bottom of the vessel in which the water is boiled. The bicarbonate which caused the hardness being thus decomposed, the water is now found to be quite soft, that is, if there were no other salts in the water to form permanent hardness. The following equation represents the decomposition of the bicarbonate:—



It is this precipitate of chalk which forms the "fur" in kettles and the scale in boilers. In some boilers, especially where sea-water is used, the scale consists partly of calcium sulphate. Instead of boiling the water, some "milk of lime" (slaked lime treated with sufficient water to make it of a thin, creamy consistency) may be added to it, and the precipitate produced allowed to stand for some hours, when it leaves the water quite clear, and settles at the bottom of the vessel containing it.

The lime (CaO) in the hydrate of lime (slaked lime) combines with the carbon dioxide in the calcium bicarbonate to form calcium carbonate, thus:—



Both the original chalk dissolved in the water and that produced by adding the slaked lime are, therefore, deposited together.

This process, which was invented by Dr. Clark, is used on a large scale at Canterbury, Caterham, and other districts for softening the water supply. Hardness due to sulphates, chlorides, &c., is said to be *permanent*, because it cannot be removed by any process that could be adopted for practical use on a large scale without rendering the water unfit for drinking. A hard water will not produce a lather with soap until a large proportion of the latter has been put into it, and if the hardness is due to sulphates a large quantity of soap is destroyed before it begins to exercise any cleansing action.

The degree of hardness in a water is determined by noting what quantity of a standard solution of soap is required to produce a permanent lather.

Soft water should not be allowed to come into contact with lead, because it dissolves small quantities of it, forming lead carbonate. Lead carbonate is an accumulative poison, that is to say, minute quantities of it when taken constantly at comparatively short intervals do not pass out through the body, but collect or accumulate in the system until a sufficient number of small doses have been taken to produce poisoning. Where rain water or very soft water is supplied, it is therefore necessary to avoid lead pipes and cisterns, and to use cement, stoneware, or slate cisterns and iron pipes.

Hard waters do not act upon lead.

POTABLE WATER.

Waters which contain much organic matter, together with a considerable amount of chlorine, ammonia, and nitrates, are, as a rule, unfit for drinking purposes. A good drinking water should not contain more than about 30 grains of total mineral matter in a gallon.

Experiments. Group 3.

QUALITATIVE EXAMINATION OF POTABLE WATER.

(1) *Colour*.—If seen in a glass tumbler it should be colourless and quite clear. It is better examined through a glass tube of not less than 2 ft. in length, when it should appear of a clear pale blue or greenish colour. Peaty matter, which may be quite harmless, sometimes occurs in a natural water and causes it to appear of a dark brown colour. A water which possesses a yellow or a greenish-yellow colour is the most suspicious.

(2) *Taste and Smell*.—Half fill a clean glass-stoppered bottle with the water, place stopper in position, and warm the water slightly. Shake bottle, and observe if any perceptible odour is emitted upon removing the stopper. Also note whether the water possesses any taste. A drinking water should be odourless and tasteless.

(3) *Lead*.—Fill a small clean tumbler or tea-cup with the water, add a few drops of hydrochloric acid, and then some solution of sulphuretted hydrogen, or pass some sulphuretted hydrogen gas through it. If the water acquires a brown tint it indicates the presence of lead.

(4) *Mineral Matter and Organic Matter*.—In a porcelain basin evaporate about a pint of the water to dryness. The residue should be quite white in appearance, and if the water is to be used for washing purposes there should not be much of it. Now heat the residue in the porcelain basin over a spirit flame or a Bunsen gas flame. If the residue darkens much in colour, it indicates the presence of organic matter. If, at the same time,

a disagreeable odour resembling that of burnt feathers is given off, the organic matter is almost certain to be of a dangerous nature.

(5) *Organic Matter*.—Another good test for the presence of organic matter is the following:—Fill a clean tumbler or tea-cup with the water, add a few drops of sulphuric acid, stir with a clean glass rod or tube, then add enough very dilute solution of potassium permanganate to impart a distinct pink colour to the water. If little or no organic matter is present in the water the pink colour will remain for a long time, but if the colour fades rapidly a considerable amount of organic matter is present.

(6) *Chlorine*.—Partly fill a tumbler with the water, add a few drops of nitric acid and a few drops of silver nitrate solution. Stir with a glass rod or tube. The water should remain clear or should only become cloudy. If a white curdy precipitate is produced, it is a suspicious indication.

Natural waters, except those close to the sea or near salt mines, seldom contain much chlorine, but urine contains a considerable quantity of it as common salt (NaCl). The presence, therefore, of much chlorine, although by no means a positive proof of contamination with sewage, is a useful indication when considered in conjunction with the ammonia and organic matter.

(7) *Ammonia*.—The presence of ammonia in a water is immediately shown by the addition of a re-agent known as "Nessler-test" which consists of an alkaline solution of potassium and mercury iodides. It may be bought ready for use at the shops of most operative chemists.

Fill a clean, tall jar or tumbler of colourless glass with the water and stand it upon a white tile or sheet of white paper. Add a few drops of Nessler-test. If only a small quantity of ammonia, such as is found in good water, is present, a pale straw colour will be produced. If a suspiciously large quantity is present, a brown colouration will be produced. A water that has recently been contaminated with sewage will be found, by the application of the above tests, to contain considerable quantities of organic matter, chlorine, and ammonia.

Tests for Chalk and Sulphate of Lime.

Small quantities of chalk, or carbonate of lime, or of sulphate of lime, do not affect its value for drinking purposes. For washing and boiler purposes, however, the less the quantity of these salts in it the greater is the value of the water. Water containing large quantities of these salts, say 100 grains per gallon, is, then, unsuitable even for drinking purposes.

8. *Chalk*.—In a glass beaker boil, say, 2 pints of the water for about half-an-hour, preventing the water from diminishing much in bulk by adding small quantities of distilled water to it from time to time. If bicarbonate of calcium was present in appreciable quantity in the water, a deposit of chalk, or, more correctly, of carbonate of lime, will settle at the bottom of the vessel when removed from the source of heat. Allow this sediment to completely settle, and then pour off the clear water into another clean glass beaker.

To the sediment in the beaker add a few drops of dilute hydrochloric acid, when, if it is a carbonate, a brisk effervescence will be caused, owing to the rapid evolution of carbon dioxide from it. In a very hard water a considerable amount of chalk is generally thrown down. Filter the water which was poured off through a filter paper, and treat the clear filtrate as follows:—

9. *Sulphate of Lime*.—Boil the clear filtrate, and, while boiling, add a few drops of hydrochloric acid, then excess of ammonia. If a flocculent brown precipitate is produced at this stage, it indicates the presence of iron. Finally, to the solution add some oxalate of ammonia solution. If much sulphate of lime is present, a heavy white precipitate of oxalate of lime will be formed. Boil another pint of the water in a glass beaker or flask, add a few drops of hydrochloric acid, and then some solution of barium chloride. If sulphate of lime is present in the water, a white precipitate of barium sulphate will be produced.

Storage and Filtration of Water.

Whenever it is necessary to store drinking water, it should be received in a clean cistern, which should be situated in some place where it can be conveniently and frequently inspected. Nor is it sufficient that the cistern at starting is clean, for unless it is frequently subjected to a thorough cleansing some of the unwholesome matter which is always liable to find its way into a cistern is sure to accumulate and putrefy. A cistern containing drinking water should not be placed in a dwelling-room, in a damp unventilated cellar, or immediately over a water-closet, nor should it be

connected in any way with any drain, sewer, or water-closet. For the filtration of water on a large scale, clean, sharp gravel or sand is generally employed. When properly used it forms a cheap and efficient material for removing all suspended matter, and has in addition a slight purifying action upon the organic matter in the water. As a rule, the water which is supplied to large towns is first run into large reservoirs or "settling tanks," where the heaviest portions of the suspended matter fall to the bottom of the tanks by gravitation. The water thus partially clarified is then passed on to the filter beds, which are usually composed of layers of sand and gravel, the total depth of a bed being usually between 6ft. and 8 ft.

For filtration on a small scale, charcoal is usually employed, and of all the kinds of charcoal, animal charcoal ranks the highest as an efficient water purifier, that is, of course, when the animal charcoal is properly prepared.

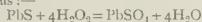
Animal charcoal not only purifies water by removing suspended matter, but the oxygen in its pores also acts chemically upon the dissolved organic bodies. The oxygen renders them harmless by oxidising them, and thus removes one of the most dangerous impurities of a water.

In some filters a mixture of animal charcoal and sand is used, and proves to be an efficient water purifier. Of late years spongy iron has been shown to be one of the most efficient purifying materials discovered. It has been much recommended by scientific men, but does not appear to have yet come into very general use.

When kept clean, domestic filters undoubtedly exercise a beneficial influence upon impure water, and may be the cause of preventing the spread of typhoid fever or cholera in a house, to say nothing of minor diseases; but, at the same time, it must not be forgotten that a dirty filter is worse than useless, and may, in fact, form a breeding-house for the very germs it is necessary should be destroyed. It should form the duty of one of the members of every household to remove the filtering medium from the domestic filter once a week, or at any rate once a fortnight, and, if it is to be again used, to boil it well in water, wash it, and, finally, bake it in the oven. If this was done, we should hear very little about inefficient filters.

Hydroxyl H₂O₂, or Hydrogen peroxide.

This oxide of hydrogen is a colourless, syrupy liquid which decomposes very easily into oxygen and water. It is a powerful oxidising substance, and is much used for cleaning pictures the paint of which has become darkened by sulphur compounds from coal and gas. These sulphur compounds convert white lead paint into black lead sulphide, which when acted upon by peroxide of hydrogen is oxidised to sulphate of lead, which is white, thus—



and, therefore, the white paint in the picture is restored to its original colour.

Peroxide of hydrogen is also a powerful bleaching agent; the pure material will completely bleach hair, while a dilute solution of it turns the hair yellow.

Dilute solutions of it are, consequently, much used in the preparation of "golden" hair dyes.

Being a powerful oxidising substance, hydrogen peroxide necessarily forms a disinfectant, and is found to be very effective although somewhat expensive. It is said to be the most important ingredient in "Sanitas."

In many of its properties, hydrogen peroxide resembles ozone, but while the former is soluble in water, ozone is almost insoluble in it. There are several methods of preparing hydroxyl, one of which is that of passing a current of carbon dioxide gas through water containing lithium dioxide in suspension.

Insoluble barium carbonate is formed and settles as a white sediment, while the hydrogen peroxide, which is also formed, being soluble, remains in the water as a clear, colourless solution. The greater part of the water in this solution may be removed by evaporation under the receiver of an air-pump.



GENERAL BUILDING NEWS.

THE SHIPPING EXCHANGE, BILLITER-STREET.—This building was opened on Monday last by the Lord Mayor. It has been formed out of Nos. 19, 20, and 21, Billiter-street, E.C. These buildings were erected about twenty-five years ago, and have a stone front, the portion taken by the Shipping Exchange being the whole of the ground floor and part of the first floor; and in order to

obtain a large room on the ground floor a thick wall with fireplaces has been removed, the upper portion of the wall and fireplaces being supported on steel girders and iron columns. The removal of this wall has given a fine room about 90 ft. long, 34 ft. wide, and 14 ft. high. The central entrance to the building has been retained, and a new lobby has been formed, enclosed in mahogany, for the members to pass in and out. The ground floor room, which is intended to be used for the Exchange proper, is warmed with two of Captain Galton's patent stoves, with descending flues made by Messrs. Yates, Haywood, & Co., and new water-closets, lavatories, and urinals have been fitted up at one end of the room by Messrs. Doulton & Co. From the ground floor to the first floor a wide staircase has been constructed, having teak newels, walnut strings, balusters, and rails, and the treads are covered with indurubber. The first floor room is intended to be used principally as a luncheon and reading room, and has a bar fitted up by Mr. Heath, of Rahere-street, Goswell-road, E.C. The whole has been lighted by electricity, and provision has been made for gas should the electric light fail at any time. The whole of the rooms have been re-decorated. The general manager, Mr. J. L. Pearson, R.A., the founder of the tower, has been asked by Messrs. Cubitt & Co. of Gray's Inn-road, W.C., under the personal supervision of the architect, Mr. Alex. R. Stenning, F.R.I.B.A., of Cannon-street. Messrs. Moreland & Son supplied the steel girders and iron columns, and the electric light is by Messrs. Pritchett & Co. of Soho-square.

RESTORATION WORKS, BRISTOL CATHEDRAL.—According to the Bristol papers, the work of restoring the tower of Bristol Cathedral, and the equally dilapidated Lady chapel, built in the first half of the thirteenth century, is about to be commenced. The contract, which has been secured by Messrs. W. H. Cowlin & Son, is for 6,500*l.*, and it will be carried out under the supervision of Mr. J. L. Pearson, R.A. The foundations of the tower received attention some years ago, but the tower itself, built in the fifteenth century, has its external stonework in such a crumbling condition that it is considered necessary to take out stone after stone, and substitute new stone, and as this will have to be done from base to summit, the work will probably occupy twelve months. The parapets of the tower, taken down many years ago,—will be revived as far as possible in exactly the same design. The Lady chapel, which has been out of use some years, will have its whitewashed and damaged stonework replaced by new stone, and all the dilapidations will be made good, the work occupying probably four or five months.

SWIMMING BATH, &c., TORQUAY.—At a special meeting of the Torquay Town Council, held on Monday last, it was unanimously resolved that the design submitted by the Borough Engineer (Mr. H. A. Garrett) for the erection of a tepid swimming bath adjoining the present private baths and assembly room, at an estimated cost not exceeding 4,000*l.*, be approved, and the necessary approval be made to the Local Government Board for powers to borrow the necessary amount. The bath will be 90 ft. long by 36 ft. wide, and the sea water required for the purpose will be obtained from the sea adjoining the Ladies' Bathing Cove. It is also proposed that the boiler power for pumping purposes will be of sufficient power to generate electricity for lighting the new and existing building throughout by the electric light.—At the same meeting it was also resolved to apply for powers to borrow the sum of 5,000*l.* for the purpose of the widening and improvement of the Fish and Coal Quays, plans for which had been prepared by the Borough Engineer and approved by the Harbour Committee.

WORKS AT KIRKSTALL ABBEY.—The members of the Sub-Corporate Property Committee of the Leeds Corporation having charge of the Abbey ruins and grounds at Kirkstall visited them on the 30th ult. They were met by Mr. Micklethwaite, architect, of London, under whose instructions the work of preserving the ruins has been proceeding during the last few months. As has been previously stated, the most dangerous part of the ruins is the tower, and it was to this particular portion that Mr. Micklethwaite directed the attention of the Committee. Eventually the members passed a resolution recommending the Council to allow the erection of certain buttresses, and also the construction of an arch across the transept. These, it was said, would considerably aid to the security of the tower.

TOWER, ST. MARGARET'S CHURCH, ISLEFELD.—The tower of St. Margaret's Church, Islefeld, near Lewes, is about to be restored as a memorial, under the direction of Mr. John Rawlinson, of London, at a cost of about 650*l.*

NEW POLICE STATION, HANDSWORTH, NEAR BIRMINGHAM.—The Staffordshire County Council have decided upon erecting a police station, with court and other accommodation, in Thornhill-road, Handsworth, and have accepted the tender of Mr. Whitehouse, contractor, of Birmingham, for the same. The whole of the buildings are expected to be completed by November 30 next, under the superintendence of the architect, Mr. John P. Osborne, also of Birmingham.

PROPOSED INFECTIOUS DISEASES HOSPITALS FOR PLYMOUTH.—Mr. S. J. Smith, C.E., one of the Local Government Board Inspectors, and Mr. T. W. Thompson, of the Medical Department, held an

inquiry at Plymouth Guildhall, on the 28th ult., into an application by the County Borough Council for leave to borrow 32,000*l.* for the purpose of providing hospitals for infectious diseases. The Town Clerk (Mr. J. H. Ellis), alluding to the proposed hospital in Mount Gould-road, said they did very well agreed as to the site. The ground sloped towards the south, and would be connected with the new sewerage scheme, so that it would be efficiently drained. It would also have the Borough water supply. Mr. Bellamy, Borough Surveyor, produced plans of the proposed hospital. The cost of the building would be 30,000*l.*

PROPOSED NEW ART SCHOOL AT THE YORKSHIRE COLLEGE.—We understand that plans have been prepared by Messrs. Waterhouse & Son, architects, of London, for a new art school in connexion with the Yorkshire College. The site of the proposed school, which is quite independent of the buildings now in course of erection in College-road, will be a plot of ground on the north side of the block of the institution used for textile purposes. The building, which will include a general art room, "life" class-room, and a private studio, will furnish ample accommodation for all the classes.—*Yorkshire Weekly Post.*

CHURCH INSTITUTE, WOLVERHAMPTON.—On the 28th ult. the Bishop of Lichfield dedicated the new Church Institute connected with St. Peter's Collegiate Church, Wolverhampton. The buildings consist of a two-story main block, with a side wing formed into a tower. The main block contains on the ground floor a large guild room, a library, and two class-rooms, over which is a large hall, 67 ft. 6 in. by 34 ft. 6 in., approached at either end by a wide easy staircase. In the side wing is the principal entrance and staircase, and on the first floor are three rooms for social gatherings, &c., and store rooms. The buildings are built in red bricks with Codrall stone dressings, and the roof is covered with blue slates. The main front next the street is treated as a gable with a projecting oriel window. The side wing is carried up and finished with a stone parapet forming a low tower. The buildings are heated by hot-water pipes on the low pressure system. The apparatus has been supplied by Mr. Allwood, of Stourbridge. The general contract has been executed by Mr. Lovatt, of Wolverhampton, and the whole has been carried out at a cost of 2,600*l.* under the superintendence of Mr. T. H. Fleming, architect, also of Wolverhampton.

PROPOSED NEW FEVER HOSPITAL FOR LEITH.—A meeting of the sub-committee of the Leith Town Council appointed to examine plans for the proposed new fever hospital for the burgh at East Pilton met on Tuesday last, and considered plans for a fever hospital to be erected on the cottage plan, was submitted by Mr. Simpson, architect. Mr. Simpson estimated that the buildings would cost about 20,000*l.* and general furnishings, &c., about 4,000*l.* more, exclusive of the cost of the site, for which upwards of 3,000*l.* have been paid. After having examined the plans, the committee approved of them, with some slight alterations.

SANITARY AND ENGINEERING NEWS.

CHESHUNT WATERWORKS.—On Thursday, January 26, a special meeting of the Cheshunt Local Board was held at the Newgate street pumping station for the purpose of witnessing the official trials of the now completed pumping machinery. The trials were conducted by Mr. Bennett on behalf of the Board, and Mr. Thom on behalf of the makers (Messrs. Yates & Thom, Canal Foundry, Blackburn). The contract was for each engine and pump to be capable of raising 80 cubic ft. (or 500 gallons) per minute, through a rising main to 50 in. in diameter, into a reservoir a distance of 850 yards, the lift being 425 ft., with not more than thirty revolutions per minute. The first engine was started at a pressure of 70 lb.; the trials were brought to a close at 12.40. The speed was never increased beyond twenty-four revolutions, the actual quantity of water raised being 578 gallons per minute for each engine, or at the rate of 1,039,680 gallons per twenty-four hours when running full speed, or one-third in excess of the specified duty. On the conclusion of the trials Mr. Paul congratulated Mr. Bennett and Mr. Thom on the most excellent result and the satisfactory completion of the works. The whole of the works now completed embrace deep well engines, pumping-station, covered service reservoir, and about seventeen miles of water mains, and were designed by Mr. Bennett, Assoc. Mem. Inst. C.E., the expenditure being 32,000*l.*, and will eventually prove a very valuable source of revenue.

PORTISHEAD DRAINAGE.—We understand that Mr. T. Moss Flower, of Bristol, has been instructed to devise a scheme of drainage for the whole Local Board District of Portishead, and to prepare plans, specifications, and estimates.

GLASGOW WATERWORKS EXTENSION.—The tender of Messrs. Morrison & Mason, Limited, to construct the Blackrigg section of the new aqueduct from Loch Katrine to Glasgow for 86,700*l.* was accepted by the Glasgow Corporation on Monday.

STAINED GLASS AND DECORATION.

WINDOW, ST. MARY'S CHURCH, LITTLETON-ON-SEVERN.—The parish church of St. Mary, Littleton-on-Severn, has just received the addition of a stained glass east window in the chancel, erected to the memory of the late Mr. Robert Cann Lippincott, of Over Court. The work has been carried out by Messrs. Joseph Bell & Sons, of Bristol.

WINDOW, LICHFIELD CATHEDRAL.—On the 25th ult. the dedication took place of the new window which has been placed in the north transept of Lichfield Cathedral. The work has been carried out by Messrs. Clayton & Bell, of London, and has occupied upwards of a year. It is a five-lancet window representing the Tree of Jesse, and the long line of kings commencing with David and concluding with Christ.

FOREIGN AND COLONIAL.

FRANCE.—The demolition of the *Galerie des Machines* in the Champ de Mars is seriously talked of, owing to the cost of keeping it up and the impossibility of utilising it. The Minister of Fine Arts has commissioned M. Daumet to go to Lille, with M. Roger Marx, Inspector of Fine Arts, to inquire into the state of the collections in the museum of that town. The reason is a report that the bad conditions of heating and ventilation in the galleries have had a very pernicious effect on their contents. M. Daumet reports that the case has been much exaggerated, and that proper precautions were being taken for the preservation of the objects.

The "Union Artistique" of Toulouse is to open on March 15 its ninth annual exhibition of painting and sculpture. The town of Nice is about to open a competition for all French artists for a design for a monument in commemoration of the first union of the province of Nice with France in 1793. The monument is to be erected in the new public garden opposite the Municipal Casino. A sum of 72,000 francs has been voted for the cost of the monument, which is to be completed *in situ* on April 1, 1894. The Government has decreed the "public utility" of a railway on the Crématoire system between Monaco and Turbia. The railway, which will start from the plateau de Carnier, will follow the course of the valley of Sainte Devote to arrive at the platform found on the level of the commune of Turbia. The operation of deepening the Vauban dock in the harbour of Havre, is to be commenced shortly. A public competition has been opened at Marseilles for the construction of new docks and warehouses. An iron bridge for foot passengers is to be formed over the Saone, at Lyons. A new canal and basin are to be opened shortly in the port of Tunis. The recent falls of snow and hail have caused serious damage to the new reservoir for the waters of the Arve at St. Cloud.

MELBOURNE.—The *Building and Engineering Journal*, of Melbourne, gives an account of the extensive sewerage works now in course of construction from the rising main at Brooklyn to the Sewage Farm at Werribee by the Melbourne Metropolitan Board of Works. The total length of the outfall sewer is about sixteen miles, from the rising main to the sewage farm, or 1,280 chains. Part of this is wholly covered, being built of 9 in. concrete lined with brick and concrete, and is 11 ft. in diameter, the remaining parts being of open concrete, but it is contemplated to eventually cover the whole. At present the discharging capacity of the sewer is equal to 80,000 gallons per day, but when the whole is covered this capacity will be about double. Up to the present 121 chains of open concrete have been completed, 68 of covered concrete, 58 of covered brick, and 46 of open brickwork, and the whole cost is upwards of 230,000. Mr. Thwaites is the Chief Engineer.

MISCELLANEOUS.

ARCHITECTURAL ASSOCIATION: DISCUSSION SECTION.—The sixth meeting of the session was held at the Rooms of the Association on Wednesday evening, the 1st inst. A paper was read by Mr. J. C. Stockdale on "Roof Coverings," with special reference to slates and tiles. The subject was treated in a comprehensive manner, and was well illustrated with diagrams and samples of material contributed for the purpose by Messrs. Asher & Green. In the discussion which followed, and which was opened by Mr. W. Bonner Hopkins, Mr. Lacy Ridge, the special Visitor, gave some interesting details from his own experience, and Mr. Ernest Matthews added some useful practical hints.

FURNITURE AND ALLIED TRADES EXHIBITION will be held in the Royal Agricultural Hall, Islington, during the week from April 6 to April 13. The Exhibition will include timber and wood-working machinery.

DEPUTATION OF PLUMBERS FROM LINCOLN. A deputation, introduced by Mr. W. Watkins, F.R.I.B.A. (ex-Mayor of Lincoln), composed of about thirty master and operative plumbers from Lincoln, Grantham, and Lincolnshire, visited London last week to inspect the Museum of Sanitary Appliances and Testing Department in connexion therewith,

established by the Horsey Local Board at Highgate. The deputation afterwards waited on the Lord Mayor, at the Mansion House, who said he was pleased to learn that the Corporation of Lincoln were doing their utmost to promote sanitary science. Referring to the visit of the deputation earlier in the day to the Highgate Museum and Testing Department, which he had the pleasure of opening a short time ago, he said it was undoubtedly a step in the right direction for a public body like the Horsey Local Board to found, as it were, a museum for the technical study of plumbing work, and the presence of that deputation from Lincolnshire was an evidence that the intelligent and public-spirited action of the Board was already bearing fruit.

DOULTON'S SELF-ADJUSTING PIPE-JOINT.—The patentees have made an important improvement in this joint, the drawback to which in its original form was the small amount of contact between the two surfaces as shown in the accompanying section (Fig. 1). The joint in this form was made by the contact of two bands of composition, cast—one on the spigot and the other in the socket of the pipes, producing a mechanical fit, no cement being used. The advantage claimed is that the risk from faulty workmanship is reduced to a minimum, as the two curved surfaces allow the pipes to dip a little without deranging the joint. We are rather disposed to think that this is a wrong principle; that necessity of proper laying should be considered first, and that so small a part of contact as is shown in this section is not desirable and does not allow sufficient margin for possible decay or abrasion of the composition. We presume that the patentees have recognised that there is some ground for this objection, as the improvement which they now announce, shown in the other section, (Fig. 2) consists in the interposition of a seating-ring of compressible material between the two surfaces, the extent of the contact being thus increased, without altering the simplicity of the original form of the joint. In this form the joint appears to us much more reliable. The patentees state that "the question of the material of the seating-ring has been the subject of careful consideration, and an eminent chemical authority has been engaged on a prolonged series of experiments in order to thoroughly test its durability, and that the result has been to show that it is unaffected by both alkaline and acid solutions of a strength far in excess of anything to be met with in sewage."

IRON-LATHING SHEETS.—Messrs. Cunliffe, Wright, & Company have made some improvements in their machinery for producing these sheets, which are not comparable to the ordinary undulated form, but bent into a section like a series of dovetails, thus retaining a grip on any plastic material which has been applied to them when in a soft state.

AN ARCHEOLOGIST'S UNEXPECTED WEALTH.—Mr. E. Ingress Bell, in a letter to the *Spectator* for January 28, writes:—"I have heard it said by a friend of the late Albert Way, the well-known archaeologist, that he came by a fortune in this wise. Crossing Pall Mall, he came against an old gentleman, and discomfited him. After mutual apologies and the interchange of civilities, cards were exchanged, and on each card was imprinted 'Mr. Albert Way.' The older gentleman dying, had no natural heir, and left his fortune to the other Albert Way."

GRANITE AND RAILWAY RATES.—The Leicestershire granite industry is likely to suffer very materially unless the railway rates on road metal are considerably modified. On Tuesday last (31st ult.) important action was taken by the Holland (Lincolnshire) County Council at Spalding relative to the increased rates. The Council require the carriage of 17,000 tons of granite, but owing to the present exorbitant rates it was found that it would be cheaper to procure the supply of road metal, &c., from Belgium by water, rather than from Leicestershire by rail. It was decided to refuse to pay the new rate, and in the event of the companies declining to revert to the old charges the Council will purchase the Belgian granite. Taken by itself, this, of course, is not a matter of much moment, but we fear that the example set by the Holland County Council will soon be followed by other bodies, to the general detriment of the Leicestershire granite trade. It is said that the loss of the traffic into Lincolnshire will be a serious matter for the railway companies concerned; if that is so, no doubt they will see their way to meet the demands of the Council, and thus keep the trade as much possible in this country—it is needed. We may remark that if the Council should ultimately be compelled to have the Belgian granite, they would probably get the Queenstown stone, for no other rock of the nature of granite is quarried to any extent for export purposes in Belgium, so far as we are aware. It is a quartz diorite, having a porphyritic structure the crystals being small but prominent; it is very hard and compact, and in every way forms excellent

road metal and paving setts,—a formidable rival to the English stone.

THE PROPOSED MUSEUM FOR BUCKINGHAMSHIRE.—The sub-committee charged with the formation of a county museum for Buckinghamshire have issued a statement about the scheme. A site was selected in Aylesbury. It was formerly occupied by a brewery, and stands detached. The price was 555*l.* A building erected on the spot could be seen from the market-place. Mr. Robert Raikes prepared plans, and he estimated the cost of the three sections at 2,000*l.*, 1,400*l.*, and 1,800*l.* respectively. It would also be necessary to provide for furniture, heating, salary of curator, wages of caretaker, &c. The arrangements were approved by the provisional committee. Afterwards the sub-committee discovered that a far more eligible site than the one proposed was to be sold at a very moderate price. This is the historic property known as the Prebendal. It consists of a large, substantially-built house,

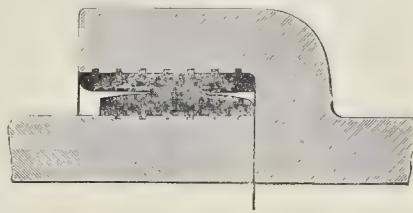


Fig. 1.

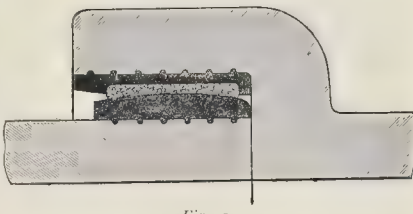


Fig. 2.

and about four acres of pleasure grounds, with fine old timber, which would be a most important addition to the museum, opening up all kinds of possibilities, and in any case they could not fail to be an immense boon to all residents and visitors. The price asked for this property is 5,000*l.* This is upwards of 900*l.* less than would be required to complete the other plan, and in the end means four acres in the best position situation, instead of a circumscribed area in a less perfect situation, of 90 ft. by 30. A portion of the outlay could be recouped by selling or letting certain outlying plots for building and by letting some of the outbuildings. The offer extends only for six months, so, to prevent the opportunity being lost, it is imperative that whatever is done in the matter be done at once.—*Herts Advertiser.*

SHERBROOK NATURAL HISTORY AND ARCHEOLOGICAL SOCIETY.—The annual general meeting of this society was held at Shrewsbury on the 26th ult. Mr. A. P. Heywood Lonsdale being in the chair. The annual report, which was read by the Secretary (Mr. F. Goynne), stated that the Council had during the year devoted attention to the preservation of the interesting discoveries which had been made in the crypt of old St. Chad's Church, Shrewsbury, and Lord Barnard had shown his interest in the work of the society by offering to give every facility for making further researches on the site of the old Roman city of Uriconium, near Shrewsbury. This offer was at present the subject of communication between the Council and the Society of Antiquaries of London. The financial condition of the society was reported to be unsatisfactory, and that for this reason and others it was not possible at present to proceed with this work. The report was adopted.

LEGAL.

CASE UNDER THE METROPOLITAN BUILDING ACT:

NEGLECTING TO GIVE NOTICE.

At Woolwich Police Court on the 27th ultimo, before Mr. Marsham, the presiding magistrate, William Marrable, of 27, Park-road, Plumstead, was summoned by Mr. Thomas Batterbury, District Surveyor of Plumstead and Eltham, for not having given him notice previous to the erection of a small one story building in Brewery-road, Plumstead, as required by the Metropolitan Building Act, section 38. The defendant was fined 1*l.*, and the magistrate allowed 1*l.* 3s. costs.

Sanitary Inspectors' Association.--Dinner at the "Criterion," Piccadilly, 6 p.m.

Mason and Smith.—C. F. Bridgman, Lewes....£398 0 0
Carpenter, Plumber, Painter, and Glazier.—G.
Bean, Isfield.....252 0 0

FIELD (Sussex).—Accepted for restoration and additional work to the tower of St. Margaret's Church. Mr. John Rawlinson, architect, 65, Chancery-lane, London.

Nason and Smith.—C. F. Bridgman, Lewes... £398 0 0
 Carpenter, Plumber, Painter, and Glazier,—G.
 Beas, 146 Old...

ILLUSTRATIONS.

Design for Stained Glass.—By Mr. E. J. Chapman	Single-Page Ink-Photo.
A Portion of the East Window, Bath Abbey.—From a Drawing by Miss Emma Knight	Single-Page Ink-Photo.
Design for a Railway Station: Front Elevation.—By Mr. A. T. Bolton, A.R.I.B.A.	Single-Page Ink-Photo.
Ground Plan of Mr. A. T. Bolton's Design for a Railway Station	Single-Page Photo-Litho.
Section and Side Elevation of Mr. Bolton's Design for a Railway Station	Double-Page Ink-Photo.
New Wing to House, Broadwell, Gloucester.—Mr. E. Guy Dawber, Architect	Single-Page Photo-Litho.
Two Houses, Slough.—Mr. W. F. Cave, Architect	Single-Page Photo-Litho.

Blocks in Text.

Diagrams showing Structure of Specimens of Ancient Mortar	PAGES 104-105
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Recent Work at Orvieto Cathedral.



THE building of Orvieto Cathedral, the design of which has usually been assigned to Lorenzo Maitani of Siena, was an event which excited immense enthusiasm among the inhabitants, as we may judge not only

from the records of the time, but from the mere fact that only about seven or eight years after the laying of the foundation stone, a very short time for cathedral building in those days, the building was so far advanced that mass was said in it at a provisionally erected altar, in 1298. The peculiar arrangement of the plan perhaps bears testimony also to this eager determination to have a cathedral as quickly as possible, after the ambitious idea first dawned on the Orvietans. The cathedral was thrust in as space could be found for it at the moment, and squeezed in to fit the lines of the available site; the two transepts, one narrower than the other, taking an oblique line, the left hand transept (looking from the nave) sloping off at an angle towards the choir end of the building, and the crossing arch being carried obliquely across the end of the nave. To approach this difficulty conveniently the left hand columns of the nave arcade, in the last two or three bays, are slightly advanced so as to lead up gradually to the skew position of the crossway arch. The eagerness of the Orvietans to beautify their cathedral was shown a century and a half later, when, hearing that a certain gifted painter, known as Fra Angelico, was for three months at liberty from his work elsewhere, they promptly secured him for that period and got him to paint the ceiling of one transept with as much as could be done in the time, figures of Christ and the Prophets, leaving the rest of the work until a greater painter, Luca Signorelli, half-a-century afterwards, made the place famous for ever in the annals of painting by his pictures of the Resurrection and the Judgment. A less well-directed enthusiasm in the sixteenth century, still in the desire for what at

the moment was supposed to be artistic perfection, would have led to the recasing of the whole building with a Renaissance overlay, but fortunately this was not carried far enough to obliterate all the original work.

The succession of five small side chapels in the shape of apses along either wall of the nave is another peculiarity of the plan, especially in the way these are arranged, not centrally with each of the six bays, but so that one jamb of each apse is opposite a pier of the arcade, and the other opposite the centre of the bay. It is difficult to understand the reason for this very unarchitectural arrangement.

The building is an exceptionally pronounced example of the very Italian tendency to concentrate the chief exterior architectural display on the entrance façade of the church. At Orvieto there is really hardly any architectural treatment worth mentioning except on this façade. The rest (and the same may be said of the interior of the nave walls) is a dreary expanse of masonry in stripes of alternating light and dark colours, with windows stuck in at intervals. The façade is a *tour-de-force* of decorative treatment of a rich and most minute kind; one may notice especially the minute geometrical inlay within the hollows of the twisted columns of the doorways. But in general the effect is not of the highest stamp architecturally. It has too much the look of furniture, of a cabinet front on a great scale, the work having a framed and panelled appearance at variance with the idea of building work in the proper sense of the word. The arcade carried across half-way up the front, with its deeply recessed arches, is the best architectural feature. The rose window tracery is not well designed, the outer portion of the tracery looking as if the cusped divisions sprang out of the jamb inwards, instead of radiating outwards towards it. There is a curious eccentricity, too, in the manner in which the arches of the three great doorways are sprung, not from the large and elaborate cornice which is the crowning of the piers, and which seems to have been intended to be the impost line, but from a subsidiary small string two or three feet above it. The device

looks as if, after the main string had been worked and set, it was found the arches would not rise high enough, and the additional string course was inserted to avoid to some extent the appearance of what is really a stilt of the arches. Probably, however, it was deliberately intended, as there is a nearly similar treatment at Siena. At all events, the architectural effect is not good. The best point in the whole façade is the sculpture decoration of the great pilaster-like spaces between the doorways; not only for the interest of the work itself, but as an example of the proper placing of bas-relief sculpture of this kind, where it can be seen, instead of placing it in some position aloft where half its detail is lost.

The cathedral seems to have been in a sadly neglected state in the early part of this century, for when MM. Benois, Resanoff, and Krakau, the three Russian architects who have produced the best illustrative work on the building, first visited it in 1842, they found the interior covered with so thick a layer of dust that the frescoes and decorations could not be seen, and obtained official permission to wash it down with clean water. It would be well if all "restoration" operations were of as harmless and beneficial a nature as this.

Recently a good deal of repairing work has been done at the cathedral, especially in regard to the timber roof of the nave, which was found to be in such a decayed condition that its renewal, piece by piece, was considered a necessity.

Before further describing what has been done, we may mention that the recent examination of the building and its records, in preparation for this work, has led to a reconsideration of the theory as to who was its original designer; and that Signor Zampi, the architect in charge of the repairs, has seen reason to conclude that Arnolfo di Cambio was the first architect of the cathedral, usually associated with the name of Lorenzo Maitani only. Part of the evidence for this consists of two ancient drawings on vellum, preserved in the Museo dell'Opera, the older of which is attributed to Arnolfo di Cambio, and the design shown in the second and later one seems to be worked out from this. There are other inci-

dents in the building itself, vestiges of the commencement of an earlier building which point in the same direction, and it is known that Arnolfo di Cambio, who took a prominent part in the first work of the Florence Cathedral, was well known in Orvieto, and was actually there at the time when the scheme for the cathedral was first discussed in the town.

The cathedral, internally as well as externally, was practically completed by the commencement of the sixteenth century. The apse was decorated with fresco paintings depicting the life of the Virgin; the central window and those at the sides of the apse were adorned with stained glass, and the whole choir with fresco paintings; and in every part of the work the taste of the fifteenth century had, so to speak, left its impress on the Gothic character of the church.

When in 1527 (after the pillage of Rome) Clement VII. took refuge at Orvieto, some modifications were projected in the internal decorations; and later on, in 1537, when the Rites of Rome had become general in the churches of the vicinity of Rome, Paolo III. ordered the choir to be transferred to the apse and the crypt to be closed.

As a consequence of these innovations suggested by the introduction of the new rite, an architect of the day, Ippolito Scalza, conceived the idea, as before mentioned, of transforming the church entirely into a building in the Renaissance style. Scalza, born in 1532, at Orvieto, had studied under Michelangelo; he was eminent as a sculptor and an architect, and became director of the works of the cathedral. He developed a large scheme for the redecoration of the church on classical models; and even commenced its execution. From his existing sketches we find that it was his intention to introduce Ionic columns into the piers of the side aisles, to turn the Gothic arched windows into rectangular openings, and to decorate the chapels with marble; but on account of the cost stucco was used instead. Thus the chapels were adorned with stucco work and painted decorations from the drawings of Scalza and of Raffaello de Montelupo. The remaining part of the project was not carried out, though there are still a great many details in the cathedral which are due to Scalza, such as the splendid organ-case and various statues; and there is in the Museo dell'Opera, together with the plan for the transformation of the cathedral, a design of a campanile by Scalza himself, which is not without a certain grandeur of style.

The restoration committee went into their work with the view of remodelling the building in conformity with the older plan and destroying the modern modifications. This policy was inaugurated by Sigr. Leander Mazzocchi, secretary of the works; the treasurers, Giacomo Bracci and Sante Felici pursued it with renewed vigour, and the final impulse was given by the present chairman of the administration, Carlo Franci, who, from the year 1880 down to the present day, has laboured in conjunction with the architect, Zampi, and the historian, Fumi, in restoring to the monument its ancient design. Thus the walls have all been divested of Scalza's stucco decorations. The painting of one chapel has been executed as a trial for the decorations of the rest (it must be confessed the result is not altogether satisfactory); the windows have received their stained glass, while the fantastically stained talc plates (a feature of the Cathedral of Orvieto) have been reinstated and the roof has been reconstructed.

The chief interest in the recent work consists in the treatment of the roof. This roof is supposed to date from 1309, though at an early period of its existence it evidently was not in a very solid condition, as, from a document of the year 1416, we learn that an artisan, named Marretta, had been entrusted with the reconstruction of it. At the present time the old timbering was found completely out of order when the work of restoration was started in 1881. In 1867, by the care of

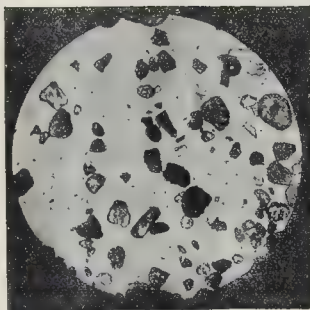


Fig. 9. Tattershall Castle.

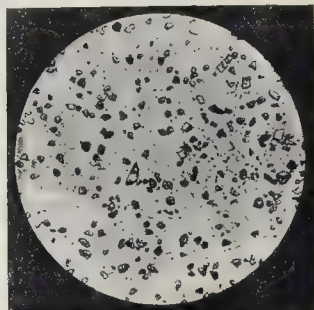


Fig. 10. Crowland Abbey.

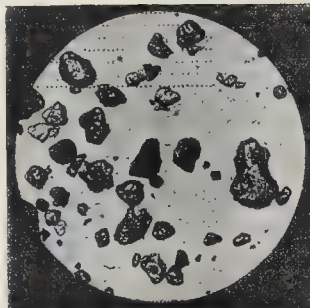


Fig. 11. Fountains Abbey.

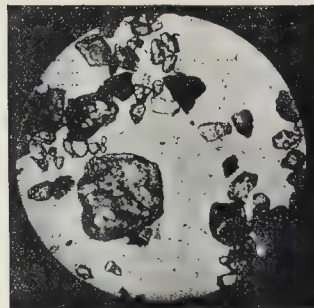


Fig. 12. Bolton Abbey.

Specimens of Ancient Mortar: Magnified 25 Diameters.

the "Ufficio del Genio Civile" of Perugia, preliminary studies had been commenced which were afterwards used as a basis for compiling the general scheme of repair. Unexpected difficulties were met with in the course of the realisation of this work, to such an extent as to bring about the cancelling of the Government contract, but these were eventually got over and the work of demolition and rebuilding was allowed to proceed with regularity up to October, 1886, when the woodwork was finished and followed by the decoration, which was also brought to an end shortly afterwards, and the roof of the cathedral now professes to be a representation of the original work as it was before its decay.

The roof-principals were renewed one by one, and Signor Zampi considers that he has succeeded in reproducing everything with the utmost accuracy. The only one occasion when he departed from the original work was in lining with copper the upper surface of the cornices, and replacing the terra-cotta tubes between the small columns by copper tubing to carry off the water from the walls.

The work has only cost the moderate sum of 200,000 francs (8,000*l.*). Many more details are still awaiting completion, and will in time be attended to; though none of such importance as the repair of the roof, which was a matter of absolute necessity, and has been carried out with commendable care and energy. Whether this replacing of a decaying timber roof by a new one giving an exact reproduction of it is so satisfactory a solution of the difficulty as Italian critics seem to think, may be a question; but it seems pretty clear that the roof-timbers had to be renewed to put the building in a sound condition, and no doubt Italian opinion at the present day would be in favour of imitating the old design, and even regard the imitation as of equal interest with the original. In England we might take a different view.

COMPOSITION OF ANCIENT MORTAR.

DURING the past summer the writer has had further opportunities of extending his inquiry respecting the chemical composition of the mortar existing in our old abbeys and castles.

The present paper contains the results of the analysis of seven specimens of old mortar, and, for the sake of a graphic and practical comparison, a specimen of modern jerry mortar of very inferior quality from the neighbourhood of Frimley. This sample had been sent for examination in the early part of last year by the proprietor, who found the walls to be giving way and suspected the quality of the mortar.

The analyses of the several specimens were made according to the method laid down in the original paper published in the *Builder*, June 18, 1892, and the photo-micrographs of the sand were prepared as before by the writer's chief assistant, Mr. Albert Ashe—the magnifying power being the same for all the illustrations, namely, twenty-five diameters.

We will now proceed to review the chief items in the analyses.

The proportions of water, combined water and volatile matter, do not call for special remark. In the Frimley analysis the original mortar, which contained 9 per cent. of water, lost at 212° F., had to be dried before being reduced to a powder sufficiently fine for analysis.

Passing on to the consideration of the figures for lime, we are at once struck with the great variation; the mortar from Crowland Abbey, in Lincolnshire, contains the highest percentage, 41.50, and the specimen from Fountains Abbey the lowest, 15.79, but the latter still contains in round numbers twice as much as was found in the wretched jerry mortar, which only shows 8.31 per cent. of lime in its present dried condition. It is, therefore, no wonder that the quality of the

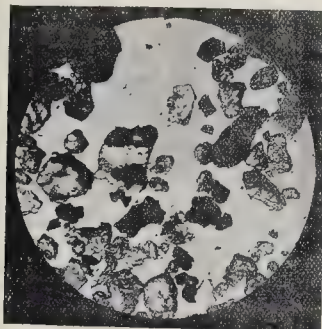


Fig. 13. Barden Tower.

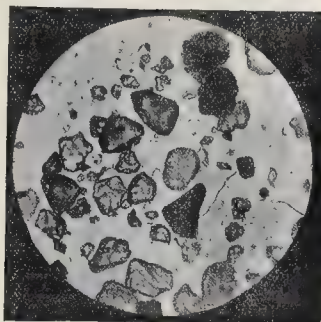


Fig. 14. Whitby Abbey.

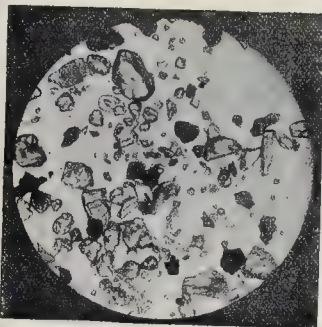


Fig. 15. Carisbrook Castle.

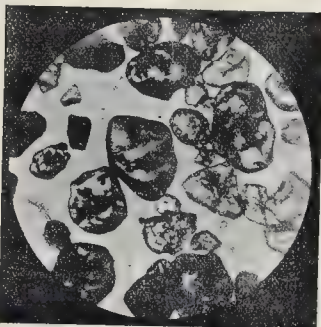


Fig. 16. Modern Jerry Mortar, Frimley.

Specimens of Ancient Mortar: Magnified 25 Diameters.

latter was condemned, and the walls had to be rebuilt.

The average quantity of lime in the seven specimens is 25.95 per cent., or three times that found in the Frimley mortar. Next as regards the quantity of magnesia, we notice that Fountains contains a remarkably high percentage, 5.66, then comes Whitby with 1.15, while the remaining specimens contain practically only minute quantities.

In the original paper (see *Builder* for June 18, 1892) the specimen which contained the most magnesia was that from the leaning tower of Caerphilly Castle, in Glamorganshire, the figures being 1.87, while the mortar was regarded as of undoubted durability and tenacity.

It may be here remarked that it is a curious coincidence that of the seven specimens, the mortar from Fountains and Whitby, for reasons presently to be put forward, is regarded by the writer as being of the best quality. In reference to the former of these it may be mentioned that the relative proportions of lime and magnesia suggest that the mortar used in building Fountains Abbey was made from magnesian limestone (Dolomite). The wonderful hardness and lasting character of this mortar are practically shown by comparing the perfect condition of the pointing with the decayed state of the porous stone, especially on the south side of the Abbey where the weathering influences of alternate rain and sun, heat and cold, would be specially experienced. The proportions of potash and soda do not require any special remark, as the quantities are but small in all cases.

Nor do the figures for oxide of iron and alumina require comment, except to point out that Whitby contains the most oxide of iron, 3.50, and alumina 1.85, while Fountains contains the least oxide of iron 1.01, and alumina 2.54, the proportions of iron to alumina being

reversed in these two specimens in a somewhat marked manner.

Sulphuric acid is small in all the specimens except in Tattershall, where the figures rise to 1.15.

Carbonic acid varies considerably and as the proportions rise and fall according to the proportions of lime it is quite reasonable to conclude that most of the lime now exists in the state of carbonate of lime.

Chlorine, as we should expect, occurs in small quantity, Bolton Abbey having the least, 0.05, and Carisbrook, in the Isle of Wight, the most, .38.

We now come to the figures for gelatinous silica to which the writer attaches great importance when determining the probable induration and tenacity of a mortar. In this respect Whitby stands highest with 8.20, while Fountains 5.75, Bolton 5.65, and Crowland 5.01 come next, then Barden Tower 4.80, Carisbrook Castle 4.35, and last, Tattershall 3.05, which is the only one that contains less than found in the bad Frimley mortar, which has 3.95.

This gelatinous or hydrated silica is the active constituent in Portland cement, and just in proportion as limestones furnish a lime rich in this constituent so are they valuable for making mortar that sets quickly and ultimately becomes specially hard.

Thus, Dorking grey lime when freshly burned contains 9 per cent. of gelatinous silica, while good Aberthaw blue lias is still richer, containing as much as 15 per cent., and as a consequence closely approaches in its famous building properties the best Portland cement in which the percentage of gelatinous silica rises to 20 or 21.

Indeed when good Aberthaw lime can be obtained at a low rate of carriage it is probably more economical than cement.

Let us now examine the figures for actual sand, the last item in the analytical

results, and in doing so the illustrations may be usefully at the same time compared, though a few words respecting these will be specially added, as regards the variations in size, angularity, and general character.

It will be at once noticed that Bolton Abbey contains the most sand, 47.95, though Fountains contains almost as much, 47.15. Whitby, too, for all practical purposes of comparison, is very similar in this respect, the figures being 46.55.

Tattershall Castle follows closely with 44.10, accompanied with Carisbrook Castle, having 43.72.

Then there is a falling off of nearly 10 per cent., Barden Tower having only 32.95, while a still more marked falling off occurs in Crowland Abbey, which contains the lowest quantity of sand, and the illustrations show us that it is also the smallest in size, and in all probability was associated with the natural limestone from which the lime was made.

If we include the figures for magnesia with those for lime and then calculate their combined relation to sand in these analyses, we have the following:—

(Crowland contains 1 part of lime to 0.34 sand.)		
Barden	"	1.03
Carisbrook	"	1.70
Tattershall	"	1.75
Bolton	"	1.98
Whitby	"	2.16
Fountains	"	2.19
Frimley	"	8.70

It will be observed that in none of the old mortars does the proportion of sand rise in round numbers above 2 to 1; whereas in the wretched jerry mortar the proportion rises to nearly 9 to 1 of lime.

As regards the illustrations, taking them in the order in which they are placed, we may remark that Tattershall is clearly a mixture of two different kinds of sand, the greater portion consisting of small, sharp grains of good quality, and the remainder being somewhat rounded and water worn; on the whole a fair specimen.

Crowland is an exceedingly fine, sharp, uniform sand, very different from any of the others examined.

Fountains, Bolton, and Barden are so similar in general size and character that they may be considered together, representing a large but sharp sand with rough edges, and therefore of good quality.

Of the three, Fountains, being smaller, is to be preferred for building purposes.

Whitby is a mixture of large, rounded grains, interspersed with some small sharp ones; on the whole not a good specimen, so that any superior goodness in the mortar must be regarded as due to the lime employed rather than to the sand.

Carisbrook gives us an almost perfect example of what a good building sand should be, varying greatly in size and form, the edges being very sharp and the general appearance being that of broken quartz.

Frimley, on the other hand, gives us an instance of a sand that should be most carefully avoided by builders, for it is coarse, water-worn, and destitute of that angularity so essential in producing a durable mortar,—for there is an entire absence of those indentations of the surface which always afford such a good grip to the lime. Having now reviewed the characteristics of these specimens, the question arises, What are the general conclusions to be drawn from the analyses?

1. That the proportions of lime have been found to vary considerably, and that a high percentage is not necessarily indicative of superior quality.

2. That the proportions of sand have also been found to vary considerably, and that, on the whole, the specimens which contained the most were generally of superior quality, but that in no case did the proportion of sand to lime exceed in round numbers that of 2 to 1, which is very much less than is usually found in modern mortar, whilst in jerry mortar it is often as much as 9 to 1.

3. That the proportion of gelatinous or

Analyses of Ancient Mortar.

	No. 9. Tattershall Castle.	No. 10. Crowland Abbey.	No. 11. Fountains Abbey.	No. 12. Bolton Abbey.	No. 13. Barden Tower.	No. 14. Whitby Abbey.	No. 15. Cardbrook Castle.	No. 16. Modern Jerry Mortar, Frimley, Hants.
Probable date of erection, about A.D.	1433	1113	1132	1154	1185	1175	1467	1891
Water (lost at 212 deg. F.)	1'42	1'26	2'19	74	1'84	2'04	1'55	40
Combined water and volatile matter	3'01	2'76	3'56	2'02	3'80	2'93	3'41	1'36
* Lime	21'83	41'50	15'79	23'80	29'73	20'36	25'44	8'31
Magnesia	27	34	8'00	25	62	1'15	18	79
Potash	24	41	23	11	97	23	11	21
Soda	2'14	42	17	15	53	33	29	24
Oxide of iron	2'30	2'05	1'01	1'80	1'29	3'50	1'32	3'08
Alumina	1'25	35	2'54	25	51	1'84	33	67
Sulphuric acid	1'15	34	60	34	80	65	30	36
Carbonic acid	17'20	30'46	15'10	16'80	21'80	11'95	18'26	1'26
Chloride	15	06	06	05	16	24	38	12
Gelatinous Silica, soluble in alkali	3'05	5'01	5'75	5'65	4'80	8'20	4'35	3'05
Insoluble matters (sand)	11'10	14'24	47'15	47'95	32'05	46'55	43'72	79'25
	100'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00
Lime present as carbonate	21'56	38'29	11'36	21'04	26'93	13'60	23'34	1'60
Lime present as caustic	2'2	22	5	33	22	5	84	Not done.
Lime present as sulphate	80	73	12	23	50	24	25	25
Lime present as silicate and otherwise combined	7'22	2'77	3'59	2'26	2'02	5'99	1'11	Not calculated.
	24'83	41'50	15'79	23'86	29'73	20'38	25'44	

hydrated silica found in a mortar is a reliable indication of its durability and tenacity, and that the higher the percentage of this constituent, the more closely will such mortar approach the character of cement.

4. That in the examination of local limestones as to their suitability for building purposes, the relative richness in this gelatinous silica should be specially reported upon.

J. H.

NOTES.



THE report of the Chief Officer of the Metropolitan Fire Brigade on the London fires of last year treats, as usual, solely of the large amount of work done by this inadequately-manned force. The number of actual fires which had to be attended was 3,146, and the number of chimney fires about 1,500, both large figures, especially if we remember the number of minor fires to which the Brigade is not called. Of the fires attended, the report classifies 177 as serious, a small percentage if we had not misgivings as to the very unsatisfactory system on which this classification is based. There were several very serious fires in January and November which called for great exertions on the part of the Brigade—to such an extent, in fact, that there can sometimes only have been about 100 men available for other fire service in the metropolis at hours and in seasons, as it happened, which are known to be the most dangerous. This is, however, by no means surprising, as Chief Officer Simonds has only some 700 firemen at his disposal for the protection of a city which, according to Captain Shaw, should have had 930 in 1872. In 1892 no less than 145 lives were saved out of fires, forty of which were, however, afterwards lost through injuries received. Twenty-four lives were actually lost in fires, and three firemen were killed, which makes sixty-seven, the total number of fatal casualties. The number of accidents due to fires is not reported, excepting as regards members of the Brigade, among whom there were ninety-two cases of injuries. Two cases of incendiarism have been proved, about 1,900 fires are reported as due to ordinary carelessness, and about 250 to structural defects. That nearly one-third of the London fires should be simply classified as due to "unknown" causes does not speak well for the amount of care and time given to research. That the Brigade should be molested with 497 malicious calls is a disgrace to the metropolis. Until the option of a fine for such rowdiness be abolished, the nuisance, with the danger thereby incurred, will, however, probably continue. The altera-

tions in the getting-up of the report are an improvement.

THE lecture given by Dr. Poore at the Parkes Museum on Wednesday evening, on "London Fogs, and the Lessons to be learnt from them," was a very interesting and able one, but he appeared to be regarded by his auditors as taking too pessimistic a view of the subject, and to be somewhat visionary in some of his proposals. He clearly showed that there was a great increase in the rate of mortality during the long-continued prevalence of fogs, and he also demonstrated that the really dangerous and fatal element in a London fog is the dirt, in the shape of carbon and other mineral matter, together with all the unwholesome exhalations of a crowded city which a London fog of many hours' duration holds in its embrace. He finds that the worst fogs of recent years have been most fatal in the central districts of London, and his argument is that it is precisely in those districts where the population is most crowded where, consequently, the air most quickly becomes polluted when stagnant, as is the case during the prevalence of fog. He likened the condition of the inhabitants of the central districts of London under such circumstances to that of gold fish in a globe if the water were left unchanged. He strongly condemned the growing practice of building high dwellings in towns on the flat system. Back-to-back buildings, he said, were not allowed to be built in London, but no objection was raised to the piling of one house upon another. It might have been pointed out in the course of the discussion that followed that there was no analogy (in the matter of ventilation) between back-to-back buildings and dwellings in flats: in the former there is no means of getting a strong current of air through the buildings from front to back; in all the dwellings in flats which we have ever seen there have been ample opportunities for thorough ventilation. Dr. Poore spoke of the increased use of gaseous fuel as likely to diminish the impurities of the air, and one speaker advocated the use of anthracite coal, but Sir Douglas Galton, who was in the chair, said he had never seen his way to advocate the use of anthracite, for unless the combustion was perfect and the draught good, there was the serious danger of getting a back draught of carbonic oxide into the room. Dr. Poore, in the course of his paper, expressed the view that fogs were on the increase. Mr. G. J. Symons, the well-known meteorologist, expressed his opinion that that was not the case, but he admitted that the fogs of recent years were much dirtier than those of thirty or forty years ago.

THE judgment pronounced by Mr. Justice Kekewich, last Saturday, in the important case of The National Telephone Company v. Baker, will be regarded with general satisfaction. Even the telephone companies can have no reason ultimately to regret a decision which forces on them a metallic circuit as the only cure for external disturbance. Of the two pleas urged by the defendant, the first, viz.: that the plaintiffs might so defend themselves from the nuisance caused by the defendant's earth return, was held to be bad in law; but the second and more technical plea, that the Leeds Corporation (who are the real defendants, Mr. Baker being their contractor), were working the electric tramways under statutory powers, was held to be sound. The plaintiffs rejoinder, that they were bound to exercise their powers with reasonable care to avoid being a nuisance to their neighbours, was also held to be sound, and, therefore, the question was reduced to the one of evidence—whether the defendant's "single trolley system" was as good a system as could reasonably be required of them. The learned judge held that the evidence showed it to be the best yet discovered, but that less than this was needed, it sufficed if their system were as good as other rival systems, and of this he had no doubt. It would be intolerable if a company should be required to adopt the latest invention of "ever-changing," ever-advancing scientific discovery, under penalty of being held liable for causing a nuisance. The grounds of this decision will hardly give as much satisfaction as the decision itself; it will be news to many people that there is no remedy for a nuisance caused by a company acting under statutory powers. It is said that in America, where earth returns are common, the electrolysis caused by the currents is continually rotting away the water and gas pipes; it seems that, if the like took place in Leeds, the public would have no remedy but to insulate their pipes.

TWO interesting and not unimportant decisions have lately been given in the Law Courts. That of Macdonald v. the Mayor and Corporation of Workington illustrates once more the rule that if contractors with their eyes open agree to perform certain work, and it proves to be more difficult and expensive than they expected, they are obliged at all cost to themselves to complete it. In the above case the plaintiff agreed to make a sewer for the defendants. Finding the work much more costly than he expected, the plaintiff asked to be paid the sum which was due in respect of the work so far as it was completed; but no certificate had been given by

the surveyor, nor would he allow alterations in the contract. The legal rights of the parties were therefore absolutely clear; the contractor had no choice but to complete the work at any cost. The Court of Appeal decided against his claim, as it was certain to do. Once again we repeat that if in the stress of competition contractors will undertake work without taking all points into consideration, they must from time to time find themselves in difficulties. The second case is that of *Smith v. Legg*, which raised an interesting question under the Metropolitan Building Act, 1855, namely, whether a building which has been completed can be ordered by a district surveyor to be altered so as to make it comply with the existing law. The Court held that the surveyor in giving notice after the building was completed was too late, and that the requisite notice must be given whilst a building is in course of erection. It is quite clear, as Lord Coleridge pointed out, that if buildings were to be altered or pulled down after completion very serious loss might be inflicted on the builder, and various odd complications might ensue if the building were sold or the builder were dead. On the other hand, it is all very well to say that a surveyor must go about his district with his eyes open, but when the notice required by the thirty-eighth section has not been given by the builder it is his default which is really the cause of the late notice by the surveyor to alter or pull down, and in a sense the builder has only himself to thank for the loss which may be incurred. However, probably the balance of convenience is in favour of the decision, which is not likely to be altered.

WE have received a copy of some correspondence which has just taken place between Mr. Levy, M.P., and the President of the Board of Trade, on the subject of patents. In the course of his letter, Mr. Levy draws attention to the following among other points:—

"The granting of a patent in this country does little more than give the patentee *visu standi* for litigation. When an applicant applies for protection, and takes out his patent, although there may be a score of patents in existence covering what he proposes, he receives no information or warning from the Patent Office that such is the case. In the United States, on the other hand, one of the five points always inquired into by the examiners is the patentability of the invention, which among other things includes the question of novelty; and the fifth point is whether the claims interfere with any pending application. The examination as to the patentability of the invention comprises the questions:—

1. Is it an art—i.e., a process, machine, manufacture, or composition?
 2. Is it useful and important?
 3. Is it new or improved?
 4. Is it injurious or contrary to morality?
- In determining the question of novelty, the examiner utilises the descriptions of prior inventions pertaining to the same subject in—

1. The specifications and drawings of domestic and foreign patents.
2. Other printed publications or manuscript digest of the same.
3. And may also utilise facts within the knowledge of employees of the Office, supported by declaration, the search being more or less extended according to the complexity of the invention and the antiquity of the art.

In Germany precisely the same questions are considered and reported upon by the examiners."

Mr. Mundella, in reply, while promising that the suggestion should receive careful consideration, points out that its adoption would involve a radical change in the principle and policy of the Patent Laws as amended by Parliament in 1833, and that there is little prospect of any legislation of this nature being undertaken during the present Session. We hope, however, that the subject will not be lost sight of. It is high time that something should be done to render the process of protection of inventions in this country more simple and less costly.

THE lecture by Mr. J. J. Harris Teall, on the "Natural History of Silica," delivered on Monday afternoon at the London

Institution, if not comprehensive, proved interesting. He commenced by explaining the crystallographic forms usually assumed by silica as exemplified by a quartz crystal, which may be described as a hexagonal prism terminated by hexagonal pyramids, and rough methods of measuring the angles were outlined. Referring to the origin of quartz crystals, he said that the theory so long held—even as far back as Roman times—had received a substantial check in comparatively recent years. The Romans thought that quartz was produced by the congelation of water, but M. Daubrée had artificially made quartz crystals, and had shown that they were formed out of material of certain composition, in the presence and under the influence of heat, pressure, and moisture. M. Daubrée enclosed a glass tube containing some water, in a steel cylinder, which was then hermetically sealed, and placing the whole in a furnace, heated it up to 400 deg. C. On opening the cylinder at the end of a week it was found that the glass had quite changed its character, it being then composed of crystalline materials, partly in the form of minute quartz crystals. By these experiments much light had therefore been shed on the mode of formation of crystalline silica in Nature's laboratory. The lecturer then drew attention to the formation of certain kinds of limestone by the accumulation of organic remains, and his remarks were illustrated by the aid of the oxy-hydrogen lantern. Photos of the sinter terraces which formerly existed in New Zealand were thrown upon the screen. Several kinds of sponges were also depicted, and special reference made to those which—like *Euplectella*—form their skeletons of silica, or strengthen their fleshy framework by the addition of siliceous spicules. Other organisms, such as radiolarians and diatoms, were well illustrated and briefly described. The lecturer remarked that the sponges, radiolarians, and diatoms referred to, obtained their silica from the water in which they lived. The proportion of silica in the ocean was comparatively small, but although a considerable quantity of this was daily abstracted by organic agencies, the constant waste of the land, and the furnishing thereby of a large amount of silica in solution, to the sea, compensated to some extent the amount abstracted. The occurrence of chert in certain geological formations was alluded to, and Mr. Teall concluded by announcing his recent discovery of chert containing radiolaria in Mullion Island, off the Cornish coast. We must confess to some disappointment of the lecture as a whole. Not a word was said respecting the formation of flint, nor of the agencies whereby that amorphous form of silica was produced; of the occurrence of silica as the matrix of certain sandstones, nor of the sandstones themselves; of the enormous masses of quartzite, nor of that quartz which enters so largely into the composition of granite and similar rocks; of "secondary" quartz, nor of the various minerals of the quartz family. In short, it may be said that many of the principal features of the subject were altogether ignored; and their places were occupied by rather lengthy illustrated references to the scenery and formation of Mountain Limestone and to the Great Barrier Reef of Australia,—interesting matters enough in their way, but having little or no connection with the "Natural History of Silica."

THOSE of our readers who have been to Nuremberg will remember the chief Market-place, with its "Frauen Kirche" and the "Schöne Brunnen," or beautiful fountain, and how the picturesque old square is spoiled by the rows of wooden booths and shanties which disfigure its southern side. These miserable market stalls were erected in the early part of the present century, and were let on long leases, chiefly to members of the Butchers' Guild. The Town Council has of late refused the renewal of the old leases,

some of which expired at the end of last year; as they become vacant the stalls will be permanently removed, and the square will be cleared of these unsightly erections. The first batch will have disappeared during the present month.

FROM the *Berliner Philologische Wochenschrift* (February 4) we learn that Madame Schliemann has placed at Dr. Dörpfeld's disposal funds to enable him to carry on a three months' further excavation on the site of Troy. Dr. Dörpfeld will begin his work about the middle of April. This will prevent his usual course of peripatetic lectures in the Peloponnese, but in place of that he will conduct a party of archaeologists and students in a tour through some of the islands, for which purpose, as once before, a special steamer has been chartered. The steamer is to touch at Ægina, Poros, Delos, Mykonos, Eretria, Oropos, Rhannus, Marathon, and Sunion. Names are received up to March 1.

IT is stated that in consequence of the death of Lord Harewood, his mansion in Hanover-square is about to be sold. The house stands on the northern side of the square; it has an extended return frontage together with a quarter-circular bay and the stables along the eastern side of Harewood-place. The original elevations are shown in the early views of the square, looking northwards, by Sutton Nicholls, of 1720 (first state) and 1754; Overton (1727), and others. In, or after, 1776 Robert and James Adam designed and erected the present two fronts, with pilasters, bay, &c., for the Duke of Roxburgh. The original drawings state that they were to be covered with the "Liardet" stucco, the invention of which formed the subject of the well-known leading case of "Liardet v. Johnson," the brothers Adam being virtually the plaintiffs. T. Malton published, in 1800, a good view in aquatint of the altered west front, together with a companion illustration of the red-brick house, recently demolished, at the north-eastern corner of Cavendish-square. On the Duke of Roxburgh's death the house in Hanover-square was bought by Edward, first Earl of Harewood, for whom Robert and James Adam decorated the interior of Harewood House, in Yorkshire, designed and built by Carr. The London County Council schedule the gates at the top of Harewood-place in their present Bill for the removal of several bars, posts, and similar obstructions in London.

AN attempt on a large scale seems to be in process of organisation for providing hotel accommodation for exhibition visitors at Chicago. This is the "Andreas" hotel, which is being carried out under the direction of and for subscribers to the "World's Fair co-operative bureau." It is to consist of a series of buildings, each 620 ft. long by 30 ft. wide, separated by wide courts and connected by skylights and covered ways of fireproof material. The buildings, according to the illustration, are built in long parallel rows, and form a kind of huge gridiron over a large site not far from the exhibition, and connected with it by railway and tram service. Unfortunately we find that nearly all will be managed "on the principle of crowding as many people into a room as possible," with a vague "promise not to overcrowd." Probably there will be a good deal of overcrowding all over Chicago, and it may be better to be overcrowded on economical terms than to be overcrowded and fleeced; but we doubt if visitors to Chicago will have a very comfortable time of it under either system.

WE have referred more than once lately to the extraordinary incapability of French architects and writers on architecture

* John the third Duke, we believe, the eminent book-collector, who succeeded in 1755, and died, unmarried, in 1804.

to look beyond their own country. A typical instance of this occurs in the last volume of M. Planat's "Encyclopædia of Architecture," which contains an article on the important subject "Pont," written by M. Planat himself. In this article illustrations of two or three of the Seine bridges are given, but no mention at all is made of Rennie's great work, London Bridge, unquestionably in every sense a more important work of its kind than any of the Paris bridges. But what will the reader say when we tell him that in this article on "Bridges" in what is intended to be a first-class and comprehensive work of its kind, there is actually no mention made of the Forth Bridge; and not only so, but there is no allusion to the cantilever principle of bridge building at all! This seems almost incredible, but it is the fact. We presume that as no French engineer has adopted the cantilever principle in a large bridge, it is to M. Planat as good as non-existent. The author of the article had better pay a visit to England and have a look at the Forth Bridge; perhaps his eyes will be opened a little then.

THE following paragraph appeared in the *Evening Standard* on Tuesday last:—

"Lord Grimthorpe, by whose generosity the ancient Abbey of St. Albans, now the cathedral church of the new diocese, has been completely restored at an enormous cost, has signified his willingness to undertake the restoration of St. Peter's Church, another venerable edifice in the locality. The old church has been in a dilapidated condition for many years, and the offer of Lord Grimthorpe has been gratefully accepted."

We do not know how much money Lord Grimthorpe spent over St. Albans Abbey, but we do know that his operations on that building were carried out at "enormous cost" to the interest of the building. But to the average English public, as represented in the average newspaper, the giving of money is the one thing that is comprehensible. Whether the person who furnishes the funds on the condition of treating an ancient building as he pleases is competent to treat it architecturally is a question that would never occur to them, or which they would put aside as entirely secondary and of no consequence. Indeed, such is the apathy and ignorance on such matters in this country, that we may be thankful there are not a dozen wealthy men with a craze for acting as amateur architects, each desirous to pull some cathedral or church to pieces at his own cost, and for his own amusement. They would probably all get their own way, and be commended in the newspapers.

WHAT IS ARCHITECTURE, AND HOW CAN IT BE ADVANCED?*

BY PROFESSOR AITCHISON, A.R.A.

THE time that nearest approached the present, as far as architects are concerned, was some period during the early Crusades, when the Crusaders, those engaged as military engineers, and the pilgrims, as well as some of the clergy, had seen the monuments of Rome, Constantinople, Antioch, Syria, and Jerusalem, besides the buildings of the other countries they had passed through; for if we have not seen the principal monuments of the world, it is our own fault if we have not seen drawings and photographs of them. The Mediæval architects, however, had advantages that we do not possess; they belonged to an architectural age in which a lofty ideal, religion, had to be worthily embodied in buildings.—I may say it was a time when every abstract idea was at once translated into a material symbol. At that time architecture was almost the only safe outlet for the thought and energy of those laymen who were not soldiers, and who desired to exercise their powers without being burnt alive. I have little doubt that the religious monuments, besides satisfying the ideal of the day, were also found to be valuable, in a pecuniary point of view, to the sees or abbays to which they belonged.

The relic, picture, or statue that a church enshrined, which worked cures, gave good luck, or prevented ill-luck, was doubtless the main attraction; yet these benefits were more loudly

proclaimed and more strongly vouched for by a magnificent building. These attractions, combined with a splendid ritual, must have drawn multitudes; the bulk of whom lived in hovels in the midst of squalor and penury, but spread the fame of the saint and of the building. This popularity must have brought a large income, rich offerings, and valuable legacies; and the very confluence of people enriched the town. However much the people of those days were actuated by religious motives, we cannot suppose that the structure itself did not attract many. The Cathedrals and Abbey churches are attractive to us; we can even learn from them, and what must they have been when new, strange, and marvellous—when every workman was anxious to see what had been done in his trade, and to pick up what hints he could? Doubtless the magnificent temples of the pagans produced like effects, for besides bringing more sacrifices and gifts to the divinity, or, in other words, enriching the temple and its priests, the pagan temples were the only safe banks of deposit, and even if no usury were gained from the hoarded gold, the owner showed his gratitude for its safe keeping by costly gifts to the temple. In the present day the value of architecture as an advertisement, is only understood by publicans. The Mediæval architects, too, of the early Crusades were like the rest of the Western people, barbarians, who could not copy if they would; but were overflowing with energy and new thoughts, while their own architecture was far below the monuments they saw, in construction, finish, and expression.

The architects of Christendom have got very far in their education; they can not only do everything that has been done nearly as well as the original builders, but could with ease re-construct Caracalla's solar cell. You may perhaps recollect that Eilius Spartianus, who lived about 297 A.D., said "that the architects of his day affirmed that this solar cell could not then be built in the way it was done, for it is said that the upper lattice-work is of brass or copper, to which the whole roofing is trusted; and that so great is the span (about 76 ft.) that learned mechanics would deny that they were able to construct it." Our architects, too, could paraphrase any style that there was a sufficient demand for, in such a way that it could hardly be told whether the building were old or new, and you must recollect what Michel said, that "Gothic could only be done by celibates fired with religious enthusiasm;" there, however, their capacity apparently ends.

The sudden abandonment of the proper study of architecture at the dawning of the Renaissance partially accounts for this, for the immense gap now to be bridged over—that is, from the cessation of Gothic to the present day—wants at least a whole century of attempts, by properly educated men of genius, before it can be expected to be bridged. The spirit of the age, too, is adverse to the expression of abstract thoughts by symbols or concrete forms, while the necessary and unnecessary unsightliness of so much around us makes the task still more difficult.

Architects have adhered to Nature's ways, that is, to try and make most things shapely, while the age is, I think, necessarily indifferent to shapeliness; for, as I have so often pointed out, directly you have a new weapon you want to use it, and it is not until the first rude weapon has brought increased spoil and leisure, that there is time or inclination to beautify it. The engineers, on the contrary, after having taken up construction at the point where the architects abandoned it, have worked at it in the true spirit of the age, for utility alone; so that with those new but powerful materials, cast and wrought iron and steel, they have carried construction beyond the very dreams of ancient madness, but without the smallest regard to the shapeliness of the objects they construct. I was once amused by an engineer declaring with the greatest pride to a body of architects "that his profession was absolutely indifferent to how anything looked; their aim was to make the structure answer its purpose, with the smallest quantity of material consistent with safety," and that "they never wasted a thought on anything else"; yet, in spite of this, they have occasionally stumbled into producing slightly structures. It is mainly from this consideration that I said we may possibly fall into the proper shapeliness, by following, as far as we can, Nature's methods.

If an investigation into the construction of former buildings was not wanted to show us how it affected their shape and appearance, my remarks on construction would be brief. I should say, you have at hand a current construction that you understand and use for common purposes, or may understand, if you take the trouble. To use

deceased construction is pedantry. Former architects used the best form of construction they knew or could invent, and so should you.

There is no building that you will ever have to erect whose largest space an iron girder will not span, and with concrete you may make an combustible roof or floor—at least one that cannot be burnt from the top. The Roman groin vault was not beautiful, not even interesting, except from a constructional point of view; nor were Gothic groins, until you got complex ones made for appearance sake, like those at the Cathedral at Oxford and elsewhere. If it be said that there might be cases in some lands inhabited by savages, where you could get neither iron nor steel, and where bullast, coke, and Portland cement were unknown, I say a problem is proposed that seems to me like the one given me to solve in my childhood:—

"If all the land were paper,
And all the seas were ink,
And all the trees were bread and cheese,
What should we do for drink?"

It is time enough to think of solving this problem when we meet with it.

In early times the materials mostly determined the construction; the main in-door occupations and the climate the shape. The early Greeks, who are supposed to have come from Asia Minor, probably lived near forests, and timber was therefore plentiful, and they used it.

The improved cottage or hut was probably an oblong chamber, and had an enclaved porch at the front, for the enjoyment of shade and the refreshing air; the porch was formed by the projection of the side walls, and I use the word "walls" as we speak of "wooden walls,"—with the roof running over it; if the space between the outer walls was very wide, the squared lintel running from side to side probably sagged with its own weight, and so a couple of tree trunks had to be put under it to support it and its load; while, to shorten the bearing between them, a block or cap was put on the top of each trunk. As the dwellers in the cottage got better off, and their family more numerous, an open verandah was made all round the cottage. These two forms were the main types of the temples; the first was called "in antis," and the second "peripteral." The ends of the cross-beams of the roof, projecting a trifle over the lintel, were eventually carved into triglyphs, and the metopæ were left open for light and ventilation. We know this was the case in the early temples, for, when Iphigenia was in Tauris, and fled with Orestes, they smuggled out the idol of Diana by the metopæ. The mutules were the ends of the rafters, which were balks of timber laid almost close together.

Some have imagined that the Greeks knew the arch,—the first mention of the arch is said to be by Aristotle; but if they did know it, we cannot believe that they were such idiots as not to use it, for to get up a stone architrave into its place an inclined plane of earth had to be made, and then the architrave had to be rolled up to its position; this was much too serious a matter to have been eventually continued, when each stone of an arch could be carried up a ladder on a man's back. We have Pliny's account of the difficulty of getting the architraves of the Temple of Diana at Ephesus into their places, but he does not say of which temple he speaks; there were certainly eight temples! I am far from saying that the Greeks might not have persisted in using the lintel for temples, on account of religious conservatism even when they knew the arch.

The Romans had at least been shown the use of the arch when the Etruscans built the Cloaca Maxima for them—wherever that may have been, for by some it is attributed to the period of the early Republic, and by others to the early Republic, though it is generally said to have been built in the days of the Greek King Tarquinius Priscus, 616 B.C.; but if it were built in Tarquinius's days, it is strange that no one mentioned the arch before; the Etruscans are said to have had much intercourse with Corinth, and Aristotle was not born till 384 B.C. and died in 322, while the Athenian masterpieces were built about 440, nearly 200 years after the Cloaca Maxima is said to have been built.

Leon Battista Alberti was, I believe, the earliest Renaissance antiquary who examined a Roman wall. He gave a correct cut of it in the Italian edition of 1565. When Leoni edited a new edition of Alberti's works (1726) he showed the face of the wall, formed of brick triangles, but left out the rubble filling; and Palladio, though he was for years studying the Roman ruins, showed the wall faced with oblong bricks, but he had observed that it was filled with rubble.

* Being the third Royal Academy Lecture on Architecture this Session. Delivered on Monday evening, Jan. 30.

I do not know if antiquaries have settled when the arched and vaulted structures formed of a brick network filled with rubble were first built, nor when the brick skins were first used, since M. Choisy discovered these systems. If antiquaries have settled the dates, their information is buried in archaeological journals.

As soon as the Romans had completed their system of construction they filled their whole empire with vast buildings, but few very high ones have come down to us, even if they built them. Martial's account of the height of Domitian's Palace may have been mere flattery:—

"The sun salutes it with his earliest ray.

On highest hills 'tis night when here 'tis day."

(Martial's "Epig.," Lib. 8, Epig. 36.) The tomb of Hadrian, now the Castle of St. Angelo, is supposed to have been the highest building erected by the Romans after Martial's day, said to have been 300 ft. high to the top of the pine cone which was supposed to crown it, but did not, as the pine cone was a fountain. The Colosseum is said by Ferguson to be 157 ft. high, and the Pantheon 147 ft. We think that if the Romans had been left to themselves, their buildings in this brick-faced concrete would not only have proclaimed their origin, but would have shown some marks of the strong and vigorous character of the people, and signs of originality; but this was not to be. All Roman knowledge and learning came from the Greeks, and the Greeks were too far above them in all artistic work to render originality possible. The Romans were never completely free from the thralldom of the Greek post and lintel, which was looked on by them, almost to the last, as a sign of what in the cant language of the day is called "art-work;" so that except in structures of pure utility, like the aqueducts, there is always some post and lintel architecture applied to their vaulted buildings.

Our grandfathers were very like the Romans, for they repeated the Roman expedient. A man wanted a house built, and though he was content that the exterior should be a dead wall with holes in it, both he and the architect wanted to be considered as men of taste; a Grecian Doric or Ionic porch was consequently added in wood or lath and plaster. Whatever may be said, English architects are now in advance of this. The fronts of the Roman baths have a mixed aspect; some parts are treated with columns and architraves, while some have only arched openings. Palladio shows some of these arched openings with columns made into Venetian windows; whether he found sufficient traces of this form to justify him we cannot say, for the text, if written, has never been found.

The principal features that were new in the outside of Roman buildings, besides the arches, were the circular curves of the exedre, with their half domes, and domes themselves; for externally the groined vaults were mostly made up with concrete to the form of a roof, and covered with tiles. At what times these arched and domed forms appeared externally we do not know. Domes are mentioned by Vitruvius, who is said to have been born in 80 B.C., and may have lived into the Christian era, for he says to Augustus, to whom he dedicated his book, that his face was wrinkled with age. (Vit., Lib. 2, Pref., par. 4. Augustus was Emperor from 27 B.C. to 14 A.D.) Vitruvius describes the domes (hemisphæria) of the hot room (laconicum) and of the Sudatories of the baths, and he also speaks of the *Tholi*, painted by Apaturius, of Alabanda, for the people of Tralles; but I do not know when Apaturius lived. These *Tholi* are commonly called domes, though they may merely have been hemispheres not of domical structure. At what date the domes and semi-domes at the baths at Pompeii were constructed is equally unknown. Pompeii was destroyed in 79 A.D., in the reign of Titus; but as this is not an antiquarian paper, the dates do not much matter. There were two circular buildings at the Baths of Titus, probably domed, but it by no means follows that they showed externally as we see at the Temple of Jupiter, in Diocletian's villa at Spalato, and elsewhere. There was one large and two smaller domes—possibly octagonal—at the baths of Caracalla, three at the baths of Diocletian, and three at the baths of Constantine. The only large antique dome at Rome that shows externally, besides the ruined one of Minerva Medica, is that of the Pantheon; this has lately been discovered to be not earlier than the days of Hadrian—117-138 A.D. The external steps, however, that about its base, give it a depressed and ugly appearance, and the outside of the smaller dome of Sta. Sophia, at Constantinople, is not much more beautiful.

There is another constructive feature in all the baths, and also in the basilica of Maxentius, as

shown by Palladio, namely, spurs or buttresses on either side of the tepidarium or the nave, to abut the thrust of the groined vaults at the springing. These buttresses may be said to contain the germ of the flying buttress, for almost all have an arched opening through them. These buttresses alone would show that the central chamber was vaulted. One part, however, of the applied Greek work became an important constructive feature with the Romans, the column with a slice of entablature over it, for it bore a part of the weight of the groined vaults, and if the drawing that Palladio left of Agrippa's baths showed the original baths, then this column and slice of entablature had become a feature of Roman architecture before Agrippa's death (12 A.D.). The springing of arches direct from the capitals of columns is first met with in Diocletian's villa at Spalato (before 313 A.D.).

The building domes on a square by means of pendentives did not affect their external appearance. The first attempt at pendentives we know was in the octagon halls of the peribolus of Caracalla's baths. (Caracalla reigned from 211 to 217 A.D.)

One particular device of the Byzantines had a great effect on the appearance of their buildings, that is, the making of the abutments internal; this plan was subsequently adopted by the Gothic architects for the same reason,—the increased internal area gained by it; the spaces between the external buttresses at Notre Dame of Paris were eventually enclosed and turned into chapels.

The main external feature that was added by the Byzantines was putting a drum to the dome—but I am ready to admit that the cause of it may have been æsthetic; still, it involved two constructive discoveries: first, that the four arches and their four pendentives would bear a drum; and, secondly, that a dome could be made that required no external abutment.

The central lanterns and small domes on drums that were put into various churches to bring light into parts that would otherwise be dark were constructive features, but can, perhaps, hardly be classed as wholly constructive.

In this rapid sketch it is impossible, even if it were advisable, to enter into smaller constructive improvements that affected the external or internal appearance of buildings.

The early Christian churches in the West, which could only be vaulted over the aisles, from want of means and skill to turn and abut the larger vaults of the nave securely, suffered terribly from fire, both wilfully and accidentally caused. All the Pagan savages and barbarians, who over-ran or made raids on Christian countries, always burnt the churches; but besides this, so large a part of the towns had the houses thatched or shingled that a fire in the town accompanied by strong wind was very liable to set the churches on fire. Sta. Sophia at Salonica was damaged by fire through the burning pieces of wood being blown in through the open windows, and firing the combustible goods stowed in the mosque, and thus calined some of the columns, and damaged the mosaic.

In addition to these causes, the Mediæval churches were frequently fired by lightning; consequently there was a most ardent desire to protect them from these causes of destruction. When the wandering tribes had settled down in the eleventh century, all the efforts of the architects were directed to the making of incombustible ceilings; and at this very time vast multitudes of the Westerns were travelling through Europe and Asia to the Holy Land. In this same eleventh century copies of the Church of the Holy Apostles at Constantinople had been erected in Venice and in Périgueux: each church was of the cross form, and vaulted and domed with five domes; that of St. Mark was built of brick, veneered with marble and mosaic in the old Roman way; that of St. Front at Périgueux was made of cut stone left bare. By the successful vaulting and doming of these naves the Westerns saw their problem solved.

I must digress a little here. It was the fashion in the early part of this century to vaunt Roman work, as far as constructive daring went, at the expense of Gothic. It is true that the Romans had built vaults surpassing the Gothic ones in span, 80 ft. not being unusual, and I believe that these have only been exceeded at St. Peter's at Rome; and no dome of so great a span as the Pantheon has ever been erected in masonry: but this fact should be considered, by those who desire to judge rightly and with justice—that the Romans had the tribute of the whole civilised world at their disposal, or, at least, of that part that surrounded the Mediterranean; all these countries were subject to the Roman Government, and excellent roads ran from Rome to the remotest parts of the Empire: not to speak of herds of

slaves being at their command, not only of those born in the Roman Empire, but those taken from the savages and barbarians beyond it, and it is probable that the Roman carts and cattle were as good as their roads.

It seems to me as reasonable to compare these structures of the Mistress of the World with those of the poor Mediævals, to the disadvantage of the latter, as to compare a house built of brick by a man of small means with the marble palace of an American millionaire; but even this comparison would be too favourable, for besides the difference in wealth, the countries where the Mediævals built were cut up into small feudatory states, so that the materials coming through them were subject to every sort of exaction, and often to confiscation or robbery. The roads were execrable, even if they could be dignified by the name of roads, and I believe the carts and cattle well matched the roads. Probably the spare serfs of the neighbourhood were all the people that could be got to do the unskilled labour, though doubtless, in some cases, the skilled workmen were impressed; but in either case the number must have been small. And yet, with all these disadvantages, such was the zeal, energy, ability, and skill of the architects, that though their buildings were not perhaps equal in area to the Roman baths, their towers were carried higher than anything the Romans built, and fell little short of the height of the great Pyramid,—in fact, Old St. Paul's, of London, exceeded it in height.

Now to take up the broken thread of my story: When the Mediævals saw a church wholly roofed with stone, they wanted to avail themselves of its advantages, but the cost stood in their way. M. Carroyer, whose admirable book on Romanesque Architecture is in every architect's hands, makes this curious deduction, that would be incredible were not fact stranger than fiction: namely, that though the Mediævals were conversant with groined vaults, that it was the domes of Angoulême and its neighbourhood that gave rise to the regular Gothic groin. He says that the demand for these domes, by those who could ill afford the cost, induced the architects to use a rib in place of the pendentive, and to make these ribs independent and the framework for a thinner dome; and that eventually they gave up the normal jointing of the dome, and, though mainly keeping the form, merely filled in between the ribs with vaults; the thrusts, thus concentrated on a point, were abutted by the flying buttress, so that when there were two or more aisles and chapels as well, and the art of construction was at its height, the Gothic cathedral was, except at its west front, a sort of stone porcupine; the ranges of pinnacled piers that carried forward and downward the thrusts of the nave and choir vaults made a bristling array round them like a guard of spearmen about a cataphal.

There is only one internal Mediæval feature purely due to construction that I need mention,—the arches. I think Professor Willis calls these single and double stepped arches "orders" ("Remarks on the Architecture of the Middle Ages." R. Willis: Cambridge, 1835), but the constructive expedient is obvious: the Mediævals were quite as parsimonious as the Romans, and with less means, so they naturally wanted to save the expense of unnecessary centering. The first arch was often not half the width of the wall, but when it was turned it acted as a centre for the next arch, the voussours of which overhung it on both sides, and when this arch was keyed up it had no longer need of support; in some cases there was a third arch, which was also corbelled over, the second one acting as its centering. The tracery of windows may also be looked on as a constructive expedient to get more light, but of course, the shapes of the piercings were adopted for æsthetic reasons, and were doubtless suggested by Saracen work.

We cannot expect to find any new constructive improvement in the early Renaissance, and, so far as I know, there is none; nor is that to be wondered at, for we do not expect to see improvements made in any art by those who do not understand it, and, if in addition to this, traditional schools are broken up, and well-understood methods of improvement abandoned, we should expect it still less. When the Roman Empire was broken up by the incursions of many tribes of savages, the schools and guilds were extinguished; yet some of the skilled men probably escaped, and when these savages began to permanently settle down, skilled men were sought for and built the structures the barbarians wanted. Theodorici's palace at Ravenna is an example, and his tomb, if really executed at the time, shows that a very skilful architect must have been found. The heads of the Christian faith, such as

Gregory the Great, forbade the destruction of pagan buildings. The Abbots started schools of architecture and of all the subsidiary arts, and we must recollect that these bodies were affiliated to others in all parts of the world, so that any new inventions, discoveries, or improvements made by the architects of Constantinople, Syria, or Alexandria could be brought to every other country where Christianity was established, and there be taught in the schools. Those students who were advanced and promising could first be put on the works of new abbeys or churches that were being carried out, and when experienced enough could be used to carry out the designs sent by the mother abbey. How this tuition and experience was gained when the architects were formed into lay guilds we do not know, but probably a similar course was pursued. At the Renaissance the ecclesiastical fetters on the human mind were removed, and man was comparatively free to pursue what studies he liked, to despise asceticism, and enjoy with a light heart all the pleasures that could be found on this earth. A much wider knowledge of the masterpieces of classic poetry and eloquence was spread, and printing by movable types soon made books much cheaper, and thus increased the number of readers. Statues, bas-reliefs, bronzes, coins, and gems, were more sought after and admired, and the impending ruin of Constantinople caused great numbers to be exported.

The seeing this earth turned from a vale of tears into a vale of joy made the people of the day hate the old church, while the superiority of the ancients in all artistic work made the Renaissance men not only desire to equal their masterpieces, but made them hate and despise the old ecclesiastical arts, and think that the Romans were perfect. The Renaissance men took to writing in Latin, imitated every bit of Greek or Roman sculpture they could find, and called Gothic "the tasteless style"; so architecture fell in Italy into the hands of scholars, antiquaries, goldsmiths, painters and sculptors, who thought that the last word of architecture was said by Vitruvius, and was to be found in the Roman ruins. Why has the fame of Brunelleschi been so widely spread? Simply because he was an able sculptor who had never even studied architecture, but by dint of genius, intellect, and the study of Roman ruins, was able to raise the walls and build the dome of St. Maria del Fiore without centering, that Arnolfo de Lapo had designed and provided for. Large domes were built before his time without mankind having heard of the architects' names. The architect of Hadrian's Pantheon is unknown; many domes were built in Constantinople and Turkey in Europe shortly after Brunelleschi's day, that have caused no sensation; and the architects of the Medieval cathedrals are practically unknown.

The present head of the constructive part of our profession is Sir Benjamin Baker, who has built the most wonderful bridge the world has yet seen, 1,700 ft. in clear span; but unfortunately people hardly hold their breath when he appears, because he was brought up as an engineer; but if the gifted President of the Royal Academy were to build one nearly as big, it would be considered miraculous, and the whole world would be agog. But I ask you, would this be the way that any sensible man would set about improving construction? Are we to wait till a heaven-born genius arises, who can solve the problems wanted, without the proper training?

We are in a scientific age, and mathematicians have for centuries past been investigating the problems we want solved, and others are still engaged in advancing this science. Are we to ignore their labours and trust to genius? or are we to learn how to solve these problems ourselves by the aid of statistics?

The Middle Ages had little science,—very little was known in their day,—but it is believed that what they did know they used; their main source of information was keen observation, remembrance, reasoning, and experience. They built just as a chair-maker does: he thins away the skeleton of the chair till it crumples up under a sitter, and then he knows the slightness has gone too far. Even to sit on chairs that are too slight involves some risk; but there is much more danger in unsafe buildings, and by a knowledge of materials, and the laws of statics, we may avoid all risks. Probably, most people would so far agree with me, but I insist that a knowledge of statics does a great deal more for us; it gives us the proportions we should use. I have never had any doubt that the proportions of the antique stone or marble columns, architraves, and capitals, and the like, were deduced from the observation that these proportions would mostly

stand without failure. Time and custom have greatly aided in making us think the proportions beautiful: though you are not to suppose that the harmonious proportioning of a building and its parts is not one of the master arts of architecture.

If statistics tell us that the best form for a cylindrical cast iron column is from 25 to 30 diameters high, we shall learn to think those proportions beautiful, and in the same way with every other part. The abacus of a column is to carry the superincumbent weight securely on to it, and we shall learn to admire the proportions of the abacus that does this; so, again, with arches, if we have to use them we shall learn to like the shapes they ought to take.

It is quite certain that some shapes of pointed arches which appear unpleasant to us, pleased the people of the Middle Ages; but even if it be admitted that we are right and they were wrong, it does not follow that the arches themselves were exactly of the shape they should have been. Nature herself is infinite in her proportions, and makes the bulk of her works beautiful; but she does not hesitate to alter her proportions, if I may be allowed such an expression, to make her creation the best for all its purposes under the circumstances, nor does she hesitate to make things ugly, if an ugly form best meets the requirements of the case. She never completely falsifies her laws, but under certain circumstances she allows some of these to seem in abeyance. Most solid things in Nature crystallise if left free, but so few things are left free that but few natural crystals are found. Whenever we are able to observe and examine one of her organisms, and to discover all its surroundings, we find it perfectly fitted for its purpose. When we are only partially acquainted with an organism and its surroundings we may find fault; and certainly when we know nothing about certain organisms, and can only judge of them by the eye, we see that some are much more beautiful than others. Yet in their forms and colours we find the greatest subtlety displayed, and those means followed to produce effect, that in man's work we should call artificial devices. I merely mention this to show that we may make some little sacrifice for the sake of beauty when beauty is required.

We see that by following out purely constructive forms the engineers have sometimes produced things that are a pleasure to look on, particularly at a distance; there is a bridge at Berwick-on-Tweed that, seen from the railway on a moonlight night, is quite lovely; its loveliness is of course accidental, and it is by no means beautiful when seen close; but if the English were lovers of the beautiful, the whole country would be full of such bridges, for the builders would learn the means of producing such effects in the distance, if they were really desired. I have no doubt that the Italian builders of the vast farmhouses in the Campagna studied these methods, for these *casali* are mostly ugly and ill-proportioned when one is close to them, but highly picturesque at a distance. The Crystal Palace again, though heavy and leaden-looking outside, is wonderful inside, and produces strong emotions from the brilliancy of its light, its vastness, slightness, and height; and this happens mainly through the mere effort to cover a large space economically. We cannot, however, give all the credit to the engineers, as Sir C. Barry and many other architects had a hand in it.

I think I have now shown you that the construction of former buildings did, to a great extent, determine the peculiarities of their external appearance, and I would ask, are our powers of invention so great that we can afford to abandon these means of giving character to our buildings? Would it be wise to depend only on our skill as ornamentalists for our future immortality? I ask each architectural student if he would rather be the man who tattooed the New Zealander, or the power that made him? and in saying this I would put aside any question of our originality and skill in ornamentation.

"HEALTHY HOMES."—Mr. Allan Greenwell, A.M.I.C.E., of the Frome Rural Sanitary Authority, has just delivered two lectures, at the Temperance Hall, Frome, on "Healthy Homes, and how to keep them healthy," under the auspices of the Frome Technical Education Committee. There has been a good attendance at both lectures, we are informed, there being no charge for admission. Mr. F. Parsons, M.R.C.S., Medical Officer of Health to the Frome Local Board, presided at the meetings. Mr. Greenwell has been instructed by the same committee to deliver further lectures in their district on "Air and Water."

THE INSTITUTE OF BUILDERS: ANNUAL MEETING.

The ninth annual general meeting of this Institute was held at the offices, 31 and 32, Bedford-street, Strand, W.C., on Tuesday, the 7th inst., the chair being taken by the President, Mr. Herbert H. Bartlett.

The Secretary, Mr. Richard S. Henshaw, read the accounts, and the following report of the Council was received and adopted:—

"1.—The Council have the pleasure to present their Ninth Annual Report.

2.—Owing to the general election, the Council have had no Parliamentary work of importance to undertake during the past year, but they would impress on members the certainty of increased liabilities being enforced on employers of labour by the extension of the Employers' Liability Act, in the near future, and the necessity, therefore, of a united front being shown by all employers, so that fair and equitable conditions may be sought for.

3.—During the past year the London County Council have made a new departure, by resolving to employ their own labour, and carry out public works themselves.

4.—The action of the London County Council in undertaking work, and the payment of wages regulated by the trades unions, will doubtless very materially and disadvantageously affect the building trade, and is, in the opinion of the Council,* entirely opposed to the public good.

5.—The Council in the early part of the year received further communications from the Royal Institute of British Architects, with reference to the proposed Conditions of Contract, and appointed a sub-committee, consisting of Messrs. H. H. Bartlett, H. T. Ashby, S. G. Bird, Frank May, and Wm. Shepherd, to meet the representatives of the Royal Institute of British Architects. The Conditions were then discussed, and have been now referred to the solicitors of both bodies with the view of completing the same, and the result of their deliberations is awaited.

6.—Although the building trade has not been interfered with to the same extent as it was last year, by the strike and lock-out of carpenters and joiners, it has, during the last twelve months, been considerably disturbed through the agitation in the labour market.

7.—The Council have the pleasure to present the audited accounts of the Institute, and the Library and Benevolent Funds for the year 1892.

8.—In accordance with the Articles of Association the President, Mr. H. H. Bartlett; one of the Vice-Presidents, Mr. R. Neill, Junior; the Treasurer, Mr. George Plucknett; one of the Auditors, Mr. George Burt, Junior, and four Members of the Council—Mr. John T. Chappell, Mr. Thomas Hall, Mr. Benjamin Hannen, Junior, and Mr. J. H. Trollope retire, but are eligible for re-election, with the exception of Mr. J. H. Trollope, who does not desire again to serve.

The following officers were then elected and re-elected—President, Mr. Frederick J. Dove; Vice-Presidents, Mr. Joseph Hill and Mr. R. Neill, Junior; Treasurer, Mr. G. Plucknett; Members of the Council, Messrs. J. T. Chappell, Benjamin Hannen, Junior, G. I. Lough, Colin G. Patrick, and George Hayward Trollope; Auditor, Mr. George Burt, Junior.

The proceedings terminated with a vote of thanks to Mr. H. H. Bartlett for his services as President during the past year.

CENTRAL ASSOCIATION OF MASTER BUILDERS OF LONDON:

ANNUAL MEETING.

The twenty-first annual general meeting of this Association was held at the Offices, 31 and 32, Bedford-street, Strand, W.C., on Tuesday, the 7th inst.: Mr. Thomas F. Rider, F.R.G.S., President, in the chair.

The Secretary, Mr. E. S. Henshaw, read the accounts, and the following report for the past year was received and adopted.

"1. The Council have the pleasure to present the Twentieth Annual Report of the Association, which is the first since its late reorganisation on which was considered to be a more popular basis, namely by the formation of District Associations, each electing members to the Council.

2. In June last a Committee appointed by the Council met representatives of the various branches of the building trades, and after lengthened discussion agreed upon a code of working rules, which came into force in November last, and have been generally accepted and adhered to, both by masters and men. As this is rather an important matter, marking, as it does, a new departure in dealing with labour questions in a broad and comprehensive spirit, by negotiating simultaneously with all trades a history of the proceedings may not be uninteresting. Members will recollect that in November

* The word "Council" here used of course means the Council of the Institute of Builders.—Ed.

1891, Mr. J. Macvicar Anderson delivered his award in the arbitration with the carpenters and joiners, and hopes were entertained that a period of tranquillity might ensue; but on March 1, 1892, an application was received from the Operative Bricklayers' Society, asking for an increase of wages and a reduction of working hours. The Council appointed a committee to confer with the representatives of the Society, and after two meetings, a resolution was arrived at, to the effect that it was desirable for representatives of this Association to meet delegates from all trades, with the object of arriving at a common code of working rules. Conferences were held on June 10 and 23, when the rules were agreed to with all trades except plumbers. A further conference with the representatives of the United Association of Operative Plumbers of Great Britain and Ireland took place on October 24, when a satisfactory arrangement was arrived at, the 4d. per hour advance being conceded, and the principle agreed, that plumbers should, whilst always having one hour for dinner, cease work at the same time as other trades.

3. The Council having empowered the Strike Committee to deal with any questions arising out of the interpretation of the new rules, they conferred with representatives of the Operative Bricklayers' Society, the Operative Stone Masons' Society, and the United Builders' Labourers' Union, and it was decided:—

(a) A workman leaving work of his own accord, after having given one hour's notice, is to be paid on the following Saturday with but where a man shows reasonable cause for quitting his employment during the week, it is customary for him to receive a ticket for payment at the yard, but in this case no walking time is allowed.

(b) Banker masons at work in shops on jobs where there is artificial light, shall be subject to the same rules as such men working at the builders' yard.

4. Members are doubtless aware that a Chamber of Arbitration has been established, under the auspices of the Corporation of London and the London Chamber of Commerce, and the Council nominated as desirable referees for the building trade, the President for the time being of the Institute of Builders (Incorporated), the President for the time being of this Association, and Messrs. Stanley G. Bird, George Burt, D.L., J.P., Frederick J. Dove, and Benjamin Hannen.

5. The Council, in the hope of dealing quickly and effectively with trade questions as they arise, have appointed a Standing Committee on Trade Questions, with power to call either one or all trades together for conference when necessary, and they sincerely hope that this may tend in the future to prevent the disastrous policy of resorting to strikes and lock-outs.

6. The Council also have to express their obligations to Messrs. Stanley G. Bird, J. H. Bridgman, John M. Burt, John Grover, and H. J. Wright, for the valuable evidence they gave before the Royal Commission on Labour.

7. The Council trust that the members of the Association will use their best endeavours to increase its numbers, and would point out to the officers of the several District Associations the importance of using their influence to induce those members of the trade in their localities, who have not yet done so, to join the Association.

8.—In accordance with the rules, the audited accounts will be presented to the meeting, and it will be necessary to elect two auditors and three elected members of the Council. The three elected members of the Council who retire are Messrs. G. J. Lyall, R. Thorn, and Wm. Scrivener, who, being eligible, offer themselves for re-election.

Various subjects of interest to the trade having been discussed, the proceedings terminated with a vote of thanks to the Chairman for presiding over the meeting, and for his valuable services in connexion with the labour questions which had arisen during the past year.

THE INSTITUTION OF MECHANICAL ENGINEERS.

THE first general meeting of the year of this Institution was held on Thursday and Friday evenings of last week in the Theatre of the Institution of Civil Engineers, when the two following papers were read and discussed: "Description of the Experimental Apparatus and Shaping Machine for Ship Models at the Admiralty Experimental Works, Haslar," by R. Edmund Froude; and "Description of the Pumping Engines and Water-softening Machinery at the Southampton Water Works," by William Matthews, Water Works Engineer. The first paper dealt with a part of a very interesting subject, and one which, though naturally of importance chiefly to naval architects, contains many features of mechanical interest, owing to the original and ingenious manner in which the details of the apparatus have been worked out. The experimental works at Haslar are a branch of the Naval Constructor's department at the Admiralty, and here models of ships of new type

are actually tried in order to ascertain the speed the vessels will reach under given conditions of power, displacement, &c. For this purpose there is a tank, or canal, 400 ft. in length, and along this the models, made of paraffin wax, are towed by a locomotive truck on which is placed the dynamometer to register the resistance offered by the hull. There are other uses to which the tank may be put. When it is remembered how great is the difference in size between a small model and the ship itself, it will easily be seen that accuracy of work is necessary to give true results.

The paper by Mr. Matthews is more particularly interesting as the Southampton Waterworks comprise by far the largest plant yet laid down for water softening by the lime process. Of course this system is very far from new, the East Surrey Water Company having adopted the Clark process in the works at Caterham in 1861, and since that date there have been some other examples of the system of greater or less importance. The Southampton works, in addition to being the largest, are also nearly the most recent, having been inaugurated in 1888, and contain most of the recent improvements; indeed the Atkins system, as seen at Southampton, is a very different thing to the original Clark process. There is so much hard water in this chalky isle, and water itself is growing to be so precious a commodity, that the subject of the paper in question is likely to become one of considerable importance, and the proceedings of last Thursday at the Institution of Mechanical Engineers' meeting afford valuable information. The author commenced by describing the pumping machinery, which does not appear to include anything very novel. There are two pumping stations, one at Mansbridge, on the River Itchen, about three miles from Southampton. This station was established in 1851, and contains a pair of single acting Cornish beam engines and a pair of rotative beam engines. This supply was found to be unsuitable, and the civic authorities determined to go further afield. A spot was accordingly selected at Otterbourne, up in the chalk downs about six miles on the road to Winchester. Here a pair of compound surface-condensing rotative beam engines by Simpson & Company, of Pimlico, were erected. These run at a speed of eighteen revolutions per minute, and can pump 2,000,000 gallons every twenty-four hours. Each engine is independent, having its own crank-shaft and fly-wheel. The cylinders are steam-jacketted, and are placed side by side in line with their beam, so that they are of different stroke. The high-pressure cylinders are 28½ in. diameter by 4 ft. 9 in. stroke, and the low-pressure cylinders, 38½ in. diameter by 7 ft. stroke. These engines work at 60 lbs. pressure, which appears very low in these days of triple expansion and steel boilers. The fact did not escape criticism in the discussion on the paper, but both the President of the Institution, Dr. Anderson, one of our most experienced authorities on waterworks engines, and also the author upheld the desirability of low pressures and slow moving engines. Undoubtedly high piston speed and high steam pressure give the best trial trip results in the matter of fuel economy, and in districts where coal is dear this will always carry great weight. But for steady, continuous work, year in year out, the lower pressure and more deliberate movement has undoubtedly the advantage, a fact which should also be remembered in cases where engines have to be erected far from foundries and machine-shops. In addition to this the older type has the advantage in not requiring so much attention to those minor particulars which cannot be classed under the heading of renewals and repairs, but, nevertheless, necessitate shutting off steam for a greater or less period of time. In connection with the question of fuel economy it may be stated that the old Cornish engine, which ran at 15 lb. pressure and made ten strokes per minute in ordinary work, consumed 4.7 lb. of Welsh coal, per I.H.P. per hour, whilst the old rotative beam-engines at Mansbridge, working at 30 lb. and making 12½ revolutions per minute, consumed 4.9 lb. of Welsh coal, per I.H.P., per hour. On a trial made with the new Simpson engines at Otterbourne, the coal consumption per I.H.P. per hour was found to be between 1.67 and 1.74 lb. per I.H.P. per hour. This is a good result, and no doubt would be approximated in regular working considering the very high duty the manufacturers have got out of their pumping engines. The mechanical efficiency of the engine is between 84 and 85 per cent, but this is taking into consideration the friction of water in the pipes, so that a higher figure of merit should be allowed, as Professor Kennedy pointed out at the meeting.

The water softening machinery is however the chief point of interest. It is capable of dealing with about 2,500,000 gallons per twenty-four hours, but by suitable additions 4,000,000 gallons per day could be treated. We believe that up to the present the largest average quantity of water softened per day at any other works has been about 900,000 gallons per day. This figure has only been reached at the well-known Colne Valley Company's works at Bushey. The softening process, as is well known, consists of treating the hard well water with a paste of lime, when the carbonate of lime which forms the hardening constituent in the water unites with the lime forming bi-carbonate of lime, which is precipitated in insoluble crystals. Mr. Matthews did not enter into the chemistry of his subject in his paper, but it will perhaps be of interest if we give an analysis of the Otterbourne water, both before and after softening, supplied by the author on another occasion.

	Well water in parts 100,000.	Softened water in parts 100,000.
Total solid matters	31.69	14.07
Organic carbon	0.024	0.021
Organic nitrogen	0.012	0.013
Ammonia	0.005	0.004
Nitrogen as nitrates or nitrites	0.365	0.381
Total combined nitrogen	0.381	0.307
Chlorine	1.6	1.6
Hardness, Temporary	16.10	3.92
" Permanent	1.89	2.10
" Total	17.99	6.02

The author divides the softening process into three operations:—The preparation of cream of lime; second, the preparation of lime water and its admixture with the hard well water; third, the filtering of the turbid water after softening. The cream of lime is prepared by mixing slaked lime with water in suitable apparatus. Softened water is then pumped in with the cream of lime and the two well mixed together. The resulting lime water is then taken to the mixer, where it meets the hard well water which requires to be softened, and here the chemical action takes place. It now remains to separate the resulting insoluble crystals of bicarbonate of lime from the water and to deliver the latter clear for use. In the old arrangement this was effected by means of large settling tanks, which not only occupied a great deal of room, but were expensive to work. For these have been substituted filters, of which there are thirteen at the Southampton works. The filters consist of a number of flat circular vessels mounted on a horizontal spindle, and placed in an open-topped tank or trough. The filtering material is cotton cloth mounted on perforated zinc, and the zinc in turn is supported by light cast-iron discs. The hard water is pumped into the troughs, and then percolates through the cloth into the space between two discs, the bicarbonate crystals being arrested on the outer surface of the cloth. The clear water then passes into the interior of the horizontal shaft, which is made hollow for the purpose, and from thence is pumped away to the mains. It should be stated that the cloth itself is not an efficient filter for arresting the bicarbonate, and when a cloth is first put in the water has to be pumped back to be refiltered. Very soon, however, a layer of crystals forms on the surface of the cloth, and has the effect of arresting other crystals. This self-filtering action is well known in connexion with various other industries. After a time the layer becomes so thick that water will no longer pass through, and then a clearing device has to be brought into play. The hollow horizontal shaft, in which the discs are mounted, is hung in trunnions, so that it can revolve. Between the discs, and pointing upwards, are spray pipes, perforated with holes in their length. In this way jets of water are made to play upon the filter cloths whilst the discs are revolving. The surplus material is speedily removed, and, falling to the bottom of the trough, is washed away through a waste valve.

The cost of softening is now 0.2 penny per thousand gallons, exclusive of charge for sinking fund, which is about another 4d. per 1,000 gallons.

The summer meeting of the Institution will be held this year at Middlesbrough, commencing Tuesday, August 1.

ARCHITECTURAL PARTNERSHIP.—Mr. Horace Cheston, of 5, Union-court, Old Broad-street, informs us that from December 31 last he has taken into partnership Mr. J. C. Perkin, who was articulated to Messrs. Paley & Austin, of Lancaster, and who has been with Mr. Cheston for over nine years. The name of the firm in the future will be "Cheston & Perkin."

Illustrations.

DESIGN FOR PAINTED GLASS.

HIS design, by Mr. E. J. Chapman, is a modern imitation of the favourite Renaissance treatment of stained glass by painting in an open manner on the white glass ground, irrespective of the divisions of the bars which hold the glass. The colouring is of a light and delicate tone, as required in this style of work. The design was exhibited at the last Royal Academy Exhibition.

PART OF EAST WINDOW, BATH ABBEY CHURCH.

We gave some months ago an illustration from a drawing by Miss Emma Knight of part of the west window of Fairford Church. The present illustration is from a drawing of part of the west window of Bath Abbey Church by the same lady, who has shown a special talent for reproducing in water-colour the effect of stained glass windows; both this and the Fairford drawing found a good place in the Architectural Room of the Royal Academy.

The Bath window is a fine example of modern stained glass by Messrs. Clayton & Bell. The window is of great size, rivaling the west window of York, and the glass illustrates the life of our Lord, in fifty-six compartments, surmounted by the usual figures of angels, apostles, and evangelists. In the spandrels on either side are the arms of the City of Bath and the Diocese of Bath and Wells.

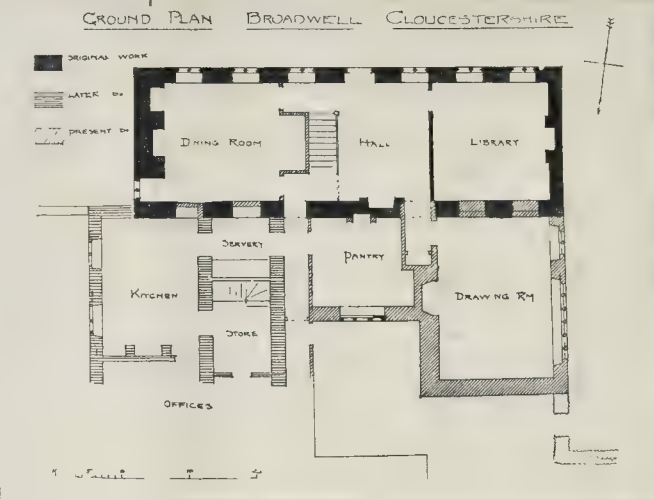
DESIGN FOR A RAILWAY TERMINUS:
SOANE MEDALLION, 1893.

The subject of a great railway terminus is a recurring one in prize competitions, and as there is no book on the subject, the student meets with considerable difficulty in obtaining the necessary data. In the first place, the Board of Trade rules will be found in Molesworth's Pocket-book; and secondly, a few examples are to be found in the *Builder* of the following dates:—Strassburg-Paris, November 3, 1849; Great Western, London, June 17, 1854; King's Cross, October 2, 1851; Cannon-street, October 13, 1866; Holborn Viaduct, June 17, 1876.

Of these illustrations that of King's Cross is especially interesting, because it shows the great arches terminated by gables, instead of horizontally, as at present. It would be very interesting to know why the change was made, as it might have been on account of the curved outline of the roofs, to which the present form is probably better suited. The façade in this case is the end of the sheds, the approach being at the side, as in the Great Western, consequently the treatment is not complicated by the necessity for a large booking hall. The problem of the booking hall consists in the fact that it must either go inside the shed, like a temporary structure, or be treated as a low block in front of the main feature of the façade, the end elevation of the shed. In the first case it spoils the inside elevation of the station, and in the second diminishes the effect of the great gable by hiding its base, though the back front of the Paris Opera House shows how this latter defect may be, to some extent, obviated.

The present design follows a third course, the first two lays of the shed being, as it were, cut off, and treated as a grand hall, whose vault is marked on the elevation by an arch of the same section, while the gable lines are those of the railway shed. Hence the filling-in of this arch must be regarded from the point of view of the hall inside, as well as being an incident in the general elevation of the station.

The treatment of the design as a whole is that of the King's Cross type, the great arch, however, being brought to the front face of the supporting masses, which are here treated as towers, and thus the arcade at the base becomes an internal gallery at the first-floor level, forming the link between the main office corridors on either side of the shed. The width of this gallery is the depth of the towers, and over it is a coffered vault, which affords rigidity to the front arch, and would, it was thought, increase the effect of the main vault. Towers in railway design seem rather out of place; here it is an excuse that they mark the through entrances at either end of the great hall, which are a leading feature in the plan. There are two such entrances at Charing Cross, though Holborn Viaduct has only one. They are very useful for the luggage trucks as well as



for passengers who have season-tickets. The separate entrance required to the company's offices has been placed in the centre of the main side gable.

The London stations are mostly obscured by hotels, and those in Paris differ radically from our plans owing to the Consigne de Bagage and Salle d'Attente systems. Travellers tell of the German termini, but there is little information to be obtained on the subject. It would be a fine subject for a Godwin Bursary student to study; collected plans and notes of the Continental termini would form a most valuable report.

A. T. BOLTON.

HOUSES, MACKENZIE-STREET,
SLOUGH.

THESE houses are built of brick; the lower part and chimney-stacks covered with Portland cement, rough cast; the upper part and roof with red tiles.

The house on the right hand has waiting and consulting rooms, &c., for a doctor; and the house on the left has solicitor's offices, with separate entrances.

The builder was Mr. G. Wernham, of Princes-street, Reading. The architect was Mr. Walter Cave, of London.

BROADWELL, GLOUCESTERSHIRE.

THIS is a very interesting house, built about the latter end of the seventeenth century. The original plan is a good type of many houses in the Cotswold country—the square, stone-paved entrance hall, with large open fireplace, the general living-room on one side, and the great kitchen on the other.

Upstairs the corridor along the southern front, with the bedrooms opening from it, and facing the north and east, a custom in those days, when it was thought unhealthy to have sleeping-rooms towards the sun.

The house, however, has been considerably altered, probably towards the beginning of this century, when the kitchen wing and offices were added, and the arrangement of the rooms upstairs altered, changing the corridor to the north side.

The new drawing-room and rooms over were added about three years ago, and complete a very charming house. The dining-room, a finely panelled room of the original date, has been altered and enlarged, and the inside of the house generally has been made more convenient. The dormer gables being similar on both sides of the main roof, the new wing had to be kept lower, so as not to interfere with the light. There are several good panelled rooms upstairs, and stone arched fireplace openings. The new work has been built of old lichen-covered stones, and the old mullioned windows, &c., built in again, and the roofs are covered with local stone-slates.

The work was carried out by a local firm of builders, Messrs. Howman & Son, of Stow-on-the-Wold, from the designs of Mr. E. Guy Dawber, of London.

ARCHITECTURAL SOCIETIES.

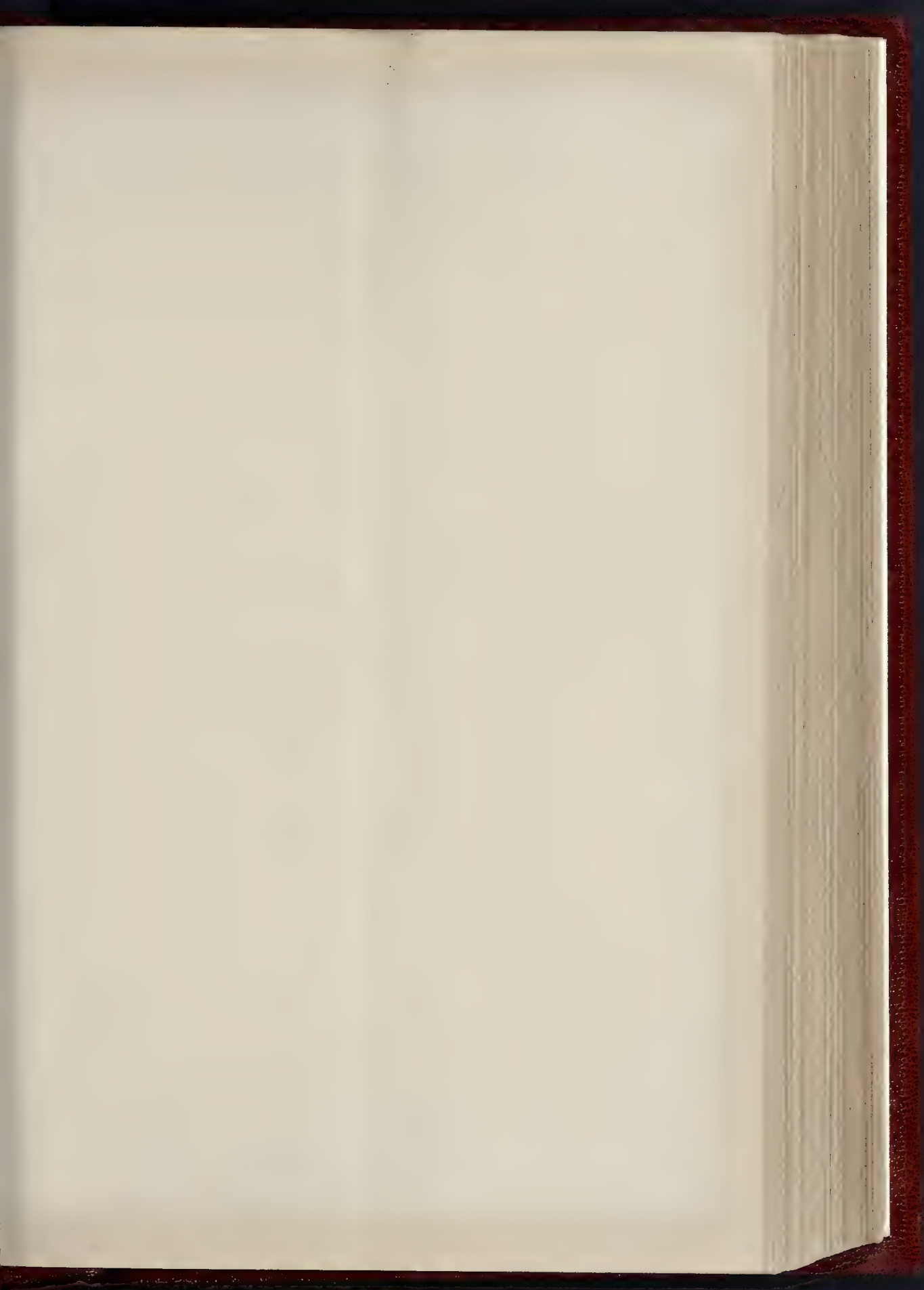
MANCHESTER SOCIETY OF ARCHITECTS.—At a general meeting on Tuesday last, Mr. Salomons, President, in the chair) Mr. H. Ross, of Accrington, was elected a Fellow, and Mr. A. J. Murgatroyd an Associate of the Society. A paper was read by Mr. John Slater on the "Buildings of the Ancients," which was illustrated by numerous diagrams and listened to with much interest. The Royal Institute of British Architects' prize drawings were on view in the room.

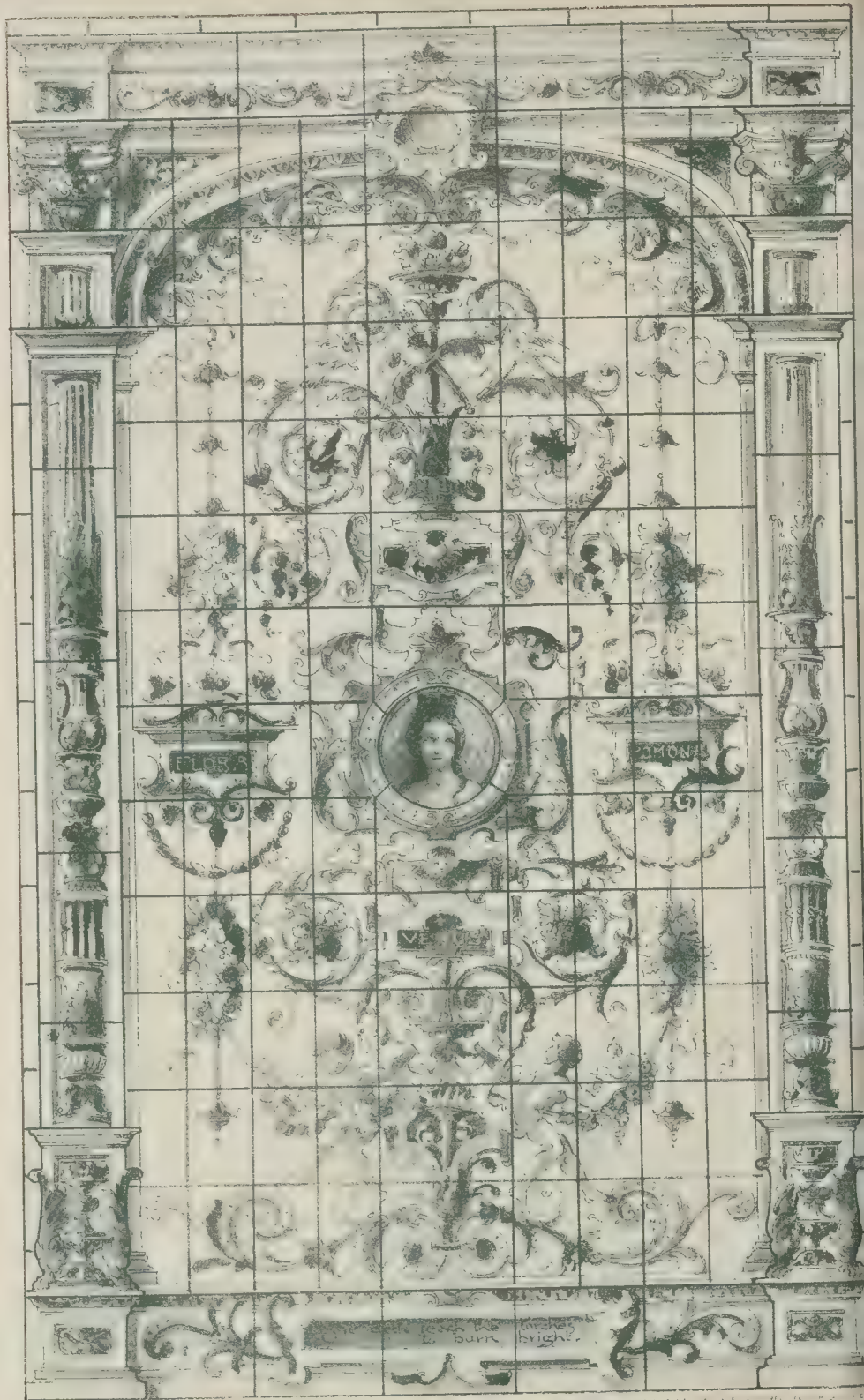
ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—At the meeting of this Association on February 1, Mr. Allan Wyon, F.S.A., in the chair, the progress of the arrangements for holding the annual congress at Winchester was detailed. Mr. E. Ebbelwhite exhibited some late Roman coins obtained by him in Germany. Mr. Earle Way described a curious silver medal of Francis Bacon. He also exhibited a drawing of Antiquity Hall, near Oxford, a building now demolished. The first paper was on the sculptured crosses at Otley Church, Yorkshire, by Mr. J. Ronnily Allan, F.S.A. Scot. During the restoration of the building a few years since, a considerable number of carved stones were found, either under the flooring or embedded in the walls, having been reused as old material. These prove to be fragments, for the most part, of the shafts of ancient crosses, and they are covered with carving of scrolls and interlaced patterns. A wyvern, carved in high relief, appears on two sides of one of the fragments. Another has busts of saints or ecclesiastics above one another, each under a semicircular arch. There are seven or eight of these fragments, one having figures carved in a different style, similar to the work on two or three examples elsewhere which have been called Danish, with great probability. Mr. Park Harrison pointed out the similarity of the patterns to those on early Saxon MSS., and suggested that the hands that could design their patterns could equally prepare these for the stone carvers. Mr. Loftus Brock, F.S.A., believed that the fragments must be of date anterior to the Norman Conquest. Norman ornament was well known, but not a single pattern here was in the style of that period, as would certainly have been the case were the date later than the Conquest. Full-sized rubbings of all the stones were exhibited.

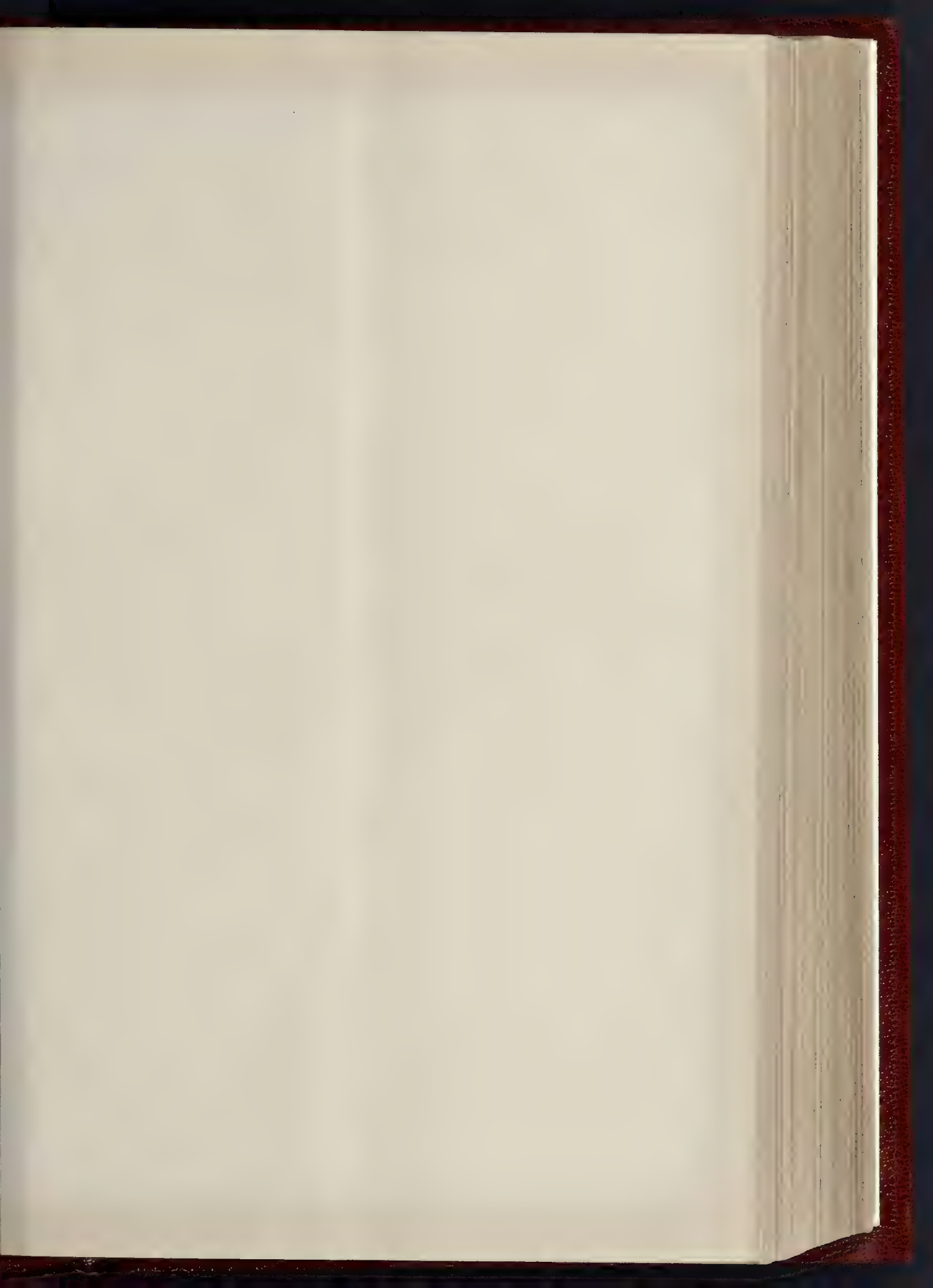
A second paper was read by Mr. Cecil Davis, on the "Royal Visits to Wandsworth."

A CORRECTION.—In publishing Mr. T. Rogers Kitsell's drawings of Siena pavement last week, we described him by an oversight as "Soane Medallist, 1892." We should have said "Titie Prizeman, 1892." Mr. Kitsell informs us that he has never competed for the Soane Medallion.



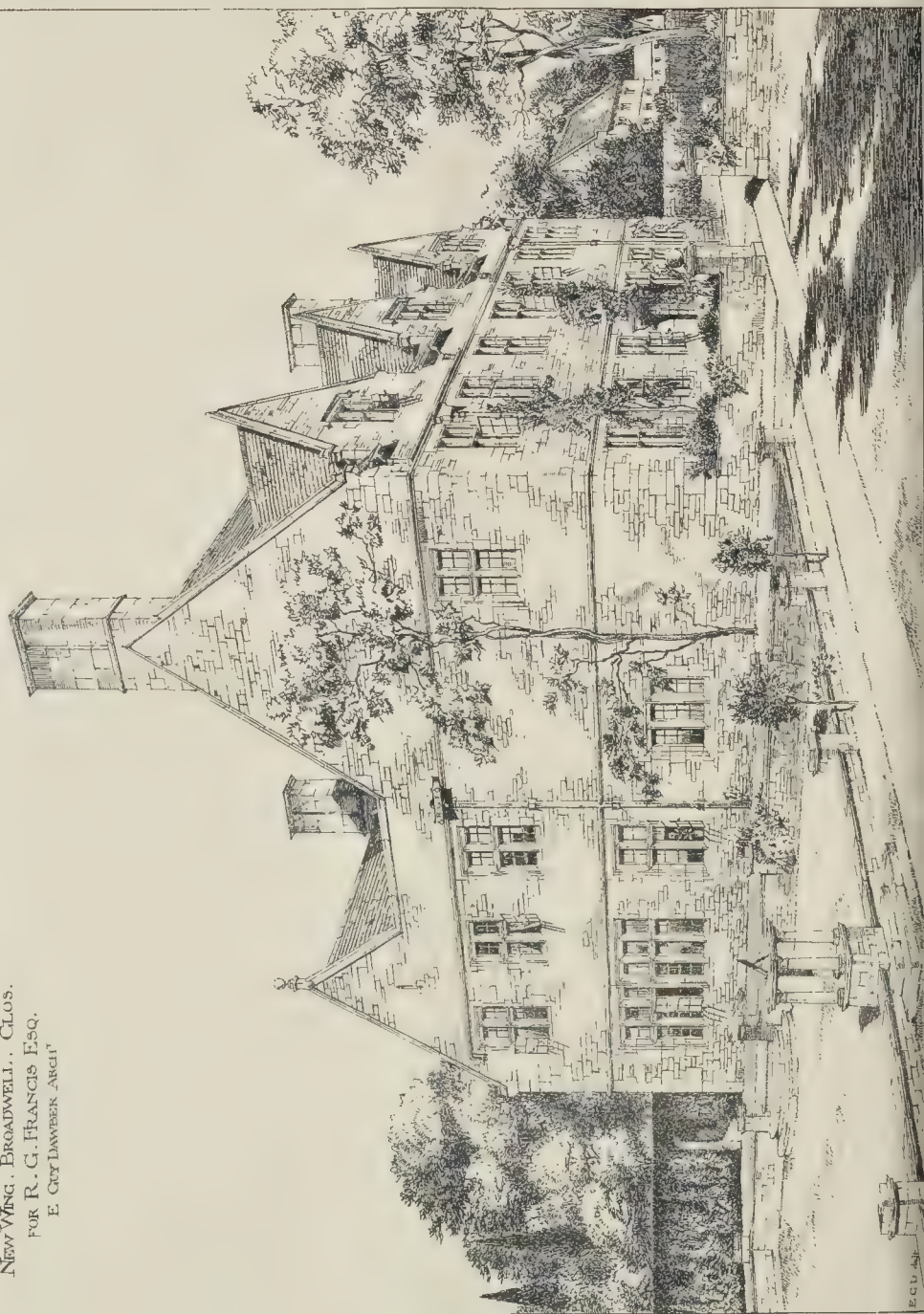


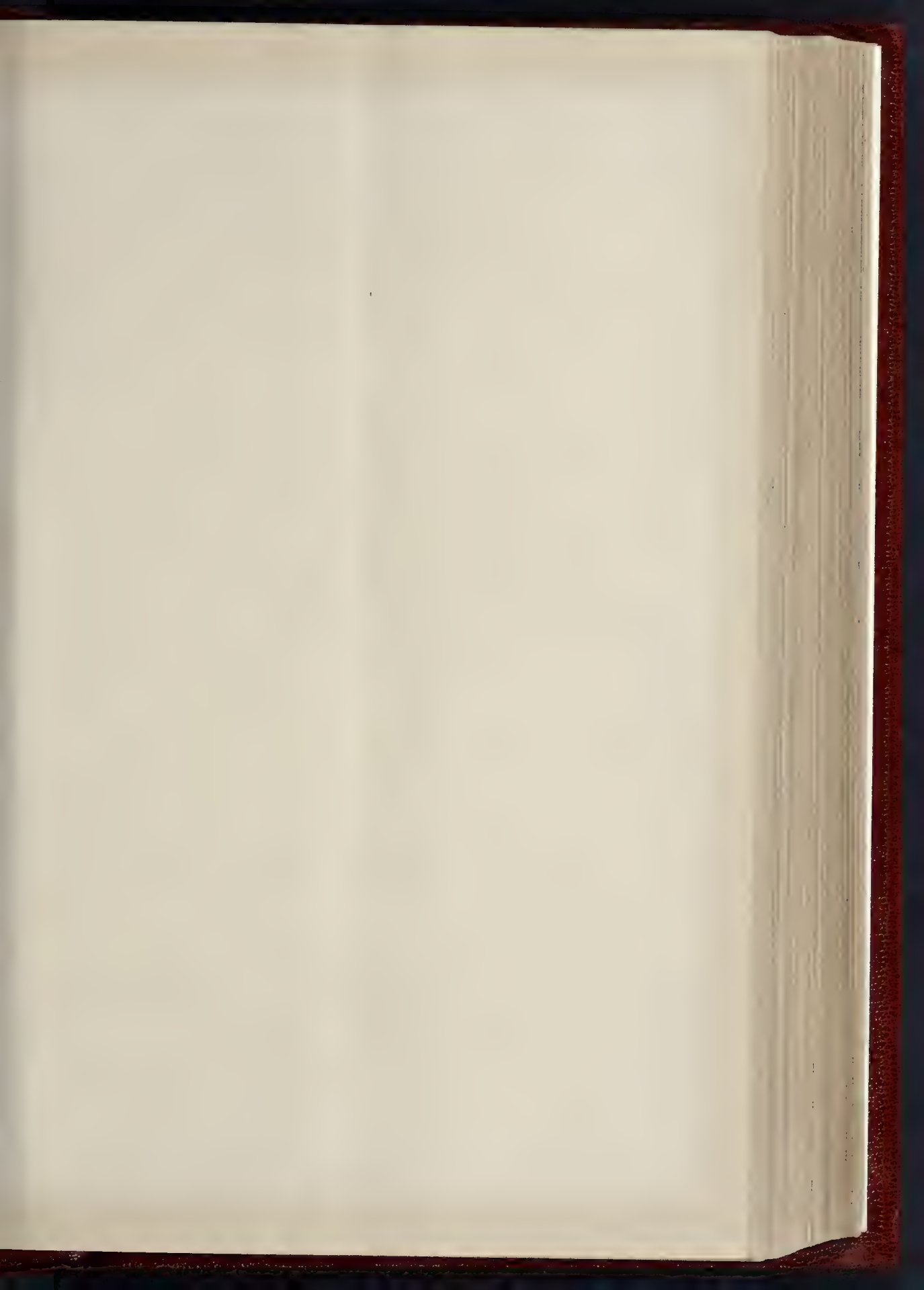
DESIGN FOR PAINTED GLASS—By MR E J CHAPMAN.



THE BUILDER, FEBRUARY 11, 1893.

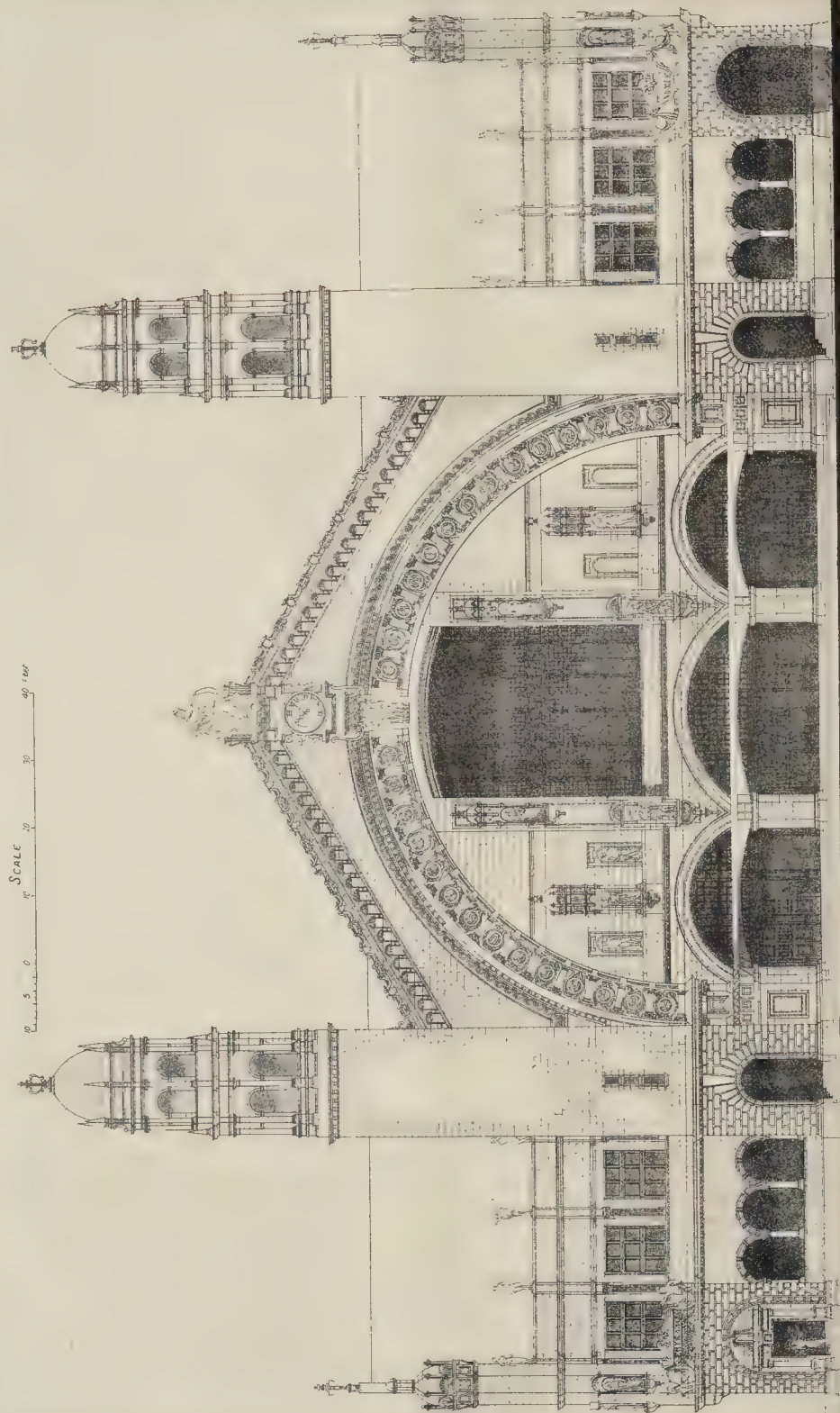
NEW WING, BROADWELL, GLOS.
FOR R. G. FRANCIS ESQ.
E. CUYLAWBER ARCHT.

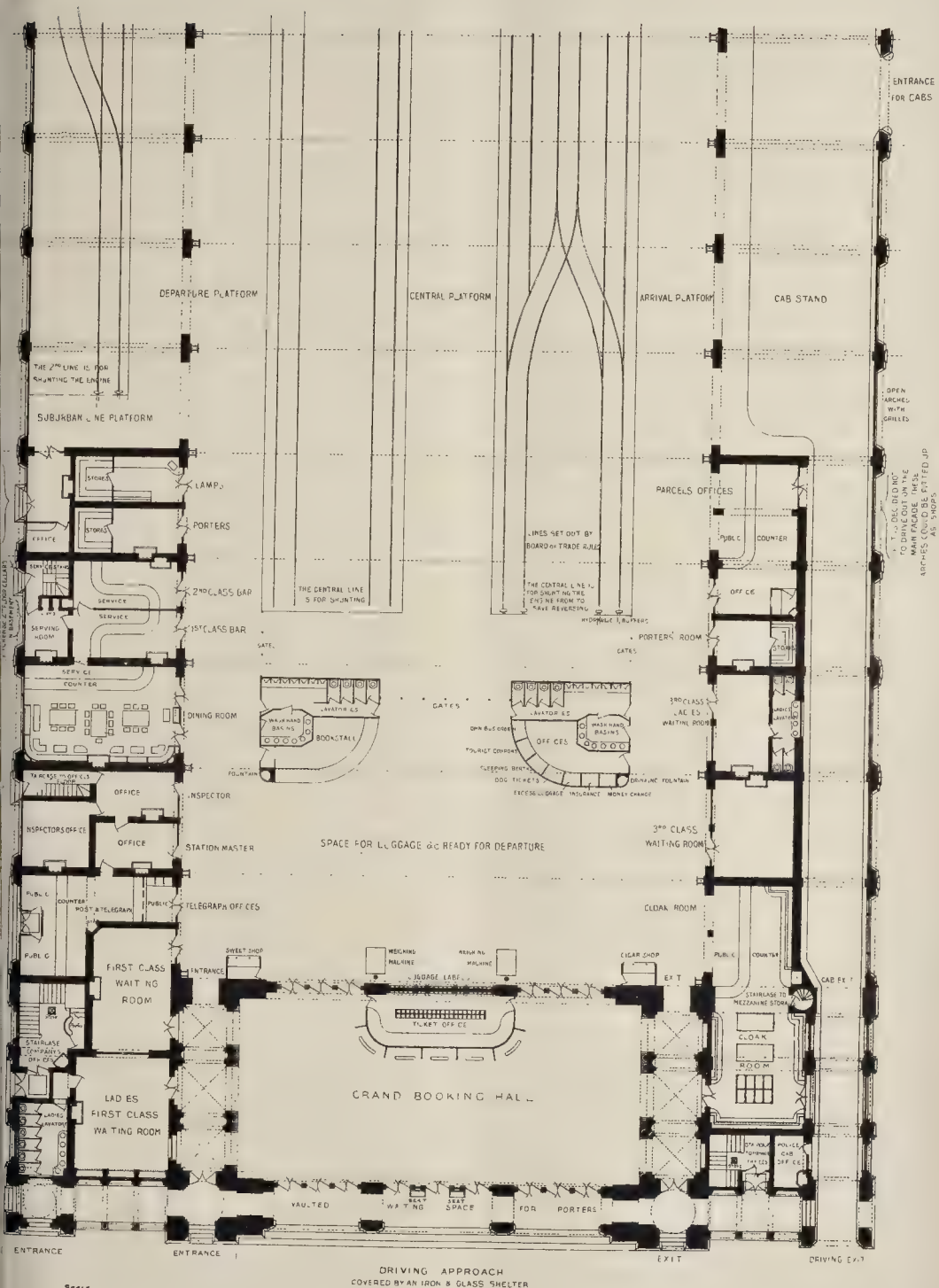




THE BUILDER, FEBRUARY 11, 1893

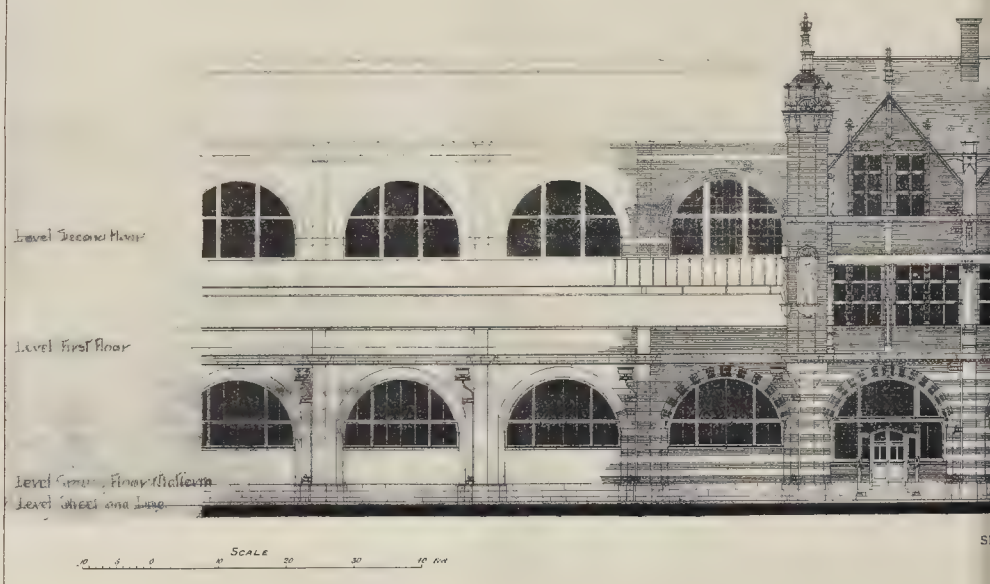
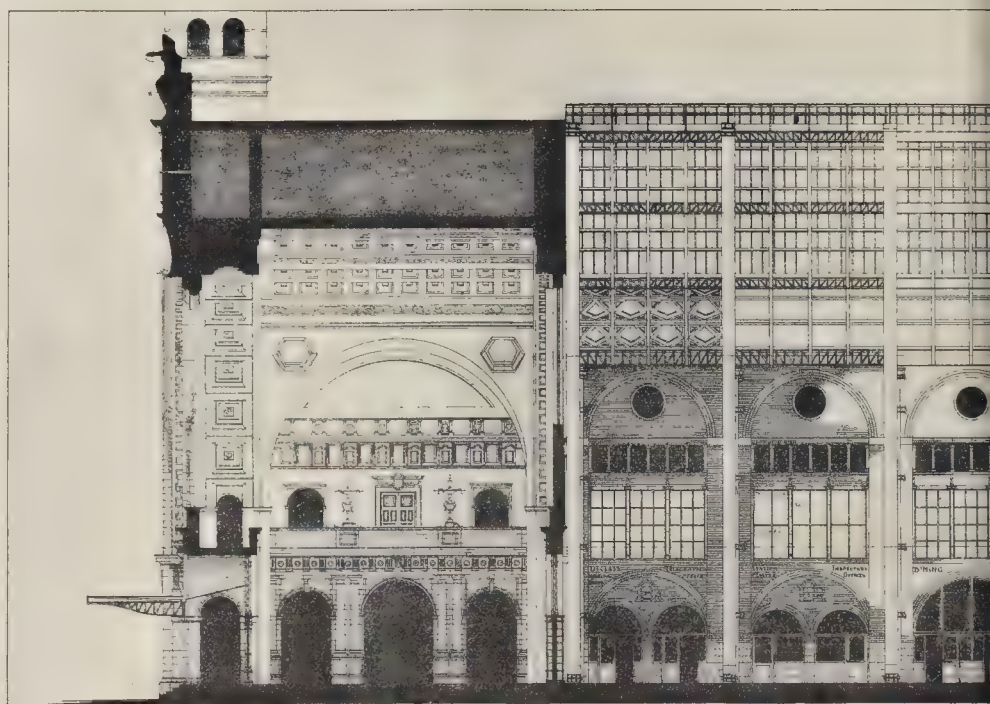
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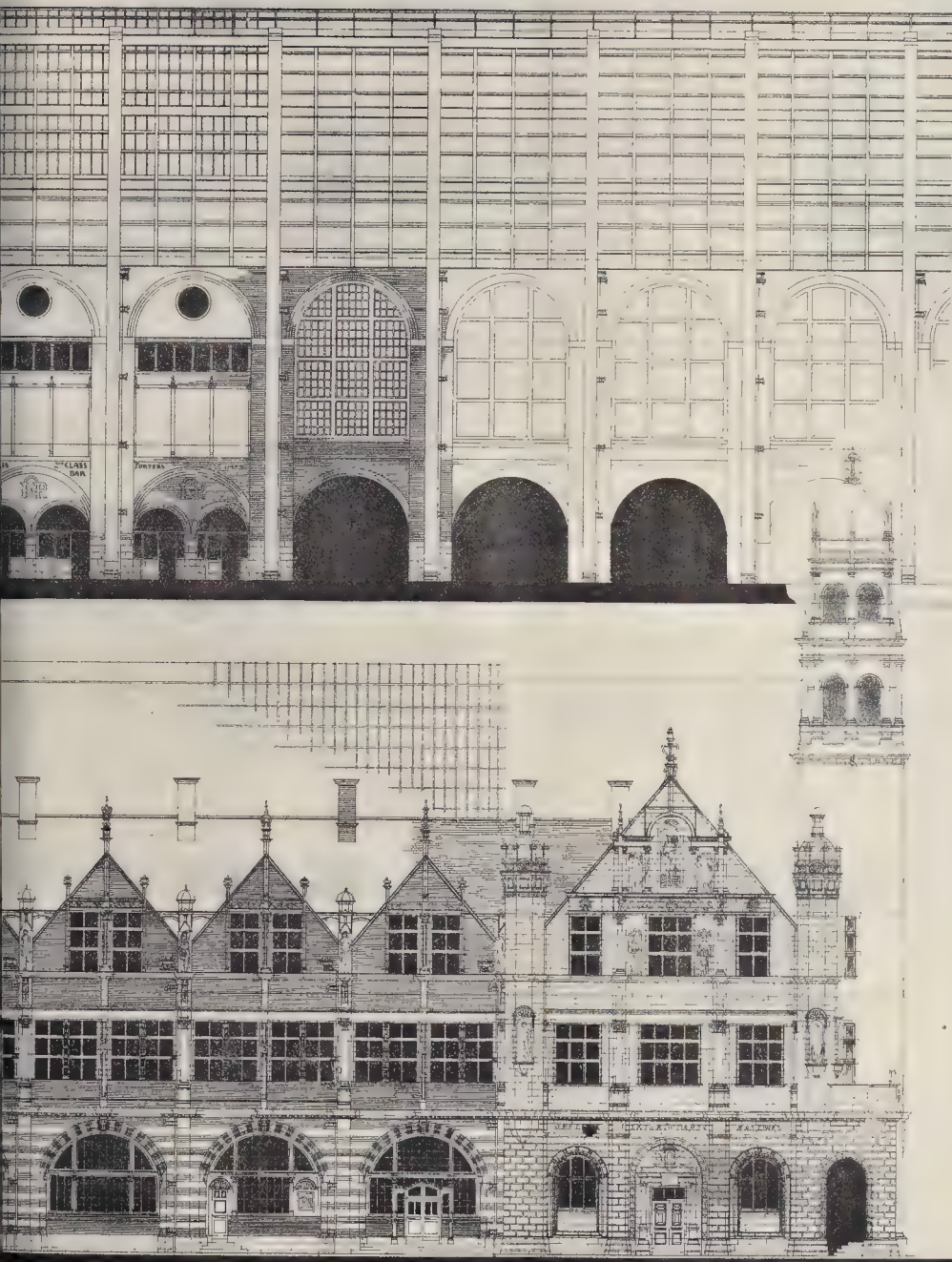




DESIGN FOR A RAILWAY STATION.—By MR. A. T. BOLTON, A.R.I.B.A.
GROUND PLAN.

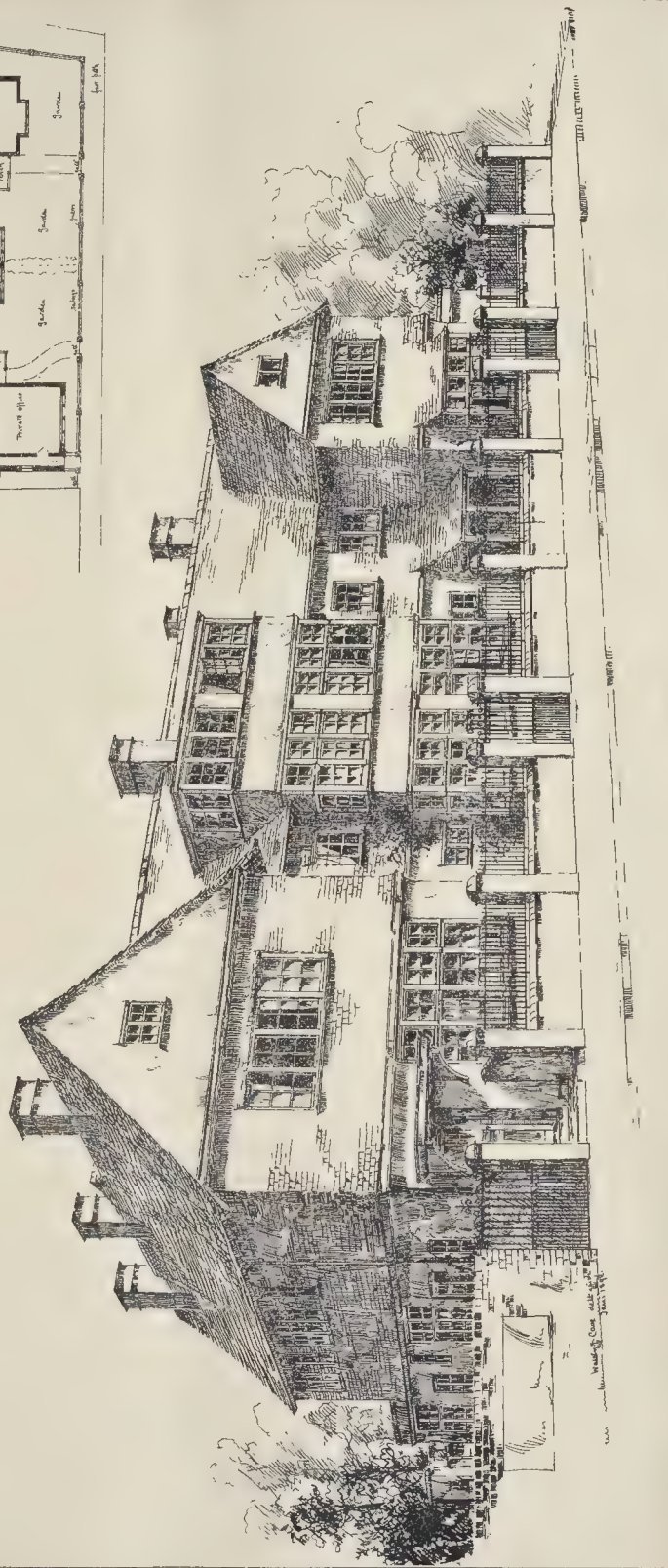
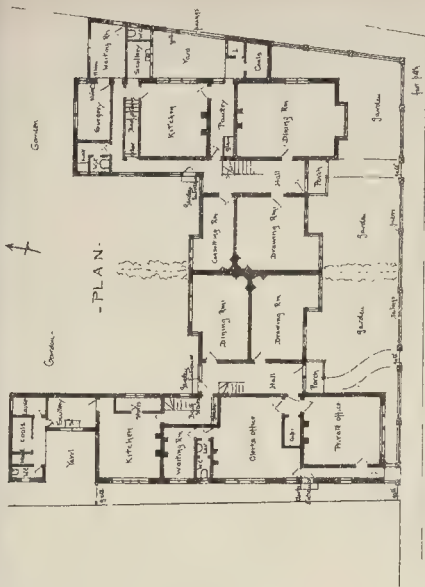






1/4" PHOTO SPRING 1 & 1/4" 48 5 EAST HARDING STREET FETTER LANE E.C.

TWO HOUSES MACKENZIE STREET,
SLOUGH - FOR G. H. CHARSLEY ESQ.
AND D^S R. STEPHEN CHARSLEY...
WALTER F. CAVE ARCHTCT...
14 MARLBOROUGH ROAD, LONDON, N.W.



WALTER F. CAVE ARCHTCT. 14 MARLBOROUGH ROAD, LONDON, N.W.



A PORTION OF THE EAST WINDOW, BATH ABBEY FROM A DRAWING BY MISS EMMA KNIGHT

LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday afternoon at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

Tenders.—Tenders were received for the erection of a Fire Brigade Station in Cherry Garden-street, Rotherhithe, and for repaving Hammersmith Bridge. We print the lists of tenders in another column.

Technical Education.—The greater part of the sitting was taken up with the consideration of the Report of the Special Committee on Technical Education. The report contained the following passages and recommendations:—

"On the 9th of May last, we were directed to consider what action the Council should take under the Technical Instruction Acts, 1889-91, and the Local Taxation (Customs and Excise) Act, 1890. We have held numerous meetings, and made exhaustive inquiry into the matter—a task which has been prolonged by various difficulties, but in which we have received the most cordial assistance from the London School Board, the City and Guilds Institute, the Charity Commissioners, many of the City Companies, and indeed from all persons engaged in educational work.

In order to enable the Council to come to a decision on the subject, we thought it necessary to obtain a complete and systematic survey of the existing provision of technical education in London, a survey which had not hitherto been made by any authority. We were fortunate enough to obtain for this purpose the services of Mr. H. Llewellyn Smith, M.A., B.Sc., who has acted as our secretary, and whose able and exhaustive report has been circulated to the members of the Council. We believe that this report, containing as it does information never before published, and presenting a comprehensive scheme for the systematic co-ordination of London's educational agencies, will, in itself, be of great and lasting use to all who are concerned with public education.

Mr. Smith's report shows that excellent work is being done in different parts of London; but it also reveals how seriously the existing provision for technical education falls below the standard, we do not say of Zurich, but even of such English towns as Birmingham or Manchester. London contains a larger artisan population than any other city, but its skilled trades are being largely recruited from the provinces, whilst Londoners, from lack of proper training, swell the ranks of unskilled labour or the 'unemployed.'

"Perhaps the most serious deficiency is the inadequate provision for evening instruction, on which, at present, the son or daughter of the London workman or clerk must so largely rely. About 100,000 children leave the London elementary schools every year, nearly all of whom ought to be found in the various evening institutions for the three or four next years of their lives. London ought, therefore, to have (besides adults) 300,000 or 400,000 young persons in its evening classes.

Yet the total numbers of persons of all ages attending evening classes in London in any branch of science, art, or technology appears to be under 20,000, of whom 7,400 are in the evening classes under the School Board. Three years ago Manchester, with one-tenth of the population of London, had already one-third as many persons attending evening classes. Since the Manchester Town Council determined to do this, in pursuance of the Technical Instruction Act, 1889, the number has been more than doubled, and Manchester has now, in proportion to its population, six times as many persons attending evening classes in technical subjects as there are in London.

Still more striking are the statistics for particular trades. In 1891 there were about 25,000 bricklayers within the County, of whom nearly 3,000 were under 20. The number receiving instruction in brick-cutting was about 50; in the principles of bricklaying only about 40, a total which has since been slightly increased. The total number of operatives in all the building trades was about 140,000, of whom 15,000 were under 20; yet the number of them who were attending classes on the vitally important subject of building construction and drawing was less than 800. About 30,000 men and boys are at work in London in the printing and lithographic industries; only 1,400 of these were in 1891 getting any kind of technical instruction connected with their work. London has about 46,000 workers in the cabinet-making and upholstery trades, of whom 7,000 are under 20. The total number who were last year receiving technical instruction was less than 100. Only three out of the 10,000 persons employed in London's tanneries, and only ten of its colour workers, were learning any branch of chemistry. . . .

In view of the facts revealed by Mr. Smith's report, we are unanimously of opinion that it is of the utmost importance that the Council should no longer abstain from exercising its powers with regard to technical education. Very few municipalities in England having power as a county council to assist technical education is now exercising that power. The experience of these municipalities shows how greatly the assistance of the Council could increase

the efficiency of the whole educational machine, especially by way of co-ordinating the work of the existing agencies and by supplementing their scattered efforts.

No other public body has the power to undertake this function; and it is in the highest degree unlikely, even if Parliament were disposed to treat London differently from other towns, that any new and special authority for this purpose could be established for years to come. Meanwhile, the Science and Art Department, on the assumption that the Council will exercise the powers entrusted to it, has so modified its grants to science and art classes, that the continuance of these in London is in some cases seriously imperilled; and Mr. Smith tells us 'that many of them have only continued to be held at all this autumn in the hope that the deficiency in the Science and Art grant would be made good in some form by the Council.'

We therefore recommend that the Council should resolve:—

"(1) That, in view of the importance of London not falling behind other cities in the provision of technical education, it is desirable that the Council should exercise its powers under the Technical Instruction Acts, 1889 and 1891, other than that of raising a rate, by devoting to technical education some portion of the funds from time to time receivable under the Local Taxation (Customs and Excise) Act, 1890.

If the Council adopts the foregoing resolution, some arrangement must be made for carrying out the very extensive work of considering the needs of every district, the claims of the several hundred diverse and often competing educational institutions, and the manner in which their action can best be co-ordinated and supplemented. The Council may either retain the whole work in its own hands, or exercise the power given by the Technical Instruction Acts of delegating it to a composite committee appointed by the Council, but not necessarily confined to its own members.

After careful consideration, we are of opinion that the Council should appoint such a composite committee, and delegate its powers. We are led to this conclusion, not only by the importance of securing the co-operation of other educational agencies, and of acting in close concert with them, but also by the difficulty of adding to the already overcrowded agenda paper of the Council. . . .

The Technical Education Board would, of course, as regards the moneys contributed by the Council, be limited both by the terms of the Acts and by any conditions which the Council might from time to time impose. But the possibility should be kept in view of the Board being, hereafter entrusted, as London's main governing body for technical education, with funds from other sources, both public and private. The Council has, on more than one occasion, indicated its view that the recommendations of the Royal Commission on the City Companies should be carried out, and that a large part of the funds now administered by these bodies should be devoted to London's educational needs. One difficulty in the way has hitherto been the lack of any public authority specifically charged with technical education. It may be suggested that the establishment of a Technical Education Board, and its successful working with such limited funds as can be placed at its disposal by the Council, would go far to remove this difficulty, and enable a strong case to be made out for the further endowment of the Board from any funds that may be available, whether from the City Companies, parochial charities, or other sources. Such a Board might indeed obtain with further funds a higher and more permanent status, by charter or otherwise, than any committee of the Council.

We have carefully considered the composition of this proposed Board. We think that the Council should maintain the ultimate control of its proceedings by having a majority of its own members on the new body. We regard it as of great importance to secure the close co-operation of the London School Board, which supplies technical education in elementary schools, and, to a small but increasing extent, in its evening classes. It would also be desirable to obtain the cordial assistance of the City and Guilds Institute, which is, at Finsbury and South Kensington, providing admirable instruction in the highest grades of technical science. The Polytechnics form so important a part of the existing provision for evening education that we should be glad that the Council should have the assistance of representatives of their ultimate governing body, the Trustees of the City Parochial Charities. The Head-Masters' Association and the National Union of Teachers might each usefully assist the Council in the work. And, as we think it of special importance that the cordial co-operation of the trade unions should be secured, we suggest that the London Trades Council should send a representative. As soon as a teaching university for London is established it would be desirable to obtain the assistance of one or more representatives of its work. But the Board should not be of too unwieldy a size. We therefore recommend—

"(2) That, in order to promote efficient and united action, it is desirable that the Council should delegate, so far as is permitted by law, its powers in respect of technical education to a composite body, to be called the Technical Education Board, to be appointed by the Council, partly from its own members, and partly from other persons whose co-operation is desired.

"(3) That the Technical Education Board should be appointed for a term of three years, and should consist for the present of not more than thirty-five members, of whom twenty should be members of the Council; that in the first instance the following bodies should be requested to send representatives for appointment by the Council, viz., the London School Board five, the City and Guilds Institute three, the Governing Body of the City Parochial Charities two, the Head Masters' Association, the National Union of Teachers, and the London Trades Council one each; and that other members, not exceeding two, should be selected by the Council from outside its own body.

"(4) That the Technical Education Board should be directed to present to the Council, in the month of April in each year, a report of its proceedings during the preceding financial year of the Council, together with detailed accounts of all payments out of the funds administered and a complete list of the institutions aided by it; and that interim reports of the progress of its work should be presented to the Council every three months.

It is a question whether the Council should guide the deliberations of the proposed new Board by any detailed plan or scheme. The able and comprehensive proposals of Mr. Llewellyn Smith's report will, of course, be considered by the Board, and the Council may think it desirable to merely express its views as to the need for adequate provision being made for each district and every class. We think that this course is preferable to the formulation, in advance, of any detailed and necessarily rigid scheme. We therefore recommend the Council to resolve—

"(5) That, without committing itself to details, the Council considers that every district of London ought to be adequately provided with technical education of every grade, rising from the school to the workshop and the university, and appropriate to the chief occupations of its inhabitants; that existing institutions of each grade should be systematically co-ordinated to avoid overlapping, and to provide for continuous education; and that provision should be made, in whatever manner may be found expedient, for supplying the gaps at present existing; and that the Council, recognising the value of the comprehensive report submitted by Mr. Llewellyn Smith, refers it for the general guidance of the Technical Education Board.

There remains the question of the amount of money to be devoted by the Council to technical education. If this were to be decided solely by the amount required for a really adequate provision for all branches of technical education, the sum would far exceed the limit of the Council's powers. Even to bring London up to the level of Manchester or Birmingham will require the expenditure of many hundreds of thousands of pounds. But it is obvious that the bulk of this expenditure must come from other sources than the County Fund. What is now necessary is that such a sum should be appropriated as will provide for the most pressing needs, and enable a beginning to be made in the work to be ultimately completed with other aid. After careful consideration of Mr. Smith's report, we have come to the conclusion that, in order to deal fairly with all districts and provide for the more necessary subjects, a sum of about 60,000*l.*, in addition to the 30,000*l.* already set aside, should be appropriated to technical education for the ensuing year.

This would involve the devotion to this purpose of about one-third of the funds receivable by the Council under the Local Taxation (Customs and Excise) Act, 1890. It will be remembered that the great majority of Town and County Councils have devoted the whole of their receipts from this source to technical education. London is less advantageously situated; and, pending some financial relief to the occupying ratepayer, we think that appropriation of one-third of this fund would be a reasonable provision for the ensuing year. We therefore recommend—

"(6) That, subject to an estimate being submitted by the Finance Committee, as required by the statute, this Council is of opinion that the sum of 20,000*l.*, being the balance of the sum of 30,000*l.* directed by resolution of the 14th of April, 1892, to be carried to suspense account, should be appropriated and contributed in respect of the year ending 31st March, 1893, for the purposes of Technical Education; and is further of opinion that a sum equal to one-third of the total amount estimated to be receivable by the Council under the Local Taxation (Customs and Excise) Act, 1890, in respect of the year ending 31st March, 1894, should be similarly appropriated and contributed; and that it be referred to the Finance Committee to submit to the Council the necessary formal resolutions.

If the Council should agree to the foregoing recommendations, it will be necessary that various preliminary arrangements should be carried out before the appointment by the Council of the Technical Education Board can be actually made. We therefore recommend—

"(7) That the Special Committee on Technical Education be continued, and authorised to make any necessary preliminary arrangements, until the appointment by the Council of the Technical Education Board referred to in the foregoing resolutions. . . .

Mr. J. Williams Benn moved that the following words be added to recommendation 1 of the Committee:—

"Provided that the City Livery Companies be called upon to contribute for the same purpose a sum of not less than one-tenth of their corporate income as distinguished from their trust property."

Mr. Hubbard seconded the amendment, and after a good deal of discussion, in the course of which some very hard things were said of the City Livery Companies, the addendum was agreed to in the following terms:—

"And that the City Livery Companies be requested to.

contribute for the same purpose a fair proportion of their corporate income as distinguished from their trust property.

The recommendation, as thus added to, was then agreed to.

On the second recommendation being put, Mr. Fred. Henderson moved, and Mr. Lemon seconded, an amendment referring the matter back to the committee, "with the instruction that the Council was not prepared to delegate its powers in the manner suggested." The amendment was lost by a large majority, and the recommendation of the committee was agreed to.

Recommendation 3 was still under discussion when the debate was adjourned.

After transacting other business, the Council rose at 7 o'clock.

COMPETITIONS.

THE FIELDS ESTATE, NEWPORT, MON.—In an open competition for designs for laying out eleven acres of the Fields Estate, Newport, for building purposes, there were six competitors, and eight sets of plans were sent in. Messrs. Veall & Sant, architects, Cardiff, were appointed professional assessors, and they have just sent in their report, awarding the premium of £25 to the design marked "Fairfield C," the author of which proved to be Mr. Alfred Swash, architect, Newport.

ST. CUTHBERT'S CHURCH HALLS, EDINBURGH.—According to the *Scotsman*, it has now been decided to proceed with the erection of new church halls in connexion with St. Cuthbert's Church, on the site of the old manse buildings, and adjoining the site of the old halls in King's Stables-road, recently demolished in connexion with the North British Railway extensions. The Kirk Session, on the recommendation of Mr. John Honeyman, F.R.I.B.A., Glasgow, their assessor, have approved of the design submitted in competition by Messrs. M'Arthy & Watson, architects, Edinburgh; and the erection of the buildings is to be proceeded with at once. The site is an irregularly-shaped triangle, and being below the level of the road the design required a special treatment. The building is placed lengthwise to King's Stables-road, and consists of two floors. The upper floor, which is approached from the level of the roadway by a broad terrace and a short flight of steps at the entrance door, is entirely occupied with the hall, which is seated to accommodate 800 adults. There are also suitable retiring-rooms. The lower floor is occupied with a smaller hall, class, and retiring-rooms, and caretaker's house. The cost of the buildings is 4,000*l*.

MAGAZINES AND REVIEWS.

The *Gazette des Beaux Arts* devotes a long article, by M. André Pératé, to the Sieneze painter Duccio, with a page illustration of his painting of the Virgin surrounded by angels, in the curious stiff Sieneze style, with the aureoles like a series of plates in the picture. M. A. Dardel in his third article on "La Céramique Italienne" treats of and illustrates the work of Caffagiolo. Tapestries at the Spanish "Exposition Retrospective" by M. Mazerolle (with an engraving of a fine chasuble from Toledo); the eighteenth-century sculptor Clodion and his work, by M. Guiffrey; and an article on the Italian Schools at the Vienna Museum, are among the other contents of the number.

The *Art Journal* shows for frontispiece a delicate engraving of Mr. Vicat Cole's "Westminster" picture, which looks a great deal better in engraving than it does as a picture. The first of a series of articles on "Tynedale, its castles, churches, and tributaries," by Mr. Edward Browne, is given, with several illustrations of the castles of the district, reproduced from photographs. In a short article on "Blake and his disciples" Mr. A. T. Story recognises the importance of Calvert's work. An article by Mr. Henry Wallis on the Cernuschi collection of Chinese and Japanese bronzes is of interest, and well illustrated.

In the *Magazine of Art* architecture is not represented this month, but Mr. Walter Crane concludes his significant and beautifully illustrated article on "Design." "The Art Life of John Leech," by Mr. H. Silver, introduces us in the illustrations to some landscape sketches of Leech's (a light in which he is not much known), and reproductions of some of his delicate drawings of figures. An illustrated article on "Daguan-Bouveret" by Prince Karagorgevitch, may introduce a fine artist to some who do not already know him. There is

also an article on "Suggestions for a New Fine-Art Copyright Bill," by the Editor, with contributions from Mr. Holman Hunt, Mr. Seymour Haden, Mr. Britton Riviere, Mr. H. T. Wells, Mr. John Brett, and Mr. Powtner. Mr. Haden suggests that "the first difficulty attending the drawing of any Bill for the protection of works of art is to determine what is a work of art"; a pithy suggestion of what is sometimes overlooked.

Harper's Magazine contains some illustrations to "Twelfth Night" by Mr. E. A. Abbey, which as supposed realisations of the characters of the play we should call for the most part complete failures. There is an article on "New Orleans," by Mr. Julian Ralph, with sketches; a more interesting one on "Bristol in the time of Cabot," by Mr. J. B. Shipley, with some representations of old buildings of the period from various sources; and the "Editor's Study" contains the kind of puff of Chicago Exhibition art which seems inevitable in all American magazines at present.

In *Scribner* Mr. E. H. and Mr. E. W. Blasfield endeavour to realise, in a charming article, the position and daily life of "The Florentine Artist," of whom they enthusiastically observe, "Eternal youth was there, and its sublime confidence and audacity; they had not even found out what they could not do." "Impressions of a decorator in Rome" is concluded, in the course of which the author falls severely on Michelangelo's Last Judgment; but, like Mr. Horne, admits the ceiling of the Sistine as the finest decorative painting in the world. The whole article is well written and suggestive.

The *Century* contains an article entitled "An Art Impulse in Turkey," by Mr. G. P. Peters, referring to Hamdy Bey's museum at Constantinople and its contents, with some illustrations of the beautiful Greek sarcophagi there.

In the *Fortnightly Review* Mr. F. T. Pigott, whose notes on Japanese art in our columns will be remembered, gives some "Stray Notes on Japanese Art," mainly a description of methods of execution, also of the new Europeanising school of painters, who have fallen into the sin of endeavouring to "cover the paper." Mr. J. S. Jeans contributes a paper on the "New Railway Rates" from the point of view of the trading community, and concludes that Government must interfere to "bring the railway companies to their senses," if they do not put more reason into their demands.

In the *National Review* Earl Russell and Mr. B. H. Thwaite combine in a short article on "Electricity in Country Houses," concluding by recommending country people to combine together in groups to establish centres of electrical supply for the general good, if possible within easy reach of railways.

To *Macmillan* Mr. Cecil Smith contributes an important article on the "Ruins of Persepolis," remarking that "when the general history of the world's art comes to be written, a large and important place in its pages will be occupied by Persia."

The *Atlantic Monthly* gives a review of Mrs. Rensselaer's book on "English Cathedrals" entirely from the French-American standpoint, and adopting the new cant that there is "no true Gothic in England." The reviewer depreciates Mr. Pennell's drawings as not doing justice either to himself or to the buildings. There is also a very pleasant article on "English Cambridge in Winter," by Mr. A. G. Hyde, an American writer (if he is American) who seems to feel the charm of the old world which hangs about our two university towns. They are not of the day or the hour: "We would gladly teach you," the old buildings seem to say, "some of the secrets of those fast vanishing days; the secrets of repose, of religion, and of beauty; but between us there is a gulf fixed which we cannot pass. You must come to us, and in some faint measure become even as we ourselves, before you can hope to understand the mystery which we have in our keeping." Amidst the current American fashion of sneering at everything English, this is rather refreshing.

The *Cornhill Magazine* devotes an article to a description of a visit to the Thames Ironworks and Shipbuilding Company, under the title "Cyclops in London."

In the *Quarterly Statement* of the Palestine Exploration Fund, the Rev. G. E. Post's "Narrative of a Second Journey to Palmyra" is continued. There is a long article by the Rev. A. H. Sayce on "Cuneiform and other inscriptions at Lachish," and one by the same contributor on "The Site of Kirjath-Sepher" or "Book-Town." The most important contribution is Mr. F. J. Bliss's Report of the Excavations at Tell-el-Hesi during the spring of 1892. This gives a plan and photographic view of the excavations, with illustrations of various objects found. A part of the

space in the book is occupied by a reprint of the rather foolish correspondence which some pious but credulous people got up in the *Times* a little while ago about a new imaginary "scripture of Christ," which was to be purchased by public subscription. Major Conder's reply (which seems, however, to have had little effect in bringing these enthusiasts to reason) is also reprinted.

The *Antiquary* contains a protest on behalf of the Lady Chapel of Gloucester Cathedral, threatened with a severe restoration, for which an appeal is made. The *Antiquary* naturally goes rather further in protests of this kind than we should always think it necessary to go, antiquaries in general wanting to have nothing touched at all, which will not always do, but we feel some fear that matters will be carried too far at Gloucester. Mr. Lines contributes an article on "Celtic Remains at Llanfairfechan." "Notes on Archaeology in Provincial Museums" (No. XVIII.) deals with Gloucester; Mr. Ward comments, among other things, on the curious mixture of the cathedral town and the seaport in modern Gloucester.

The *Essex Review* continues its notes on Essex churches, dealing in this number with St. John the Baptist, Danbury.

The *Canadian Architect and Builder* (monthly) appears with a "New Year" number for January, containing an extra number of illustrations, mostly reproduced from photographs of actual buildings, which give the idea that Canadian architecture is in a quiet and safe road of conservatism, not to say commonplace.

The illustrations in the *Architectural Review* (Boston) are more remarkable for their good execution than for the designs. In a "Sketch for a Cathedral of St. Matthew, Dallas, Texas," the architects (Messrs. Cram, Wentworth, & Goodhue) have done all they can, not only to assume a Medieval style (Perpendicular), but to convey in the drawing the idea of an old building. Did it not occur to them that such buildings were once new? A "Portion of an elevation of a house," by Messrs. Roich & Tilden (executed work, apparently), looks like a combination of the Lycistrac Corinthian order with doorways from the Erechtheion.

The *Revue Scientifique* for February 4 includes a short article by M. Le Chatelier on "La Théorie et l'Emploi en Matière de Constructions Métalliques."

The *English Illustrated Magazine* contains a paper on "Scottish Castles and Residences of Mary Queen of Scots," with some picturesque illustrations by Mr. George Reid; the article has no special value apart from the illustrations.

MASTER PLASTERERS' ASSOCIATION:

ANNUAL DINNER.

The first annual dinner of this Association was held in the "Queen's Salon" of the Holborn Restaurant on Thursday, the 2nd inst., Mr. C. Peek, President, in the chair, supported by a considerable number of members of the Association.

The Chairman having proposed "The Queen and Royal Family,"

Mr. E. T. Taylor, Treasurer, proposed "The Master Plasterers' Association," coupled with the name of the President. The Association was one of the most recently-formed of the many societies connected with the building trade, and was not yet, in fact, a year old, but although it was one of the youngest of societies, it was one of the most vigorous and successful, and was meeting an hitherto unsatisfied want. He hoped and believed that the plastering trade would flourish in the near future more than it had done of late, and that when architects found that they could rely upon plasterers' work being carried out with skill and integrity they would put more of it into their drawings. The toast was very heartily received.

Mr. Peek, the President, in replying, referred to the circumstances which had led to the formation of the Association. The master plasterers of London had hitherto been wholly unorganised, and had suffered much owing to the arbitrary conduct of the leaders of the operatives, who had industriously and malevolently encouraged the idea that the master plasterers of London were the greatest "scampers" to be found in the building trade. He repudiated such unfounded insinuations, which, he said, were due to the ill-will, not so much of the men themselves, as of their leaders. He maintained that no man could succeed in the plastering trade unless he did good work, and contended that the allegations which had been made against the plastering trade by the leaders of the men were insults to the intelligence of architects, clerks of works, builders, and foremen. The master plasterers of London wished to uphold the honour of the craft and desired to do good work, and to employ men at good wages to do that work. The Association had been formed to advance the interests of the craft, and they desired to promote not only the welfare of the masters, but the true interests of the workmen.

Mr. Charles Turner proposed the health of the Chairman, who had, he said, done a great deal to ensure the success of the Association.

The President briefly replied.

Mr. S. Wright, Secretary, next proposed "The Craft," and in an able speech referred to the great antiquity of the plasterers' art. It must date back, he said, to a period little later than the time

"When wild in words the noble savage ran."

Soon after the first carpenter had erected the first log hut, the first plasterer must have been called in to stop up the chinks, so that the cold air should not come through and chill the occupants. In more civilised times, as in those of ancient Egypt, the plasterers' art attained a much higher development, both for practical and decorative purposes. He could instance no greater or more striking evidence of the nobility of the plasterers' art than the hieroglyphic decorations which adorned the ancient temples and catacombs of Egypt—decorations which were really historical records. Having characterised the many noble specimens of plaster ceilings, &c., to be found in many of the ancestral homes of England, as monuments of craftsmanship, he said that the members of that Association were capable of doing good work at the present day, and he hoped that by their efforts to improve the craft they would have the support and assistance of the architects. In conclusion, Mr. Wright gave some particulars as to the aims and objects of the Master Plasterers' Association, which has now been in existence some eight months, and was formed on the advice and with the assistance of the Central Association of Master Builders, with the view of uniting and strengthening the members of the craft, and as a means of defence against what were described as the unwarrantable demands of the trade union officials, who sought not only to boycott individual employers, but to prevent builders from subletting their plaster work. The Association now numbered among its members the majority of the established Master Plasterers of London, all of whom were pledged to conform to the arrangements made between the masters and operatives in June last. Among the objects of the Association was the re-introduction of the system of apprenticeship, with a view of raising the standard of technical and practical knowledge among the operatives. In conclusion, Mr. Wright begged to couple with the toast the name of Mr. E. T. Taylor, a member of the Plasterers' Company, and expressed the hope that they in that Association would always bear in mind the injunction which formed the motto of the Company, and "Let brotherly love continue."

Mr. Taylor briefly replied, and other toasts followed, including "The Secretary," to whom a presentation was made by the President, on behalf of the members, in recognition of his services in connexion with the formation of the Association.

Correspondence.

To the Editor of THE BUILDER.

THE ORIENTATION OF CHURCHES.

SIR,—Hearty thanks are due to your correspondent, Mr. Francis E. Jones (January 28), for having taken the trouble to calculate the points of sunrise on four varying saints' days. He has thus far rendered a list where none previously existed, and its application cannot fail to produce interesting results.

Mr. J. Houghton Spencer objects to the hypothesis of a shadow from a pole, which I have suggested, on the ground "that different lines on the same day would be given in this way to different localities, although in the same latitude." But it is not these different lines that are actually observable in our ancient churches, and are we not seeking for their cause? But I am not wishing to press a hypothesis—far from it. The subject of orientation is too large for any individual to master it, and it is only by many observers and by conference over ascertained facts that results are to be attained.

Mr. Wm. White's quotation from Durandus indicates the absence of rule with respect to the orientation of a church to the position of sunrise on the saint's day to whom it would be dedicated when completed. It is this belief, vaguely referred to by many writers, that is deserving of most attention, and lists like that which Mr. Jones has begun would soon enable direct evidence to be thrown upon it.

But have we any reference to such a custom in any ancient document? I know of none. And yet, surely if ever practised, there would remain some written record of its use. This is the more likely, since the custom could not have been acted upon without trouble—in some cases a good deal. Founders and builders alike would have had to remain idle, on some occasions for the longest part of a year, waiting for the particular saint's day to come round. Such patient

waiting for such a small result as this would surely have had its record in some case had it ever existed.

Your correspondent, F. E. H., will find other examples of churches—and large ones too—as much out of true orientation, or nearly so, as St. Alban's Abbey. Of these, one at least, Rievaulx Abbey, owes its axis most probably to the circumscribed site between the river and the base of hills, although the older and much smaller church had the same direction. Rochester Cathedral owes its position to local circumstances, about which some of your readers may hear shortly. Others, however, like Southwell Minster, stand in open ground, and it is subject of enquiry as to the influences that have determined their positions. But it has to be remembered that the axis of a square body, if set out to sunrise at the summer or the winter solstices, will, for many positions in our island, have its angles directed to the cardinal points. These angles will vary in proportion as the times of the solstices are approached or departed from.

E. P. LOFTS BROOK.

SIR,—Replying to the question of your correspondent, H. E. T., it may be pointed out that it has not been suggested that a rule for orientation exists to which there are no exceptions.

On the contrary, when it is remembered how early the Christian Church was planted in these islands, that upon the arrival of Augustine considerable differences of opinion and custom were found to exist between that section of the Church which he represented and the British Church, that from the twelfth to the fifteenth centuries alterations were made in our then existing churches by the erection of chantries, and rood-lofts with their accompanying staircases, representing the prevalence of doctrines which the original builders were probably strangers to, then it seems reasonable to suppose that the influence of the Italian party by rededication, or in the case of new buildings by a disregard of orientation, would be the cause of many apparent and actual deviations from the ancient rule. June 17 is the day assigned to St. Alban in the Calendar of the English Church; August 2 is the day connected with the day of his translation, and May 16 with his death; but as each of these days has an orientation north of east, none of them can be connected with the axis of St. Alban's Abbey, which your correspondent describes as being "nearly due east-south-east." It should be noticed that in latitude 51° 44' north, the latitude of St. Alban's, the true bearing of the sun at rising is much more to the north of east throughout June than 22 or 23 deg., which your correspondent seems to think is its position on some days in that month.

Whether the line of the axis of St. Alban's Abbey is that set out by Offa, or was modified in the time of Lanfranc, who, as well as Offa, had relations with the Papal See, it would appear that its connexion by orientation with St. Alban was not regarded by its builders. The poetical idea of ancient church-founders waiting for the rising sun in order to get a guiding line for their work, for which it is believed Wordsworth is responsible, has been more than once alluded to, but this *modus operandi* does not commend itself to the practical builder, taught by experience that waiting for the sun to rise on a particular day may be attended with a very unsatisfactory result. Nor is this to be wondered at when it is remembered that the period of bright sunshine in the British Isles, estimated in percentage of its possible duration, may be as low as 16 in one month, and not give a higher average than 28 for the year. The outline of a table of horizontal angle of sunrise, prepared by Mr. Francis Jones, must prove very useful for comparing the differences between the same days (nominally twenty) in different centuries, brought about by the increasing error of the Julian Calendar, which reached its maximum, as far as our subject is concerned, in 1752.

But it must be borne in mind that the, in some cases considerable, differences in angle which that table shows are the result of an increasing difference between the civil and solar year, and not of an alteration in the actual points of sunrise from one century to another, which difference in Russia, where the old style is still followed, now amounts to twelve days, but which has been corrected in the new style, and is prevented from again accumulating inconveniently by regarding, of the last years of every century only, that of every fourth century as a leap year, thus omitting three days in four centuries, which days would have been added under the old style. The observations of Mr. William White, based upon a remark of a polemic Latin divine, show that there was a difference of opinion with regard to orientation in the fourteenth century, which is precisely what history teaches was the case generally with regard to many ecclesiastical subjects, but do either of the rules alluded to by Durandus necessarily exclude a reference to a particular day? The vernal and autumnal equinoxes and the summer and winter solstices are closely connected with the days of the annunciation of the birth, and the birthdays of the Great Founder of Christianity and his forerunner, so that

these two ever-prominent personages, by the four days assigned to them at or near these periods, figuratively grasp the whole of the Christian year, and one or the other may be referred to by a solstitial or equinoctial orientation.

Further investigation would show how many churches accord with either of these rules, and if Durandus gives a reason why one rule was right and the other wrong, it would be interesting to have it stated, and if not, it is thought that it would not be difficult to assign one.

The conclusions suggested from a full consideration of the subject generally are briefly these: that a rule for orientation was in operation in the British Church at a very early period, notwithstanding that it was disregarded by a certain party seeking to influence that Church from without and within; that the early builders could accurately ascertain the true north, if not by the compass, then by means of a circumpolar star, and the true bearing of the sun at rising by calculation in any latitude, and further were aware of the increasing error in the Julian Calendar, and would probably correct it for this purpose; that we have the same means of ascertaining the cardinal points of the compass as they had; that we can ascertain by calculation the true bearing of the sun at rising for any day in the year which, as our calendar is now corrected, would be the same for us as for them with a corrected calendar; therefore we are in a position to test the lines so unalterably laid down—or perhaps rather to recover an idea, an intention, long shrouded it may have been by a subsequent rededication.

J. HOUGHTON SPENCER.

Taunton, February 6, 1893.

The Student's Column.

CHEMISTRY.—VI.

Symbol N. Nitrogen. Atomic weight 14.

NITROGEN is an odourless, invisible gas. It forms about four-fifths of the total volume of our atmosphere. Combined with other elements, it is a constituent of most vegetable and animal bodies, and also of many mineral substances. The value of many manures depends chiefly upon the amount of available nitrogenous matter they contain.

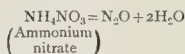
Nitrogen is not a poisonous gas, but will not support animal life or combustion.

The most convenient method of obtaining it from the atmosphere is to burn a small dry piece of phosphorus in a bell-jar filled with air, the mouth of the bell-jar being immersed in a tray or dish of water. The burning phosphorus combines with the oxygen of the air in the bell-jar, forming dense white fumes of phosphorus pentoxide (P_2O_5), which may at first be seen in the bell-jar, but soon dissolve in the water, leaving the colourless nitrogen in almost a pure state. The water will, of course, rise a little way in the jar, because about one-fifth of the original volume occupied by the air has been removed by the phosphorus.

The following five distinct compounds of nitrogen with oxygen have been identified:—

1. Nitrogen monoxide N_2O
2. Nitric oxide NO (N_2O_2)
3. Nitrogen trioxide N_2O_3
4. Nitrogen tetroxide N_2O_4
5. Nitrogen pentoxide N_2O_5

The first of these, nitrous oxide or nitrogen monoxide (N_2O), forms the "laughing-gas" of the dentist. It may be prepared by heating ammonium nitrate to a temperature not exceeding 250° C. in a test-tube and collecting the gas over hot water (see Fig. 1).



The gas is soluble to a considerable extent in cold water. When required for inhalation, laughing-gas must be purified from all acid vapours and from all traces of the higher oxides of nitrogen. This may be performed by passing the gas over lime and then through sulphate of iron solution.

Nitrogen combines with hydrogen to form ammonia (NH_3), with hydrogen and oxygen to form nitric acid (HNO_3), and with hydrogen and carbon to form prussic acid (HCN).

The Atmosphere.

The atmosphere consists almost entirely of a mixture of nitrogen and oxygen gases. They are not chemically combined.

Roughly speaking, the gases are mixed in the following percentage proportions:—

	By Volume.	By Weight.
Nitrogen.....	79.0	76.9
Oxygen	21.0	23.1
	100.0	100.0

The atmosphere, however, always contains small quantities of other gases. The following may be considered as representing approximately the average composition of air:—

	By Volume.
Nitrogen	77.95
Oxygen	20.61
Aqueous vapour (variable)	1.40
Carbon dioxide	0.04
Nitric acid {	traces
Ammonia {	traces
Marsh gas {	traces
Sulphuretted hydrogen { near }	traces
Sulphurous anhydride { towns }	traces
	100.00

In the open country, and by the sea-shore, traces of ozone are also said to be sometimes found.

Ventilation.

All gases expand when heated, and according to the law of the expansion of gases discovered by Charles, for each degree Cent. that any gas is heated above 0° C. it increases $\frac{1}{273}$ part of its volume at 0° C., provided, of course, that the pressure upon the gas remains constant.

Consequently, air, or any gas or mixture of gases, is lighter, bulk for bulk, when warm than when cold, and cold air may, therefore, be regarded as possessing a greater density than warm air. Now, as building stones and bricks are more or less porous to air, it follows from the "law of diffusion" that if air of different densities be placed at opposite sides of these porous materials, the two gaseous mixtures will diffuse into one another, the warmer air diffusing into the colder air more quickly than the cold air diffuses into the warm air. Taking into consideration the great difference which sometimes exists in the winter time between the temperature of the open air and the air of a room which is only separated on one side from the open air by a brick wall, it will be at once recognised that diffusion plays a somewhat important part in ventilation. In fact, it is said to have been shown by experiment that with the temperature of a room of 2,650 cubic ft. capacity at 64° F., and the external air at freezing point, or 32° F., the air in the room became entirely changed in one hour, merely by diffusion through an ordinary brick and mortar wall.

According to Prof. V. B. Lewes, even with so small a difference in temperature as 2.5° C. between the external and internal air, air will diffuse through the following materials at the following rates per hour:—

	Cubic feet per hour.
Sandstone	4.7
Quarried limestone	6.5
Brick	7.9
Loose sandstone	10.1
Mud	15.4

The amount of ventilation produced by diffusion is, however, by no means sufficient to keep the air of a dwelling-room as fresh as it ought to be. It is necessary to adopt other methods of ventilation, which will cause the air of the room to become changed at a much quicker rate. The respiration products when they leave the body are much lighter, bulk for bulk, than the atmosphere, because they are much hotter. Consequently they will rise towards the ceiling of a room, where, if they cannot escape, they will become gradually cooled by contact with the atmosphere. They will then descend and be again respired by the inmates of the room, for respiration products are heavier than air if both are weighed at the same temperature. It is therefore necessary to have an outlet for the waste products near the ceiling, but at the same time it is of little use to provide an outlet for the impure air if no inlet is provided in some other part of the room for fresh air.

All methods of ventilation must depend upon setting the air of the room in motion. This, as has just been shown, is brought about by heat, and consequently gas flames, instead of increasing the amount of impure air in a room, may be turned into very efficient ventilators. It is simply necessary to place over each burner a tube with a trumpet-shaped mouth, and to lead the other end of the tube into the open air or into a chimney flue. The hot combustion products rapidly escape through this

tube, carrying with them by aspiration a considerable amount of the atmosphere of the room. Here, again, it is very necessary an efficient inlet should be provided from the fresh air. Speaking of ventilation in this way by gas, Dr. Wynter Blyth says that even "a water-closet in the centre of a building may be kept fairly sweet by carrying a tube direct from the outer air in a horizontal position to the floor of the closet, and a shaft led vertically upwards to the roof, and placing in the shaft a tiny jet of gas."

Referring to the air expired by human beings, Professor Huxley ("Lessons in Physiology") says that, "speaking roughly, air which has been breathed once has gained 5 per cent. of carbonic acid, and lost 5 per cent. of oxygen."

The expired air also contains, in addition, a greater or less quantity of animal matter of a highly decomposable character.

Also that "uneasiness and headache arise when less than 1 per cent. of the oxygen of the air is replaced by other matters."

He also considers that "to be supplied with respiratory air in a fair state of purity, every man ought to have at least 800 cubic feet of space to himself (a room 9 ft. high, wide, and long contains only 729 cubic feet of air), and that space ought to be freely accessible, by direct or indirect channels, to the atmosphere."

It should however be noted that carbonic acid is not an active poison, for so long as the oxygen of the air is maintained in its normal proportion of 21 volumes in 100, it is said that an animal can breathe without much discomfort in an atmosphere containing as much as 10 per cent. of carbonic acid. It would seem therefore that the principal harm caused by small quantities of carbonic acid is that it displaces some of the available oxygen, and that it is only when the proportion of it increases very considerably, as, for instance, in unventilated rooms in which oil or gas is burning, that it is really detrimental to health. It appears that it is to the organic matter which accompanies the CO₂ in expired air, that the injurious nature of the air in crowded rooms is chiefly due.

Vitiation of the Atmosphere by Products of Combustion.

It has been shown that a true process of combustion is carried on within our bodies, and that the atmosphere is vitiated by the products of that combustion, but it is intended here only to refer to the combustion of coal, gas, oil, and candles. Without the presence of oxygen, coal cannot be burnt, it can only be "carbonised."

When coal is burnt in air, the carbon of the coal unites with the oxygen of the air to form carbon dioxide, or carbonic acid gas as it is often called, while the hydrogen of the coal also unites with the atmospheric oxygen to form water. Now carbon dioxide is beyond all doubt quite unable to support life, even though not an actual poison. Consequently, it is desirable to prevent these products of the combustion of coal from entering and mixing with the air of a room, and it is partially for this purpose that a flue is provided. The most important function of a flue is to carry away the products of the incomplete combustion of coal. When oil, gas, or candles are burnt, carbon dioxide and water are formed in just the same manner, and when any of these substances are burnt some means of escape into the outer air ought to be provided for their combustion products. Many theatres have adopted the electric light, which does not vitiate the air, as their means of illumination; but at the same time are provided with ventilating shafts containing small gas-jets within them. This method, although excellent for maintaining the atmosphere of a public place, such as a theatre, church, or assembly hall in good condition, is not suitable for adoption to the majority of private houses on account of expense. It is not sufficient, even in a private house, to adopt the electric light without providing also some efficient means for withdrawing the foul air produced by respiration and allowing an ample inlet for fresh air.

The most economical means of lighting and ventilating a private house efficiently is probably the ventilating Regenerative burner. Here we have not only a good, steady light, but at the same time a most efficient modification of the ventilating shaft. Both oil lamps and candles have the advantage of being movable to any part of a room; consequently, less total light is required, for it is seldom desired to illuminate every corner of a room very brightly at one time.

The following table, taken from Professor Lewes's "Air and Water," shows the comparative effects on the air of a room of several methods of lighting:—

Table showing the amount of oxygen removed from the air, and carbon dioxide and water-vapour generated by giving an illumination equal to thirty-two candle-power.

Products of Combustion.				
Illuminant.	Quantity Oxygen burnt	Water vapour	Carbon dioxide	Equal to Adults
	Grains.	Cub. ft.	Grains.	Cub. ft.
Sperm candles.....	3.480	19.27	13.12	13.12
Paraffin oil	1.984	12.48	7.04	8.96
Gas (London) ...	Cub. ft.			
Batwing	11.0	13.06	14.72	5.76
Argand	9.7	11.52	12.80	5.12
Regenerative.....	3.2	3.68	4.16	1.60

Hence, while 32 candles would vitiate the air with the same amount of carbon dioxide that 21.8 adults would give, the same amount of light may be obtained from a Regenerative burner with the comparatively small amount of carbon dioxide that 2.6 adults would produce. Of course, in practice, this enormous difference would not be obtained, for while it is a common occurrence to have an illumination equal to 32 candles in a room when lighted by gas, no one would think of having 32 standard candles alight at one time in an ordinary room. The difference is, however, sufficiently marked to show that even in practice, illumination by means of the Regenerative burner is not only less likely to be injurious, but is also more economical than by the other means mentioned. It is not always, however, convenient for application to rooms in private houses; and has the disadvantage of being very unsightly.

While upon the subject of combustion products, it may be well to draw attention to the fact that comparatively large gas-stoves are often fitted in private houses without being connected in any way with a flue. This cannot be too strongly condemned. No gas-stove should be allowed in any room of ordinary size unless some means are provided for preventing the combustion products finding their way into the room.

Carbon dioxide is a product of complete combustion. Carbon monoxide and acetylene are produced by the incomplete combustion of coal-gas. Both these gases have been shown to be present in the products of combustion when gas is burnt in ordinary burners. The first of these products, carbon monoxide, is exceedingly poisonous, while the second is also believed to have deleterious effects upon the health.

GENERAL BUILDING NEWS.

NEW POST OFFICE, PAISLEY.—New Post-Office buildings which have been erected in the County square, Paisley, were opened on Monday. The new premises are situated in the centre of the town, and close to the Glasgow and Paisley Joint-Line Station buildings. In the architecture of the premises the Tudor or Domestic Gothic style has been adopted. The new building is in two stories, and from the ground floor to the ridge of the roof the height is 40 ft. The public office, which is 40 ft. in length by 22 ft., and 15 ft. from floor to ceiling, is on the ground floor of the main building, with the entrances leading off the pavement in the square. The postmaster's private room is in the north-east corner of the main building, behind which there is a retiring room for clerks and sorters. At the rear of the public office is the sorting room. This department is 57 ft. long by 25 ft. wide. The light is supplied from the roof. The batteries and other apparatus belonging to the telegraphic department are to be kept in premises behind the sorting room. The mails will be taken in through an archway at the back of the building, while on the south side a separate entrance has been provided for taking in stores, &c. On the first floor, above the public office, is the telegraph room, 54 ft. by 22 ft. Retiring rooms for telegraph clerks and messengers are also placed on the first floor. The building is heated throughout with steam pipes. The architect of the building is Mr. W. W. Robertson, of H.M. Office of Works, Edinburgh, and the clerk of works was Mr. Thomas Ely. The principal contractor was Mr. Alexander M'Naughtan, joiner, Paisley; and the sub-contractors were—Mason work, Mr. William M'Ghee, Paisley; plumber work, Mr. Kilpatrick, Paisley; plaster work, Messrs. John Fraser & Co.; slater work, Mr. Charles Wallace, Paisley; and heating apparatus, Messrs. Mackenzie & Moncur, Edinburgh.

BOARD SCHOOL, SEACOMBE, CHESHIRE.—On Monday last there was opened at Seacombe the new school, built from the plans of Mr. Meland Reade, F.R.I.B.A., of Liverpool, for the Seacombe School Board. The buildings consist of separate boys', girls', and infants' schools, grouped under one roof, and all on the ground floor. The site, which has a frontage of 230 ft. to Poulton-road, and 240 ft. to a new road called Park-road, contains about 7,500 square yards. The buildings, front Poulton-road, and are set back therefrom 80 ft., giving good playground to the south. The boys' and girls' school-

"THE SAFETY TREAD SYNDICATE, LIMITED."—As will be seen by an advertisement appearing in our issue this week, this company has been formed

for acquiring and working the English patent-rights of Mason's patent safety tread covering for stairs, &c. This "tread," which consists of a combination of chilled steel (or other hard metal) and lead, has been already described and illustrated in our pages.

A HAND WINCH.—Mr. Oscar Witte, of Bodenbach, Bohemia, has designed a hand winch for builders' purposes, which can either be worked by pinion and spur wheel on the barrel in the usual way, or by a separate handle which actuates bevel gearing, which in turn works a worm and wheel. The latter gear is for slow speeds, and is made to drive the barrel by means of a clutch, which, of course, is out of gear when the more direct method of operating is in use. The device seems more suitable for marine purposes than in the construction of buildings.

SALARIES AT ST. HELEN'S.—At a meeting of the Council of the County Borough of St. Helen's, held on Wednesday last, it was decided, by 26 votes to 6, that the salary of the Town Clerk, Mr. Wm. Jno. Jeeves, be raised from 500l. to 700l. per annum, and also that the salary of Mr. Geo. J. C. Broom, M.Inst.C.E., Borough Engineer, be raised 100l. per annum from January 1 last.

CAPITAL AND LABOUR.

EDINBURGH TOWN COUNCIL COMMITTEES AND THE CONTRACT SYSTEM.—The Streets and Buildings Committee of the Edinburgh Town Council, at a meeting on the 3rd inst., had before them the remit from last meeting of the Council as to the declaration proposed to be inserted in the city contracts to secure that "the contractors shall pay the standard recognised rate of wages, or such wages as may be generally accepted as fair in the trade." Dean of Guild Miller moved that the Committee should report that it was inexpedient to insert such a condition in the forms of offer. Mr. Mortimer seconded. Mr. Euston moved that the Committee should report in favour of the insertion of the declaration recommended. Mr. Miller-Dunlop seconded. For the motion there voted 8, while for the amendment 6 voted. The motion was therefore carried. At the meeting of the Treasurer's Committee the same subject came up, and the proposal that the declaration should be inserted in the city contracts was rejected by three votes against two.

MEETINGS.

FRIDAY, FEBRUARY 10.

Architectural Association.—Mr. C. J. Tait on "The Value of Criticism." 7.30 p.m.
Institution of Civil Engineers (Students' Meeting).—Mr. H. Calder Lectures on "Long Shot Druggers—their design and mode of working." 7.30 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Mr. W. C. Tyndale on "House Drainage." 8 p.m.
Society of Arts (Howard Lectures).—Professor W. C. Unwin on "The Development and Transmission of Power from Central Stations." V. 8 p.m.

SATURDAY, FEBRUARY 11.

Architectural Association.—Visit to the Church of St. Bartholomew the Great, West Smithfield, by permission of Mr. Aston Webb. 3 p.m.
Sanitary Inspectors' Association.—Dinner at the "Criterion," Piccadilly. 6 p.m.

MONDAY, FEBRUARY 13.

Royal Institute of British Architects.—Colonel Lenox Prendergast on "The Cathedral of Palma, Majorca, with some notes on its neighbourhood." 8 p.m.
Royal Academy of Arts.—Dr. A. S. Murray on "The Sculptures of the Mausoleum." I. 8 p.m.
Society of Arts (Counter Lectures).—Professor J. A. Fleming, M.A., F.R.S., on "The Practical Measurement of Alternating Electric Currents." III. 8 p.m.
London Institution.—Mr. Shelford Bidwell, M.A., F.R.S., on "Electricity and Heat." 5 p.m.
Clerks of Works Association.—Annual Dinner, Holborn Restaurant. 6.30 p.m.

TUESDAY, FEBRUARY 14.

Institution of Civil Engineers.—Dr. Edward Hopkinson, M.A., on "Electrical Railways." 8 p.m.
British Museum.—Miss Emily Penrose on "The Daily Life of the Athenians." III. 2.30 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Professor H. Robinson on "Sewerage and Sewage Disposal." 8 p.m.

Civil Engineering, Engineering, and Surveying Association.—Mr. A. W. Johnstone on "Building Construction in Earthquake Countries."

WEDNESDAY, FEBRUARY 15.

British Archaeological Association.—(1) Mr. E. A. Ebbelwhite on "The Parish and Church of Beaufort, Middlesex." (2) Mr. Andrew Oliver on "The Monumental Brasses in Westminster Abbey." I. 8 p.m.
Society of Arts.—Professor F. Clowes on "The Detection and Estimation of small Proportions of Inflammable Gas or Vapour in Air." 8 p.m.
Builders' Foremen and Clerks of Works Institution.—Ordinary Meeting. 8.30 p.m.

THURSDAY, FEBRUARY 16.

Royal Academy of Arts.—Dr. A. S. Murray on "The Sculptures of the Mausoleum." II. 8 p.m.
Society of Antiquaries.—8.30 p.m.
Institution of Civil Engineers.—Students' Visit to the Sewage Purification Works of the Henden Local Board, at Henden. 2.45 p.m.

FRIDAY, FEBRUARY 17.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. H. H. Collins on "Sanitary Building Construction." 8 p.m.
Society of Arts (Howard Lectures).—Professor W. C. Unwin on "The Development and Transmission of Power from Central Stations." VI. 8 p.m.

RECENT PATENTS.—Owing to pressure on our space this week, we are obliged to hold over our usual list of Patents until next week.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JANUARY 30.—By *W. W. Jenkinson*: Nos. 182, 184, and 186, Dalston-lane, f. r. 135s., area 18,000 ft., 5,500l.; 79, Navarino-lane, Hackney, u. t. 61 yrs., g. r. 6l. 17s. 6d., 420l.; 1, Canterbury-rd., Old Kent-rd., and 5 and 6, Wagner-st., f. r. 41l. 19s. 20s.; 3, 7, 17, to 23 odd Canterbury-rd., f. r. 520l.; 33, 35, and 37, Canterbury-rd., f. r. 200l.; "Rose Cottage," Wagner-st., f. r. 105s.—By *Weatherall & Co. Ltd.*: The Pineapple Nursery, Maidstone, f. r. 450l.; 24, William-st., u. t. 90 yrs., g. r. 6l. 10s., r. 250l. 250l.; 31, Whistler-st., f. r. 350l.

JANUARY 31.—By *S. B. Clark & Son*: f. market garden land, 12 acres, Heston, Middlesex, f. 60l., 1,720l.; By *Matthews & Matthews*: 28, Essex-rd., Islington, f. 55l., 950l.; By *Dann & Lucas*: An enclosure u. t. land, Belvedere, Kent, 24 a. 2 r. 0 p., 450l.—By *W. Stocker*: f. g. r. of 27l. 10s., St. Dunstan-sd., Hammersmith, reversion in 90 yrs., 640l.; f. g. r. of 44l., reversion in 90 yrs., 1,065l.; f. g. r. of 16l., reversion in 90 yrs., 410l.; f. g. r. of 200l., 2,800l.; 6 and 8, Knighton-pk-rd., Sydenham, f. r. 56l., 700l.; f. g. r. of 25l. 4s., Stanton Villas, with reversion in 90 yrs., 550l.; 19, Alexandria-rd., Finsbury-pk., u. t. 81 yrs., g. r. 10l. 10s., r. 450l. 350l.; 24, William-st., u. t. 90 yrs., g. r. 6l. 10s., r. 250l. 250l.; 31, Whistler-st., f. r. 350l.

FEBRUARY 1.—By *F. Jolly & Co.*: 34, St. Peter-st., Islington, f. r. 40l., 600l.—By *Baxter, Payne, & Lepper*: "The Eden Lodge" near Beckenham, containing 11a. 3p. 35l., f. r. 7,000l.; three f. cottages and plot of land, Hadden, Kent, 200l.—By *H. Griffiths*: 1 to 17 (odd), Redfern-st., Battersea, u. t. 84 yrs., g. r. 45l., 1,500l.; 42 to 56 (even), Stammer-st., u. t. 84 yrs., g. r. 40l., 1,475l.; 25, Austin-rd., f. r. 28l. 25s., 395l.; 86 to 94 (even), Uxbridge, f. r. 380l.; 14, Wayland-rd., Clapham, u. t. 64 yrs., g. r. 4l. 31l. 4s., 150l.—By *Messrs. Spelman* (at Ipswich): 1 to 9, St. Margaret's-st., Ipswich, f. r. in lot 1, 1,410l.

FEBRUARY 2.—By *D. J. Chattell*: 2, Prospect-villas, West Green, f. r. 20l. 5s., 2, Prospect-villas, f. r. 22l. 28s.; f. g. r. of 10l., Caxton-rd., with reversion in 73 yrs., 255l.; 24 and 26, Shore-rd., Hackney, u. t. 42 yrs., g. r. 8l., 725l.; By *Beard & Son*: 131, Portobello-rd., Notting., u. t. 38 yrs., g. r. 8l., r. 50l. 450l.; 152 and 160, Portobello-rd., u. t. 38 yrs., g. r. 16l., r. 100l. 885l.; 121, Portobello-rd., u. t. 38 yrs., g. r. 8l., r. 46l. 365l.; 128, Cornwall-rd., u. t. 67 yrs., g. r. 8l., r. 40l. 300l.—By *Worsfold & Haywood*: Dovey-rd., 7, Dovey-rd., f. r. 21l. 17s.; 30 and 36, Albany-pk., u. t. 97 yrs., g. r. 2l. 30s.; 24, York-st., f. r. 250l.; 11, Russell-st., f. r. 250l.; 45, 46 and 48, Maison Dietrich, u. t. 66 yrs., g. r. 6l., r. 53l. 800l.; 105, High-st., Chancery, f. r. 1,400l., 4,050l.

FEBRUARY 2.—By *Baker & Sons*: 3, 5, and 7, Brathwaite-rd., Wandsworth, u. t. 90 yrs., g. r. 25l. 240l.; 17 to 27 odd; 31 to 45 odd; 24, 46, and 10 to 28 even, Brathwaite-rd., u. t. 60 yrs., g. r. 135l. 2,025l.; 10 to 40 even; 47 to 51 even; and 9, 11, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 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4 & 5, East Harding-street,
Fetter-lane, E.C. [ADVT

6 and 8, Hatton Garden. 47 and 49, St. Enoch-sq.

Fetter-lane, E.C. [ADVT]

ILLUSTRATIONS.

Reredos, Colyford Church, Devon.—Messrs. Tait & Harvey, Architects	Single-Page Photo-Gravure
Pulpit, St. Matthew's Church, Exeter	
Bishop's Throne, St. Mark's Church, Torquay } Messrs. Tait & Harvey, Architects	Single-Page Photo-Gravure.
Title Prize Design for the East End of a Town Church.—By Mr. C. A. Nicholson	Double-Page Ink-Photo.
Extension of Offices for the <i>Morning Post</i> , 346, Strand.—Mr. H. O. Cresswell, Architect	Single-Page Photo-Litho.
New Room in Crom Castle, Ireland.—Mr. T. Garratt, Architect	Single-Page Photo-Litho.
Interior of a Hall and Ball-room.—Designed by Mr. J. Armstrong Stenhouse	Single-Page Ink-Photo.
Part of Second Court, St. John's College, Cambridge.—From a Sketch by Mr. William H. Thorp, F.R.I.B.A.	Single-Page Ink-Photo.

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The "Enneakrunos" Excavations at Athens.



WE have already more than once drawn attention to the excavations carried on by the German Archaeological Institute between the Pnyx and the Areopagos, and we are glad to be able now to lay before our readers a plan of the discoveries made, which not only shows the lie of the actual buildings found, but also makes intelligible the exact state of the famous "Enneakrunos" question. The plan is taken from our energetic Athenian contemporary, the *Erria*, and accompanies an article by Mr. George Soteriades, a summary of which, with some additional commentary, we now proceed to give.

The excavations began at the point marked A, i.e., a little to the north of the modern carriage road that leads from the lower town up to the Acropolis, and close to the place where the road to the modern observatory branches off. Even before the excavations were begun there were visible at this point remains of a cistern, though the position seemed a strange one if the cistern were intended to collect the water from the conduit hewn in the Pnyx rock which comes to light at the point marked I, i.e., on the right hand of the carriage road as you go to the Acropolis, close to the road. The place was thoroughly cleared out down to the ancient pavement of what was once the Panathenaic road. And here we may pause to note that the first, and perhaps the greatest topographical service rendered by the excavations, is the fixing, beyond the possibility of doubt, of the route taken by this road. Generations of scholars and archaeologists had assumed almost as an axiom for Athenian topography that the Panathenaic road went by the much shorter but far steeper route to the north of the Areopagos. The shortest road is not

always the nearest. Modern Athens takes the longer and easier way, and relying mainly on the impracticability of the northern route, Dr. Dörpfeld always maintained that the road wound round to the south as marked, by his advice, in the plan of the Agora in "Mythology and Monuments of Ancient Athens." The lie of the Panathenaic road is, of course, of paramount importance in settling, e.g. the site of the Eleusinion; the position of the statues of Harmodios and Aristogeiton, and a number of other questions. It will be seen by a glance at the plan that the ancient road is by no means coincident with the modern one. The ancient one is marked ΑΡΧΑΙΑ ΟΔΟΣ.

To proceed with the excavations. Close to point A a little further on the road Dr. Dörpfeld came upon a stairway leading up as a short cut to the Pnyx. This he cleared out as far as was necessary to determine its ultimate direction. It is marked M. Immediately after this point the old road cuts clean across the new, and naturally the excavations followed the old track. On its right side there came to light almost immediately a series of buildings which were wholly unlooked for. They are marked I, Θ, Η, Ζ. They all date, by their masonry, &c., from the sixth century B.C. The most important is I, an oblong building which, from an inscription, "ΗΟΡΟΣ ΑΕΣΧΗΣ," is known to have been a lesche or hall—it extended backward from the ancient road to Pnyx rock. This lesche of the fourth century B.C. occupied in part the site of a still more ancient building, probably of the sixth century, which, owing to the rise of the level of the road and other causes not now ascertainable seems to have been early submerged. This early building was a small sanctuary of unknown dedication. It was surrounded by polygonal walls and contained a small shrine without a colonnade, in front of which was a round altar of poros stone. Two boundary stones belonging to this sanctuary were found, each bearing in archaic letters the inscription *ἄρος*; one was still *in situ*. It is exceedingly disappointing that there is no means of ascertaining the dedication.

The building marked Θ is a private house built of polygonal limestone masonry. It is known to be a private house from the interesting fact that two inscriptions on its outside wall in letters of the sixth century state that it was heavily mortgaged. Η is another large house, the front wall of which measures 25 mètres. Last of this group is Ζ, a house bearing the inscription "ἄρος οὐκείας περπαμένης ἐπὶ λῶσι," i.e., "boundary of the house sold for redemption." The sum was 2,000 drachmas, to be paid to a certain Aristodemos. At Ε there branches off a short cut for foot-passengers only up to the Acropolis.

Δ marks the site of a perfectly unexpected discovery, i.e., of a sanctuary to Asklepios. Pausanias mentions no such building, but from the character of the sculptures found there can be no doubt. A little further south, and still on the left side, the excavators came again unexpectedly upon two graves. They found also what they did expect, i.e., a conduit. It was made of terra-cotta pipes, of excellent though archaic workmanship, and its object was to carry water to the Asklepieion, and also probably to the Eleusinion. These pipes were prepared with the utmost care, and soldered together with lead, and glazed inside and out in order to render them impermeable. It was clear that these pipes must belong to some important reservoir. At first it had seemed possible that the missing reservoir might be found near A, where, as we noted above, remains of a reservoir were discovered, but these proved to be of much too late date. It was not many days later that the real reservoir came to light at A. It was 10 mètres long, and the masonry of the date of Peisistratos. Here, and here only, could be the site of the Enneakrunos. Still further confirmation, however, was to be forthcoming.

The supply of water from the old Kallirhoe before the gate was a limited one, and in hot weather apt to run short. The ancient Athenians then had recourse to wells that they had sunk for such cases of emergency. Two such wells have now been found,

one close to the reservoir, and the other near the Asklepieion, and here wells were filled up artificially at the time of Peisistratos; that is clear from the fact that they are full of rubbish, consisting of remains dating only before his time, fragments of black-figured vases of that period, &c. The reason is clear. When Peisistratos by his new conduit brought an ample supply of water to the city gate—a supply that never ran dry—the wells were superfluous, and therefore naturally were filled up. They, as well as the small spring Kallirrhoe, were superseded by the Enneakrunos.

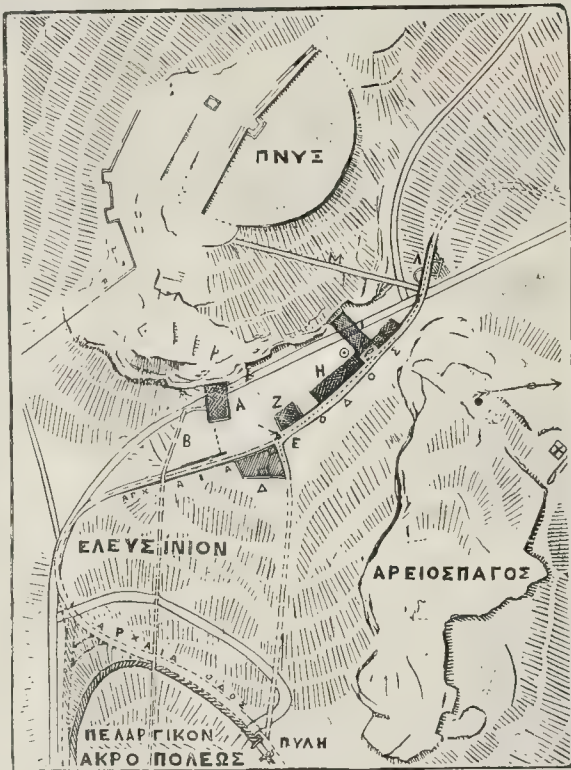
There will, no doubt, remain some scholars who are still wedded to the "Enneakrunos episode." These will argue that the Enneakrunos is on the Ilissos; the newly-found reservoir is not on the Ilissos, therefore it is not connected with the Enneakrunos. To such an argument, so based, even the spade can make no convincing reply. To others, the fact that the reservoir is where we should naturally (barring misconceptions based on Thucydides) look for the Enneakrunos, i.e., just in front of the old city gate, where the ancient Kallirrhoe stood, coupled with the second fact that the pipes, masonry, &c., are all of the date required, and with the evidence of the disused wells, will seem enough. We may be a little disappointed that no Agrippeion, no Metroön, no Eleusinion have appeared, and that in place of them we have a lesche, private houses deeply mortgaged, and a sanctuary to Asklepios. We may feel that we must go back and reconsider the ordering of the building seen and described by Pausanias, and bear him a fresh grudge for not describing what we know he passed close by; but it is a satisfaction to reflect that we have one more spot where we can pin him fast—the Enneakrunos; and that we know for certain, step by step, at least, one stage of the way trod by the citizen of Athens when the Panathenaic procession went up to the Acropolis.

COAL AT DOVER PROVED.

It is an open secret that although various particulars have been published from time to time concerning the discovery of coal at Dover, people have been very sceptical in regard to the matter. Why they should is not very clear, for the information in general has emanated from those who are in every way responsible persons, aided by certain eminent scientists, and who were in full possession of the facts. It is not in human nature to give too much information on such a subject as the discovery of coal in a private experimental boring, for fear it should benefit a neighbour who had contributed nothing to the funds of the experiment. For our own part we have never doubted the statement that the coal had been found, and clearly said so some time since in our columns.* In geological circles, however, the discovery was regarded with suspicion, and that too, in spite of the circumstance that from theoretical grounds the occurrence of the Coal Measures in Kent had been anticipated years before. Perhaps the only reason why the general body of geologists had any doubt as to the coal found being of Carboniferous age was the absence of undoubted palæontological or palæobotanical evidence, of which they demanded production. Beds of Secondary age in the South of England produce thin partings of coal, or lignite, of no consequence; it was conjectured by the majority that the coal at first found in the Channel Tunnel trial boring was one of these unimportant seams; and the matter has until very recently remained in statu quo.

Within the past few months, however, in addition to the discovery of other seams in the Dover boring, fossil plant remains have been found, which are such as to place beyond the shadow of a doubt the Carboniferous age of the strata; and, further, the position of the coal seams has been tolerably well fixed with reference to those in Somerset-

* See Builder, Vol. LVIII. (1890), p. 165.



Plan of the Enneakrunos Excavations (from 2-Estia-1893, p. 28).

shire on the one hand and the Pas de Calais on the other. These plants were submitted to M. R. Zeiller, the well-known palæobotanist of the Ecole des Mines, Paris, and formed the subject of a paper recently published in the *Comptes Rendus* of the Academy of Sciences, Paris. M. Zeiller states that the levels in the boring from which the plants came were 1,894 ft., 1,900 ft., and 2,038 ft. respectively, below the surface of the ground. We need not give our readers particulars concerning the whole of the plants found, but two, *Neuropteris varinervis* and *Neuropteris Scheuchzeri*, are ferns specially characteristic of the top of the middle Coal Measures, or of the extreme base of the Upper Measures; the author inclines to the opinion that the Dover coal is of the former age. He says that they cannot be either more recent than the beds of Radstock in Somerset, or more ancient than the deepest beds of the upper zone (*Charbons gras et légers*) of the Pas de Calais. According to this evidence, therefore, there should, normally, be a considerable thickness of productive Coal Measures yet to be passed through at Dover.

In this connexion it may be well to give some particulars of the coal seams already found. We have before us a work recently issued (which has apparently been privately circulated, as it bears no publisher's name), by the Engineer of the Channel Tunnel Company, Mr. Francis Brady, C.E. in charge of the coal boring. In it he gives a brief account of the mode of occurrence of coal in the Pas de Calais and contiguous areas, together with qualities, &c., and concludes that the coals of the French district alluded to increase both in thickness and value to the westward, instead of decreasing in both as was maintained before the Coal Commission

Comptes Rendus, Acad. Sci., Paris, t. cxv. No. 17, p. 626 et seq.

in 1869. The Radstock series are also described.

According to Mr. Brady, the following coal seams have been found in the Dover boring:—

No.	Depth from Surface, feet.	Thickness, feet, inches.
1	1,181	2 6
2	1,273	2 0
3	1,323	2 0
4	1,356	1 3
5	1,500	2 6
6	1,614	2 3
7	1,808	2 9
8	1,875	1 8
9	2,082	1 0
10	2,222	4 0

The lowest and thickest seam was met with on December 19 last. Seams Nos. 4 and 9 will probably be found too thin to pay for working, but the thickness of the remainder is very satisfactory. We may remark that in Somerset all seams over one foot in thickness are worked. From the published analyses of the Dover coal it appears to be of good quality, in every way comparable with the French fuel to which we have referred. The cost of working, including royalty, is estimated at 6s. 6d. per ton, but would probably be less.

The question has sometimes been mooted, in the daily papers and elsewhere, as to whether the Dover coal does not exist at too great a depth for the practicable working of the fuel. As will be observed, the lowest mentioned seam is over 2,200 ft. from the surface, and in answer to these queries we may point out that in Belgium the majority of the pits are deeper than 2,000 ft.—between 1,800 and 2,700 ft.—whilst the depth of 3,900 ft. has been attained in one pit. A seam 1 ft. 6 in. in thickness is worked at 1,900 ft. in the Golden Valley pit, Bitton, Somerset. The cost of sinking a 15 ft. pit to further

prove the seams already discovered at Dover, and to commence the working of a colliery, is estimated at 40,000*l*.

The importance of this discovery of coal in the south-east of England cannot be overestimated from a national point of view; but the idea of the altered appearance of the "Garden of England" when it is studded with collieries is not pleasant to reflect upon.

NOTES.

THE Imperial Federation League received but little more encouragement from the Postmaster-General last week than did the Decimal Association from the Chancellor of the Exchequer the week before. The reform advocated by the first-named body, however, will probably come long before a decimal coinage, and Mr. Arnold Morley's difficulties will not prove so insurmountable as Sir William Harcourt's. Popular opinion on the question of Imperial penny postage is certainly not unanimous, but, far from being hostile, it is distinctly favourable, although the change would involve loss of revenue. The Postmaster General says, however, that the Colonies are unwilling to agree to the reduction, and that it is impossible for the Government of this country to think of carrying out the proposal until the attitude of the Colonial Governments is more favourable. Mr. Henniker Heaton has stated that every Colonial Minister he meets declares that if the mother country would take the lead in this matter, it would be welcomed and followed; while a very representative Colonial gathering in London has voted in favour of it. It may, therefore, fairly be asked if the Treasury has ever really attempted to ascertain the feeling of the Colonies with regard to the proposed reform. Mr. Henniker Heaton is ready to start off to the Colonies at once, and pledges himself to bringing back their united assent, if the Government will but promise their conditional support. The adoption of Imperial penny postage would doubtless be welcomed by many, though it would hardly accomplish all that the sanguine and enthusiastic "Member for Australia" predicts. The *Daily Chronicle*, which asserted that the present Government had practically made up its mind in favour of this reform, still sticks to its text; but the Postmaster-General's remarks certainly do not bear out the statement. He, if anyone, should know the mind of the Government on this subject, and his reception of the Imperial Federation League seemed to imply that the question was at present regarded as being outside the range of practical politics.

THE views of railway directors as to the recent revision of rates may be gathered from the remarks made at the half-yearly meetings and the statements in the reports. They agree in deprecating the disturbance to trade caused by the advanced rates and altered conditions, and also in throwing all the blame upon Parliament and the public. Mr. Dent-Dent repeated at York the plea that revision was called for, not by the railway companies, but by the traders; and remarked that it would almost appear that the public thought the object of the companies had been to take their revenge for having had the trouble of revising the rates, by putting them up to the very highest point they could. Having regard to the undeniable fact that the vast majority of the rates were put up in this manner, the public may well be excused for taking this view. As Mr. Mundella has said in the House of Commons, the companies might have approached this work in a very different spirit, even though they did find the time too short to do it satisfactorily. They would not then have been subjected to so much of what the Chairman of the Great Western Railway has petulantly termed the "senseless criticism of the outside world." That the officials chiefly concerned have had a very severe strain put upon them, no one at

all conversant with the subject will entertain any doubt. A railway Chairman has said that if there was a society for the prevention of cruelty to railway clerks, the Directors would all have been prosecuted; and as they are now daily engaged in restoring a number of the old rates, it might be added that a great deal of their work must have been unnecessary. It is a singular fact that although constant reference is made by railway officials to the many reductions which the revision involved, and to the reticence of the traders with regard to them, not a single example is quoted as a set-off against the array of figures published by the numerous victims of advanced rates. Certainly it may not be expedient to particularise, but generalities do not always carry conviction,—especially when confronted with a host of specific examples.

AN Exhibition of Forestry is announced to be opened at the Earl's Court Exhibition grounds, to open on May 13. It is to be hoped that the promise of the prospectus will be kept; in that case the exhibition may be interesting and valuable; but it will require a very decided effort in this direction to efface the recollection of the pretensions and the failures of former exhibitions on the same site.

AN effort is being made to purchase the site of Launceston Priory by public subscription. Founded in 1126, the establishment soon became one of the wealthiest in Cornwall—a county, by the way, not over remarkable for the number or the importance of its monastic establishments, especially when the goodly number of the parish churches is considered. The buildings were so completely demolished at the dissolution that, for many years the site of the priory remained forgotten, and an enriched Norman doorway, of the period of the foundation, built into the walls of a hostelry, was the only relic visible above ground. A few years ago, accident revealed the exact site. During the excavations for a new gasometer, the workmen came upon the foundations of the choir of the monastic church and some attendant chapels, which were carefully explored by Mr. Peter, the historian of Launceston, who published a description of the remains that were then discovered. Many fragments were met with, which proved that the buildings must have possessed considerable architectural beauty. The site being a damp one, it was found that the builders had taken the precaution of laying their foundations upon walling formed of dry stones. By this ingenious device, the water had percolated through them while the walls above were dry and firm. The priory buildings extended into a meadow adjoining St. Thomas's Church and churchyard, and by the courtesy of the owner, Mr. Trood, some general explorations have been made within the past month by the Launceston Scientific and Historical Society. Several bases of piers, with foundations of walls and other relics, have already been found, and the explorers are encouraged to proceed with their work. Mr. Trood now offers to sell to the Society the most promising portion of the site, about a quarter of an acre in extent, and it is stated that the whole area can be explored, and the site purchased and fenced in for permanent preservation for the very moderate sum of £150. The offer of the owner to sell at a moderate price, such as this sum indicates, certainly ought not to be lost, and when it is remembered that the land is in close proximity to the important town of Launceston, it is evident that if not now accepted, it may not be possible for it to be purchased for so reasonable an amount later. Mr. Otho B. Peter, hon. secretary of the Launceston Society, a relative of the historian's, will gladly receive subscriptions in furtherance of this very desirable object. His address is, Northernhay, Launceston.

THE advertisement which we publish this week from the Leyton Local Board, announcing a competition for New Board Offices and a Technical Institute, marks a new step in the exactions put upon architects by competition committees. This time it is not one guinea, but five guineas, which architects are invited to advance before they can gain any knowledge even of the conditions of the competition, beyond the mere statement of the premiums offered. If the conditions of the competition were fully advertised, and a deposit-fee were charged for a plan of the site, in order to keep away idle inquirers, there would be some reasonableness in the demand. But nothing is stated in the advertisement from which any architect could decide whether he would choose to enter into the competition or not. There may be no assessor appointed (none is named in the advertisement), there may be too much asked for in comparison with the extent of the site or the amount to be expended; there may be half-a-dozen different reasons why an architect of judgment would not choose to meddle with the competition; and he cannot ascertain this without running the risk of forfeiting five guineas. We hope the profession will show their opinion of this new exaction in a practical manner. If a dozen architects of known reputation in planning the class of building required were to write to the Leyton Local Board and say that they declined entering into the competition unless the instructions were furnished to them without any payment, they would do a service to the profession and read a useful lesson to the promoters of competitions.

MESSRS. J. A. Lumley & Co. will offer for sale at auction, next Spring, the ancient and historical estate, divided into farms and small holdings extending over 2,000 acres, known as Hedingham Castle, near Halstead, in north Essex. William I. gave Hedingham (or Heningeham), together with thirteen other lordships in that county, to Alberic de Vere, and the castle,—of which the Norman keep yet stands,—has been held from the Crown by his descendants, the Earls of Oxford, for a period of nearly 650 years. The keep, standing on a partly artificial eminence, is supposed to have been built temp. Henry I. Mathilda, Stephen's consort, died within its walls, 1152. It is right-angled on plan, with a squared turret at each corner, and measuring 55 ft. from east to west, by 62 ft. from north to south, rises to five stories, including the basement. When Wright wrote his "History of Essex" (1831) only two of the angle-towers stood above the roof, to a height of 110 ft. He describes it as built of flint and stone, embedded in mortar, faced with neatly squared calcareous stones, which it is supposed were quarried at Barnack. The east wall is 1 ft. thicker than the three others. The ballium, 3a. in area, contained some towers and buildings erected by the thirteenth earl circa 1490, but most of them were demolished one hundred years later, and the keep was despoiled in 1666, in order, it is said, to frustrate its use for prisoners of war. There are plates (and a general view, title page, Vol. II.) by W. Bartlett in Wright's "Essex"; Brayley and Britton's "Beauties" (1803), after E. Dayes; and Morant's "Essex," Vol. II. (1768). The last-named, by Olive, shows the mansion erected by Robert Ashurst near the keep, circa 1720, and in the corner a view of the keep as it appeared in 1665, with a similar tower having two octagonal turrets within the ballium. The reader should also consult the description by L. Majendie, the then owner, with plans, sections, and views (1796) in Vol. III. of the "Vetusta Monumenta." Alberic, first earl, and his wife, Lucia, founded here a convent for Benedictine nuns which, at the suppression, was valued, *teste* Speed, at 29*l*. 12*s*. 10*d*. per annum. Hedingham Castle suffered two sieges in the civil wars of King John's reign, and was captured by Lewis the

Dauphin in 1217. There are some monuments to the De Veres in St. Nicholas parish church (built by the second earl), including that of John, fifteenth earl, Henry VIII.'s Lord Chancellor, who died in 1539.* It was here that Henry VII., after having been sumptuously entertained by John, thirteenth earl, took umbrage at his host's array of liveried retainers, saying, "My attorney must speak with you," a rebuke that cost John de Vere 15,000 marks. Morant says he cannot account for the origin of the name of Heddingham-Sibil parish; it perhaps was so called after Sibil, daughter and heiress of Manasses, Count of Ghisnes, who, by her marriage with Henry, castellan of Bourbourg, was mother to Beatrix, wife to Alberic de Vere, who, dying in 1088, was buried in the priory he had founded at Earls Colne.

ST. PETER'S CHURCH, St. Albans, to whose proposed restoration by Lord Grimthorpe we adverted last week, is one of the three (the two others being St. Michael's and St. Stephen's) which Ulsinus, sixth Abbot of St. Albans, built in the town, circa 960. Two transepts, a chancel, and a central tower with low spire were added about 150 years later; and in the latter half of the fourteenth century the nave, aisles, and chancel were rebuilt. Vol. VII. of the "Beauties of England and Wales" describes an attempt that was made in 1785 to sustain the tower, 33 ft. square, with four timber props, placed at the crossing, which were encased in brick-work cemented over. But matters became worse; so, in 1799, the tower, chancel, and transepts were pulled down, and borrowing powers having been obtained through two Acts of Parliament, the outer walls were rebuilt, of brick, under the directions of Robert Chapman, architect and surveyor, who built also what Cussans, in his "History of Hertfordshire," calls the "beastly brick and plaster-encrusted tower," 67 ft. high. The former chancel extended 40 ft. eastwards beyond the present one. This church is noteworthy as being the burial-place of Edward Strong, of New Barns, in the parish, citizen and Mason of London, *obit* February 8, 1723, *ætat.* 72. An inscription on his mural monument sets forth that—

... In Erecting the Edifice of St. Paul
Several years of his Life were spent
Even from its foundation to His laying the Last
Stone. . . .

There is an altar tomb in the churchyard to Dr. Cotton (and his two wives) at whose private asylum in St. Peter's-street Cowper stayed more than eighteen months in 1764-5. The second battle of St. Albans was fought on Barnard's Heath, half-a-mile distant, and in St. Peter's churchyard were buried many who fell in that and the previous battle. Leland saw Sir Bertin Entwysle's memorial, and Weever records the epitaph of the Babthorpes, father and son. Cussans says that to this church was removed, in 1725, one of the oldest organs in England, built by Ralph Dallans, who died 1672, for St. George's Chapel, Windsor. Dallans was buried at St. Alphege, Greenwich, near to the grave of Tallis, *obit* 1581. In 1889 the bells of St. Peter's were rehung, the belfry and ringing chamber refloored, and the tower repaired within, at a cost of 300*l.* under the superintendence of Mr. F. W. Kinneir Tarte, architect.

WE see from an article in the *Liverpool Daily Post* that it is proposed to build a great hotel along the line of pier parallel with the great landing stage, including also new baths to replace the old ones which have long stood on the pier adjoining the Liverpool landing-stage. There is no doubt that a hotel close to the landing-stage would be an

immense boon to passengers landing from ocean steamers, who at present have to go some distance into the town for a first-class hotel; but we should like to point out that the erection of such a large and lofty building as is proposed in the sketch published in the *Liverpool paper* referred to, parallel with the shore-line, would have a more or less detrimental effect in checking the free circulation of the sea air into the low-lying and crowded portion of the town behind, and that a building placed at right-angles to the river would, for this reason, be preferable. The lofty dock walls of Liverpool are already an injury in this respect; it would be better for the sanitary condition of the town if they were down; and the proposed hotel would, besides, block the view of the Mersey from the town. The long low building of the old baths, with its colonnade, will be regretted by some as a characteristic example of the "classic" taste of the earlier part of the century, though we do not argue that it should be retained on that account. But we deprecate the interposition of a long and lofty building between the town and the open water of the Mersey.

IN a recent number of *Le Génie Civil* (vol. xxi., p. 189) there are some interesting particulars of a new system of utilizing cement for the construction of water-pipes and vessels. It is known as the Bordenave system, and consists of the employment of a framework of iron bars on which the cement mortar is placed. In pipe-making, bars of I section are used, and the chief novelty appears to consist in winding these in helical form, the pitch of the helix being governed by the strength required to withstand the internal pressure. The working stress is taken at 9·8 tons per square inch; so that for a pipe 2 ft. 7½ in. inside diameter, using a bar ½ in. height by ½ in. in width, the requisite pitch is 3·8 in. for a head of water of 33 ft. The weight of the bar would be 0·14 lb. per lineal foot. In the manufacture of what are described as cylindrical reservoirs the structure is formed in the same way, but has a bottom worked in by means of a framework of radial and circumferential bars. Verticals are placed at intervals all round the wall, and solidly attached to the floor. The pitch at which the spiral is wound diminishes from top to bottom, in order to give greater strength at the lower part, where there is, of course, increased pressure owing to the greater head. An experimental line of piping, four miles long, has been made to test this system, and the results have shown the calculations given as to strength to be sufficient. The iron is well protected, so that it will not rust, and, moreover, the co-efficient of expansion and contraction of iron and cement are nearly the same, so that the cement is not likely to crack off. It is said there is a saving in cost over iron pipes, either cast or wrought, of 15 to 45 per cent.

ON Monday, the 13th inst., Mr. S. Bidwell, F.R.S., gave an interesting lecture at the London Institution on "Electricity and Heat." After briefly referring to, and illustrating, the heating effect of an electric current, and the enormously high temperature of the electric arc, he passed to the effect of temperature on the resistance of conductors. This he curiously illustrated by a platinum wire, rendered incandescent by a current through it, part of which was wound into a coil so that it could be conveniently cooled by water. The effect of lowering the resistance of the whole by cooling this part was shown in the increased brightness of the part which remained incandescent. The very great fall in the resistance of pure metals at the low temperatures obtained with liquid oxygen, by Professors Dewar and Fleming, was next alluded to, and the speculation that at absolute zero they would have no

resistance at all. The lecturer next called attention to the fact that non-metals, unlike metals, had their resistance lowered by heating, and gave his results in some experiments on selenium, a material which behaved as a metal at low temperatures and as a non-metal at high temperatures, the change taking place at 20° C. A mixture of carbon and sulphur was found to behave as a metal, though each of its constituents is a non-metal. After explaining, and experimentally illustrating, the chief phenomena of thermo-electricity, the lecturer connected the ends of an iron wire to the galvanometer and heated it with a spirit-lamp; as he moved the lamp, a current was set up in the wire in the direction of its motion, and he said that some theorists were disposed to account for the earth's magnetism in this way, the upper strata of the atmosphere taking the place of the wire and the sun that of the lamp. In conclusion Mr. Bidwell discussed the possibility of obtaining light with far less expenditure of energy, showing that there are two directions in which we may hope for improvement in this respect. On the one hand, we might save the wastefulness of the steam-engine if the energy of coal could be directly converted into electrical energy; and, on the other we might follow Mr. Tesla's lead, and aim at obtaining "light without heat." He deprecated any further attempt to make the thermopile practically efficient, saying that it had been demonstrated that at least 299 parts in 300 of the heat used in them was wasted.

THE paper on "Scenic Art" read by Mr. Herkomer last week at the local German "Society of Arts and Sciences" in London was a very interesting one, proposing numerous rational improvements in the mounting of plays, illustrated by some good figure studies and a neat wooden model of a theatre proscenium. But it must be said that except in a few minor cases (most notably as to the stage rendering of a rainbow), the proposals could have been by no means new to his audience on that occasion. The various arrangements which his experiments have induced him to adopt at the Bushy Theatre, are to be found, in part or wholly, on such of the German and Austrian stages as are already managed by scientifically trained experts instead of the too conservative stage carpenter. His convertible framing to a stage picture, his diffused light, his abolition of footlights, his moon, &c., are all forthcoming on many German stages, and have also received theoretical treatment in textbooks such as those of the Asphaleia Company, MM. Foelsch, Sturmhoefel, and others.

AN important illustrated work on Greek vase-paintings, by Miss Harrison and Mr. D. S. MacColl, will be issued shortly by Mr. Fisher Unwin. Miss Harrison, as is well known, has made the subject of Greek vase-paintings a special study, and her knowledge of it will give additional value to a work which is also to be illustrated by a number of large-size plates giving reproductions from the original vase-paintings.

WE have received from Mr. Batsford Part V. of Mr. Gotch's valuable collection of illustrations of "The Architecture of the Renaissance in England." It is fully equal in interest to the preceding Parts, and includes reproductions from photographs of Condover Hall, Aston Hall, Breton Hall, Burton Agnes (with a view of the splendid staircase), Middle Temple Hall, Cobham Hall, Hatfield House, and other buildings. As before observed, we reserve more detailed notice till the whole work has been issued, which will be complete, we believe, with the next Part. The same publisher announces the appearance shortly of Mr. A. N. Prentice's illustrative work on Spanish Architecture, which is certain to be of a high class in regard to the drawings, as all who know Mr. Prentice's ability as a draftsman will be aware.

* For a notice of other monuments to this family, in Hatfield Broad-oak, and Colne Priory churches, see our review, April 15, 1891, of Mr. Frederic Chancellor's work, "The Ancient Sepulchral Monuments of Essex." Alberic de Vere founded Colne Priory, whither he retreated as a monk.

THE eighth annual report of the "National Footpaths Preservation Society" shows that the society is actively working for the public benefit in this respect, and with a very large measure of success. The report gives some extraordinary and most discreditable instances of the means that have been taken by some landowners to annoy and injure people making use of customary footpaths—fastening large fish-hooks in the grass, for example. We note one case in which a resident lady offered a new clock for the parish church on condition that a public footpath was stopped. It is to the credit of the local vestry that they declined the offer.

THE sixth issue of the Transactions of the "Cremation Society of England" contains plans and sections of the improved Gorini Cremation Furnace made by Messrs. Newlands for the society. The report includes a reprint of the debate in Parliament on the disposal of the dead (Regulation) Bill on April 30, 1884, and a list of publications dealing with the subject of methods of burial. The report does not convey the impression that the society is making very much way, so far, in its objects.

UNDER the heading "A disgrace to London" a "Q.C." writes to the Times of Tuesday with another of those demands to pull down St. Mary-le-Strand which people make from time to time when they find themselves delayed in the narrow part of the Strand. A cab-horse had fallen and blocked the road, therefore St. Mary's must come down of course, and be built up elsewhere. The answer to this is simply that St. Mary's is just what gives the Strand its chief picturesqueness, and to remove it would be to destroy for ever one of the most charming effects in London. In Paris there would be an outcry at the proposal to remove a building of that kind from such a position. It has been promised over and over again that the Holywell-street block should be removed, and a roadway made on each side of the church; and the delay in carrying out that improvement is a reasonable cause of complaint. But one can only look with contempt on the capricious folly and Philistinism which, at an accidental stoppage in the street from an exceptional cause, will immediately clamour for the destruction of an important architectural monument. As a matter of fact, the statements about the stoppage of traffic alongside St. Mary's are grossly exaggerated. We have frequently had to drive past it in a cab, and never met with any greater delay at that point than is commonly to be experienced along the whole length of Fleet-street and Ludgate-hill.

THE VALUE OF CRITICISM.*

It is longer than I care to say since it was my privilege as a student to form part of an audience at the fortnightly lectures of this Association. The completion of a decade is a personal matter of some importance, but viewed more broadly, such a lapse of time is insignificant, for we remember the magnitude of the quest upon which we are all bound. Thus it certainly does not warrant my appearance before you as seer or prophet; and indeed I venture to think that this is hardly demanded by an association of students. I will therefore ask you to listen to me as a fellow student, who a little older perhaps than many of you, ventures to address you upon a matter which must be a subject of importance to us all, and especially during these years which immediately succeed that period of training for which this Association was formed. It was said of the Sophists, that they believed themselves to be imparting education, whereas they were only imparting results, and the same is true in a greater or less degree of all elementary teaching. Early years of training must be largely occupied in acquiring fact and information, and that at second hand. And this means is very valuable.

It is a speedy method of finding out what we do and what we not want to learn. To this end, the teaching of the Association has been greatly enlarged since my time. A feast of endless courses has been provided, and my advice to you would be to systematically try them all. Your several powers of digestion will soon reveal to you your capacities of assimilation; and it is when this knowledge comes to you that the true period of education—the leading out of what is within you—commences. For at this point a new and important factor comes into operation, namely, the colouring of your knowledge by your own particular individuality. So long as you are conscious of learning only what must or should be acquired, there is no response from the living, sensuous side of your nature. But when you have discovered what those studies and pursuits are that train and excite a way of regarding things peculiar to your nature or kindred natures, you are entering upon that critical state which will thenceforth dictate the appreciations and depreciations of your life. What we mean by criticism, then, is the expression of a judgment formed by the union of knowledge and self; knowledge alone constitutes a mere inventory, and self alone evokes but an expression of opinion.

For this process of thought, the union of knowledge with self, the Greeks had a name that is more expressive than any exacting definition—imaginative reason. Such a state you will find may be reinforced by all manner of knowledge and experience, for the individual quality forms the necessary link between things that are by themselves unrelated. And this relative knowledge is of the utmost value, for it is reliable when specific information is not available. It is like good money, which will pass currency in all countries, irrespective of nationality, while it further permits you to approach a subject from many different sides; a power, if I may put it so, which enables you to model thought rather than depict it in a linear manner from one point of view only. How we shall train and direct this imaginative reason is surely a question of the utmost importance, for if our natural temperament, which we have elected dictator, love well but not too wisely, we may readily fall into bad habits, and acquire a fatal moral or intellectual squint. This question Matthew Arnold has answered so truly and so shortly that I will ask you to accept his advice. We are to know the best that has been done in the world if we would be critics.

It is clear, I think, from what I have said, that I do not propose speaking of the professional critic, of whom it has been written that he will be chiefly remembered by what he has failed to understand. The intelligent craftsman who writes for the limited sphere of his own craft, belongs to a remnant sufficient for the general salvation. It was Mr. Toots who spent so much of his time in writing letters to himself, and it is the public who addresses the public in that class of literature upon which the general taste is formed. The interpretative power must be in ourselves and ready to hand. We must each one of us know the best that has been done, and we are to know this best for two reasons, that it may correct a wrong estimate of the importance of ideas, and also create a current of ideas that are true and fresh. This high standard upon which we are to model our judgment is of especial value, since it saves our self from merging into mere egotism. By it we are brought rather into agreement with our fellows than into antagonism, for most things contain something of the best which renders them worthy. A dewdrop may appear insignificant to us until we remember that it is fashioned by the same laws that form the spheres.

Let us now look back upon architecture, that for our guidance we may regard the best that has been done. And we shall find in doing so that just as criticism is a union of knowledge with self, so architecture, and indeed all creative work, is a union of self with some quality or other. In this way the subject of inquiry, and the method of inquiry, will often help to explain each other. By knowledge, I do not mean information alone derived from books. The Greeks, who have given us our modern ideas, had no books, and deprecated all written thought, since it limited those powers of expression which conversation gave such opportunities to. They rather perceived fact, as some blind folk are said to be aware of a blank wall before them without touching it. We shall see, I think, in the outset that architecture divides itself into two groups, to take a proper estimate of which an important claim is at once made upon our critical faculty, viz., the capacity to differentiate between the communicable and the incommunicable.

Many types of art of which Greek art

is the completion have reached the forms they present to us by gradual evolution. The original germ of these forms is known, just as the derivations of a language are known, and by tacit consent these forms have been accepted universally as the fit expression of certain universal ideas. These forms are, therefore, capable of interpretation—communicable just as a language is. On the other hand, that style of architecture which succeeded the Greek, viz., Gothic architecture, is largely incommunicable, the spirit of it entirely so by reason of its forms and characteristics not being the result of a general consent, but, on the contrary, the will of the individual artist predominates. It has, for instance, been pointed out how dangerous model Shakespeare is to the young poet by reason of his personality which pervades and colours his style. The same may be said of all the finest art of the Medieval and Middle Ages. It will be my purpose now to provide some material towards the building up of these two great types, from which each one of us may fashion as he will what to him befits the immortal.

To ideas which are communicable I give the name of Metaphysics, and the incommunicable I call Caprice; and it is out of the strange and wonderful admixture of these elements that architecture is born. "The best physician is also a philosopher," said a wise man; and Mr. Ruskin has lately told us that the best architect is also a metaphysician. Now, what are metaphysics? We will take as an instance what Professor Huxley calls the metaphysics of sensation. He describes how we perceive a rose to be scented by reason of certain particles of the flower impinging upon a sensitive organ. The effect is translated along the nerve fibres until it reaches the sensorium, that portion of the brain which is related to the excited nerve. This operation, as far as the sensitive organ is physical, belongs to physics, and its action can be demonstrated; beyond this point the operation belongs, he declares, to metaphysics, and its character is not capable of demonstration. One knows the result, and that is all. It is the same with the point in question. The application of certain natural and physical laws are devoted to the development of certain architectural results. The nature of the forces employed is known and can be demonstrated. How and at what stage they cease to be forces and become architecture, and yield us pleasure, as the scent of a rose yields us pleasure, cannot be demonstrated. Yet these forces and their architectural resultant are clearly so nearly related to each other, that we may learn much about the latter, by an understanding of the physical laws at work, and that physical condition, which is of first importance, and shows itself throughout the whole of Greek art, is *rhythm*. We find this element not alone in ornament, as set forth in beads, recurring rosettes, and such like examples which are common to all decorative epochs, but we also recognise it as the keynote of all Greek masterpieces. The drama for instance is derived from the rhythmic dance, performed at such seasons of the year as were important in the lives of vine plants, when at the feast of Dionysos, a chorus of fluting dancers was headed by the wine god. To this dance came to be added a dialogue between the god and the leader of the chorus, and so by the introduction of further dialogue did the drama grow. But the rhythmic element was never absent. The verse is now leaping, now flowing like a stream, and now caught up by the chorus and whipped into a tempest of passion as the dancers swayed their procession through the orchestra.

In sculpture it is the same. An early frieze shows us processions of identical figures or beasts which are rhythmical by reason of their repetition. Then the action becomes more complicated, and pause and motion succeed and interweave with each other, its effect becoming heightened by its intricacy.

In the later drama, the exigencies of plot shrouded much of this constructive element, as in later sculpture the ethic school gave way to the pathetic, and the breadth of the grand style became lost amid pictorial effect, but in the best time of both the drama and sculpture, the architectonic of each was of prime importance.

In these fields did rhythm manifest itself with a greater ease than was displayed by architecture of a similar period. Architecture is a fugue upon forces, and these forces had to be overcome or assimilated before a kindred freedom could declare itself.

Rhythm, I need not tell you, is an ever-present phenomenon of nature. No force acts continuously, but in leaps and bounds. You will be

* A paper by Mr. C. J. Tait, A.R.I.B.A., read before the Architectural Association on the 10th inst., as elsewhere mentioned.

conscious of this when you put a stick in a running stream, and the stick beats in your hand. Our own organism is dual and not singular, while physiologists will tell you that our nerve-force proceeds in jumps and is not continuous. This property of forces at once presented a decorative aspect to the Greek mind, and was expressed in their architecture by the play of action and reaction. Thus to have so disposed the weight in their buildings as to dissipate a portion of the thrust laterally, as by a flying buttress, would have been a violation of this rhythmic sense. It is fully evident that the arch was at their disposal had they chosen to adopt it, but its use must have broken this cherished beat in their buildings. Ornament is regularly recurrent, and it is never sought to vary its monotony. This restrictive faculty is unquestionably limiting to imaginative purpose, and the Gothic builders, feeling this, varied the detail of their repeating ornament and produced a harmony of forces by interweaving their thrusts. Harmonies of this kind the Greeks never aimed at. It necessitated a want of due balance in one direction or another, abhorrent to their sense of measure. Their conception of ordered motion was that of a star revolving round a sun, and not the course of a comet which approaches from and disappears into space. Such an apparent dissipation of energy would have been an æsthetic blunder. Concessions to truth which later ages have been willing to make is aptly illustrated by musical tones, which in the Greek scale were in true and perfect intervals, but which for the purpose of obtaining harmonies, that is, the striking of two notes together without discord, have been artificially rendered imperfect in their interval.

While all architecture is, as I say, a figure upon forces, Greek architecture is pre-eminently a figure upon the conservation of force, in the working out of which *proportion* and *symmetry* are evolved. Proportion is simply another aspect of rhythm, it is the relation that one mass bears to another. If the attraction of one prove too great in a building, then that building is out of proportion, or since the area upon which the building stands forms one of the masses to be taken into account, if this area be overloaded or underloaded, the rhythmic reaction is inaccurate, and the whole block conveys a sense of disproportion. Any building crowded round by houses is thus always at a disadvantage proportionately, for you are unable to appreciate the area upon which it stands. Symmetry is but rhythm marshalled into order, and the rhythm of parts arranged towards the production of a total effect. A crystal or a flower are very evident examples. The relation of the entablature to the columns is proportion, that is, the weight carried to the reacting support. The relation of a number of such instances as they together form a whole, becomes symmetry, the final step.

These effects produce the typical classical temple style, and it is to these that the sculptor adds, if sculpture be employed, a fresh element, viz., *bias*. Proportion and symmetry complete an arrangement of forces at rest. Bias, or direction, belong to forces in motion, yet still in equilibrium. It is surplus force, and we see its action in the movement of a star when it moves round a sun by reason of the surplus force which it evolves. It shows itself in a subtle, if unpronounced way, in the profile of mouldings and in the ornaments painted or carved upon them. The cyma is a moulding leaping in its form, and is typically the crowning line of a structure. It is as vigorous as as some flamboyant poppyhead cresting, allowance being made for the fact that its function is horizontal as well as vertical. The echinus, which exactly resembles a claw, possesses the gripping and supporting outline, and there is no sense of dissipation marked in its profile as in that of the cyma, but rather the force expressed in its outline returns upon itself. The ornament, again, which is painted upon the cyma, is the upward clustering houndsneckle, while that upon the echinus is the egg and dart which graphically explains the feeling of the mouldings.

There are plays of detail which impart freedom within the strict limits of architectural line, but it is in the sculptural frieze and pediments that a more unreserved freedom is to be sought. Yet it is not the freedom of caprice. Its laws are very definite; indeed the sculptor could not have dared the flights he essayed had he not thoroughly known his limitations. In the Parthenon frieze we find what is but a neutral band made to serve a very definite purpose. By reason of the slowly-moving procession sculptured upon it, diverging in two lines from the centre of the west front, the interest of the spectator is conducted

to the entrance situated in the east or principal front. Individually the figures of horses and riders or maidens may be observed to be in perfect equilibrium, and could move backwards as readily as they could forwards. But the long column of processionists heading in one direction produces its effect, and a steady and balanced tendency is directed towards the focus of the situation, where the dramatic scene of Athens' birth is being enacted. Here, in the E pediment, what we find is not a mere pictorial rendering of the event, or what might be supposed to be the conditions of such an event, any more than the frieze actually represents the Pan-athenæan procession, with its ship bearing the floating peplos, which was so evident a feature in the scene. The figures of the pedimental composition are equally chosen for architectural effect, and the fact that the groups are turned from the centre of interest, when viewed merely pictorially, has led to all manner of conjecture as to whether they are gods or mortals, symbolisms, or what not. Viewed architecturally, however, it is evident, I think, that since the raking lines of the cornice must be counterbalanced, the action of the figures must be from the centre outwards. The effect of this grouping is so important that it cannot be allowed to be an accident of composition. The strength thus added to the building lines is seen at once in comparison with such examples where the direction is inwards, as on the temple of Zeus at Olympia, or Athenè at Ægina. The sculptures at Ægina are elementary and tentative, while those at Olympia are careless in their execution. The keynote of the Parthenon, however, is the absolute completeness displayed in both the conception and finish of its detail, and the evidence of intention which is observable in every line of it. The forces suggested by the raking lines of the cornice must meet and drop, and although translated into the new medium of pictorial line, the action continues one with the architecture, and the scattered vigour directed towards the angles is caught up again by the architectural lines.

The Parthenon frieze and pediment sculpture are the example of what I take architectural sculpture to be. It is not embellishment, calculated to give effect to an otherwise bald and inexpressive production, as sculptors have lately given us to understand. It is architecture transposed if you will, or its musical score arranged for another instrument.

There is no reason to suppose that these masterpieces were executed by other than skilled masons. Architectural sculpture and sculpture proper were two perfectly distinct trades with the Greeks. The sculptor of the Phigalian frieze was the architect Iktinos, and Pythios, the architect of the Mausoleum, executed the famous chariot group. Pheidias, as controller of works, doubtless picked his men, and these men were moreover Athenians, and not provincial. Pheidias is a household word among us, but we know nothing individually about him, save that he died in prison, and his contemporary Myron in much poverty. Of the studio ghosts who must have worked these wonderful marbles, we know absolutely nothing, much to their credit as artists.

Mr. Brett, when discussing architecture from a painter's point of view, hinted that she was far too ready to accept help from the allied arts, and he would like to see her rather express her whole self and nothing but herself. And such a sentiment is most corrective. There is too much stress laid upon the so-called unity of the arts, and the justification for it is, I think, not conclusive. Painters have been in the first place painters of easel pictures, and sculptors have been creators for dedication and portraiture in all periods, and when for an exception Raphael left his Madonnas to paint academic proprieties in the Vatican or Titmore placed his precious work where it cannot possibly be seen, such result of co-operation is at least open to remark. And we should further note this, that as the painter and the sculptor came to the front, architectural painting and architectural sculpture went to the wall. From the gossip that hangs around the lives of painters like Zeuxis and Apollodoros, or the sculptor Lysippos, we may judge that their free and popular treatment produced a far greater impression than the grand style of the painter Polygnotos, the decorator of the Theseum, or of the unknown Phidian sculptors who wrought the Parthenon frieze. As a matter of fact the Greeks exercised a rigid distinction and did not include architecture among the liberal arts (*λευτεροι τεχναι*) where they placed painting and sculpture, but among the useful arts which we now call the crafts. Sculpture gradually became an embellishment as applied to architecture, as it continues to be,

and as folk seem satisfied that it should remain. It is you architects who can revive its old feeling, if it may be done at all, and to this end you should know the figure sufficiently to enable you to make details of your sculpture where you employ it, as you would for any other portion of your design. While you may work from the life, you should more particularly study the best sculpture itself, for we learn art from art and not from nature, who is our inspirer and not our master.

There is yet another quality which we may notice, and the value of which we may appreciate from the study of Greek work, prompted as it was by the nation's acute perception of what is due, even to the materials employed. The history of sculpture especially shows us that the early years of artistic activity were directed to acquiring a knowledge of material. The Parthenon marbles are among the first examples to testify to this power over material having been obtained. In the metopes, this struggle is still either intentionally or otherwise apparent; and these, like the Æginetan sculpture, possess that woodiness which fitly expressed the Dædalean, or Wooden Age. The large surfaces and the sharpness of detail which fine sculpture shows us are demanded by marble. In the Olympian sculptures, which immediately precede the Phidian, they had arrived at the large surfaces but not the sharpness of treatment. In examples immediately succeeding that age, largeness of surface showed evidences of being undervalued and sharpness exaggerated into flicker, as in the detail of Niké Apteros.

These considerations, then, are some of the metaphysics of architecture. I have traced them as far as I am entitled to; their effects as architecture I must leave you to evolve and to admire. Let me conclude a review of these considerations by pointing out that I have avoided any suggestion that these elements were derived from the contemplation of natural phenomena, as flowers, the seasons, tides, and so forth. This may or may not have been their origin. It should be sufficient for us that we ourselves are a part of Nature, and her laws and methods intervene in our lives equally as in the life around us. We are expressing ourselves when we employ these laws and methods as a language, and this is the function of art.

Although nearly everything which we now value has been bequeathed to us from the Greeks, Greek art, as a concrete expression, died in the third century before Christ. We are still influenced by its suggestions, but not by the unity of its life. A new spirit, demanding new expression, sprang up with the Roman civilisation, which reached its full development in Medieval times, and this spirit was the popular spirit. In art pure and simple the Romans had no facility of expression, and they borrowed the clothing of their buildings from the Greeks. It was Greek art, with the art left out.

In this direction, then, we can learn nothing from Rome. The prophet returned an evasive answer when asked, "Can these bones live?"—an Eastern habit, probably constitutional with him. We need be guilty of no evasion. Roman detail expresses nothing; and I am afraid it is, for that reason, only too serviceable—when you have nothing to express. From the decline and fall of Rome we may seek warning, but not inspiration. The life of Rome, which has given us her great laws, lay in her people, and it was to the fulfilment of the popular life that we owe the legacy bequeathed to architectural style, for her baths, public buildings, and halls of justice provide us with plans upon which the architecture of our own time is modelled.

An agreement had taken place, as I have said, in ancient buildings, as to the fittest expression of certain paramount ideas. But on turning to the succeeding periods we find no such agreement. The individual, and not the collective perception, is supreme, and such perceptiveness is formed of such infinite variety that we can only recognise it as the element known as individuality or caprice. Such a characteristic was unknown to older civilisations, where despotism ordained and coloured everything, as in Egypt, Assyria, and even Greece. The flexibility of Greek ideas, so evident in all they touched, never bent themselves to the claims of the individual. The Republic of Plato leaves him out in the cold, since his intrusion—possibly unwashed and unclothed—into a society which was to be of such unblemished respectability, that had its members been other than Greeks it must have been most unmitigatingly dull, could not be entertained by even the most advanced

philosophy. Yet this sentiment doubtless saved her artists and kept them pure. Their life was in the workshop; they were regarded as tradesmen, and society left them unspoiled by its follies.

It was the little band dwelling amongst the Lagoons of the Adriatic, whom King Pepin tried to drive into the sea, and who afterwards became the great Venetian Republic, that set the true note from which Medieval art sprang. By her sea trade with Byzantine she became a repository of such arts as had descended from Athens and Rome, and under this influence built the most notable Western building of that time. How is criticism to help us here, where precedent is derided, and where the interests of common life on sea and land, usurp the sovereignty of ideas—in this changed state from law to caprice—from what is by nature communicable to what is by nature incommunicable? It is here that related knowledge becomes so serviceable. It enables us to look round and behind the capricious element, to catch it by the difference of treatment, perhaps, in architecture and poetry, but especially by an understanding of the life that lay at the back of that which is interesting us, the life of the man and of the moment. By this means we may augment the volume of the song as the body of a viol augments the vibrations of the strings.

And this brings us very near the "Poetry of Architecture." The Italian cottage, with its white walls cresting the olive terraces, bosomed in grey and domed in blue, is indivisibly one with its scene. And were time able to touch it in its seclusion, as it touches the busier homes of men, it would in like manner belong to its time also. It is in this way that we may regard the creations of bygone days, and so augment the impression they make upon us. The tower of the Signori at Florence rears itself the straighter and dominates us with a sense of gathered power, when we hear the clash of its bell calling the citizens to arms, while its echo is answered by the hurry of feet and murmur of voices from the thronging piazza beneath. Or to speak of presences which are nearer to us, and which, as they keep audible silence in the midst of a city's cries, may tell us the eager story of their lives if we will stay and listen awhile. Our cathedrals tell us of days when they formed a shelter to the people who dwelt at the foot of their high walls, a hospitality shared with the homestead itself. For folks did not lead two lives. The kindly gossiping monk went in and out of their doors carrying with him the common interests of the day along with creed and benison.

The records of the religious or social guilds, for we are unable to distinguish a difference, describe this life for us. To such a guild, dedicated to one or more saints, all were admissible, man and woman, priest and layman, so long as he or she be of good report. Provision for decent burial with candles and night watches, feasts, services, and processions on guild days, once, twice, or thrice in the year as might be, ministered to the devotional element. The relief of the poor, loans on surety, even free loans to assist the young to obtain work, dowries to good girls of the guild, assistance to brethren imprisoned, hospitals for poor strangers, free schools, these and many more kindly and social works did these guilds undertake.

I cannot refrain from quoting to you a portion of the ordinance from the return or deed of the Guild of St. Christopher, Norwich, of the fourteenth century. It opens with a prayer for the Holy Church, for peace, pope, cardinals, patriarch, Holy Land, archbishops, bishops, parsons, king, queen, dukes, earls, barons, bachelors, knights, squires, citizens, burgesses, franklins, and continues on behalf of all true tillers and men of craft, widows, maidens, wives, and for all the commonality and christian people; for all true shipmen and true pilgrims that they may safely come and go; for the fruits of the land and of the sea; for brothers and sisters of the guild, and all christian souls, amen. One beholds the same social unity in the Canterbury Pilgrimage. We have the same folk that have just been remembered in prayer. The friar, the nun, the poor parson, the knight, the shipman, the yeoman riding together merrily and unreservedly.

It was from the hands of the true craftsman prayed for, conjointly with bishops and prelates, that our great churches have grown. With this binding together of all classes, one is not surprised at a great unified type of architecture springing up, nor a spirit of gentleness and devotion one with the lives and homes of the true craftsman, manifesting itself in a devotional and homely manner upon the graceful detail. Thus we find the quaint and grotesque carved on boss and corbel, and a delightful innocence and freedom displayed in the

intersection of mouldings, while the cresting pinnacle, with its eager clambering leaves, from beneath which laughs some elfish countenance, tells the delight of the conquering hand that raised it. In this spirit may the critic linger in our cathedrals. He must not tell us that these pinnacles are the prototype of the flag-staffs which Egypt lashed to her Pylons. It may be a fact, but it is a fact that bears not a ray of expression upon its face. Gothic architecture rather wears, like Wordsworth's mistress, "a countenance in which did meet sweet records, promises as sweet." And one is veritably nearer to its spirit in verse than in anything else.

We have, in conclusion, the second value of criticism to consider—that it has the power to create new and fresh ideas, to furnish an atmosphere when our surrounding conditions are against us, in which we can best work. I will not go so far as does a modern author, who declares that everything that concerns us in the present is inconvertible into art, and that it is precisely because Hecuba was nothing to anybody, that she forms so suitable a centre for tragic motif. On the other hand, the statue of an heroic policeman lately erected in Chicago, which suggests to us more than anything our old friend demanding who stole the sausages, may well, if I may borrow the descriptive transatlantic language, take the cake as an experiment in modern inspiration. Yet beneath the hideous veneer of modern life the passions surely are there which created and moved through Greek drama, and which Shakespere worked into his material. But while we have to mine for them, these ideas and passions were then in the air. "Listen," quoth a modern seer—"there never was an artistic age." Truly not. A shipman upon the Pireus knew no more about art than did Queen Elizabeth's turnspit, nor either of them more than a sixth standard schoolboy to-day. But they knew more of the passions and ideas out of which art is made. So far, then, Mr. Oscar Wilde is right. We must turn to days such as these for inspiration, for we shall not find it in the interests which surround us. In saying this, I do not propose, like Mr. Gilbert's hero, "to be eloquent in praise of the very dull old days that have long since passed away." Every man belongs to his time. But I would urge that we cannot expect to have our cake and eat it. We cannot hope to be famous for everything, and just now we are famous for commercialism and common sense, both inimical to art. By common sense, let me explain that I mean what Mr. Ruskin doubtless does, when he declares it to be no sense at all, a condition of mind which is chiefly remarkable by an inability to see the incongruous, whereas to coax congruities out of incongruities, with just a flavour of the incongruous left on, forms one of the first lessons in art.

Yet if we are to push our craft and carry our mission into the enemy's land, it is most necessary to have some acquaintance with commercial methods. Further, since *function* is an indispensable element in architecture, one indeed which distinguishes it as a so-called useful art from an imitative one, the inarticulate wants of an inarticulate age have to be mastered and marshalled before there is any hope of clothing them with architectural effect. It is function which dictates in the rough the shape of everything as we see it, for instance in a spoon, a pin, or a ship, and function it was which planned a Gothic cathedral and a Greek temple. In contrast to these simple types let us picture to ourselves the function of a modern hall of justice with its cloud of witnesses, its judge, jury, counsellors, and prisoners, with a myriad untold minions of the law, all demanding twice the accommodation they want or expect to get. But they will require some semblance of their wishes being met, and it would be no good presenting them with a design for a basilica, and tell them to fit it up with pens for themselves. To meet what are considered to be modern requirements, an architect must possess no mean organising power. Also we must remember that they are not like the sculptor and the painter who execute their own work. We have to employ others, or get somebody else to employ them, if we would see our creations grow into life, and to get this much done requires all the tact of which we are capable. These faculties cannot be neglected, and yet we must always remember that they are but the servants of our craft, who is our mistress.

We are to-day in an age of transition from one of authority and pedantry towards one where the freedom of the individual largely enters. A hundred years ago, Stuart and Revett's then new book set a fashion which kept its head above water into the

first half of the century, when the Gothic revival finally swamped it. There is a fine touch of melancholy about these Stuart buildings, as though erected in memory of an art impossible to revive; and I always think of the architects as very silent gentlemen in black wearing weepers and undermined by grief. They, at least, made little stand against the robust Goths, when prosecuting their second invasion. These brought back with them the old sense of freedom, but narrowed by eclecticism. They were so horribly afraid of doing what was wrong, that they were always doing it, as is the custom with excessive virtue. The low-pitched roofs of the fifteenth century came off wherever they were found, and the ghostly traces of a high pitch were sought for upon every tower. In us the new spirit of freedom has gained power, and the accumulated reaction against the pedantry of both modern Greek and modern Goth is inclined sometimes, perhaps, to make us break bounds. Therefore, we should not be unmindful of the old Greek restraint, a quality always present in fine art. Caprice without reasonableness appeals only to one part of our nature, and without its restraining power we lose a nice sense of the fitness of things. Laws which we have seen paramount in Greek architecture are paramount to-day, and a musician who cannot evolve a fugue from some given phrase, or a sonata from certain melodies, is very naturally disqualified by his confères. Happy is the young architect who from rhythm and the development of rhythm early discovers himself to be unable to construct in obedience to the laws that govern these qualities, for the profession of millionaire is still open to him.

This Association possesses unrivalled opportunities for assisting in such a discovery, and it might well include among its parental duties a quorum of fathers who should communicate this advice to their young sons both for his own sake and for that of the craft whose reputation we have in keeping. And for the rest of us, let us familiarise ourselves with such things as are of good report, that our efforts may not be in vain.

An age has never been so full of endeavours as this, that can never bear fruit and come to perfection, and chiefly for want of direction. Happily for us, we had our infant complaints so badly and so universally in the Greek and Gothic movement, that we have no sickness on us to compare with the epidemic of Ibsen and Anglo-French painting. There is, I venture to think, a better all round excellence of work done in architecture than in any of the other arts. Perhaps for this reason there is not that brilliancy and distinction in our work that belongs to individual groups in other lines of creative effort. A modern impulse is distinctly evident in those fields where the poets Arnold and Rossetti and the sculptor, Alfred Stevens left their mark. One could only wish that the painters George Mason and Fred Walker were equally well remembered.

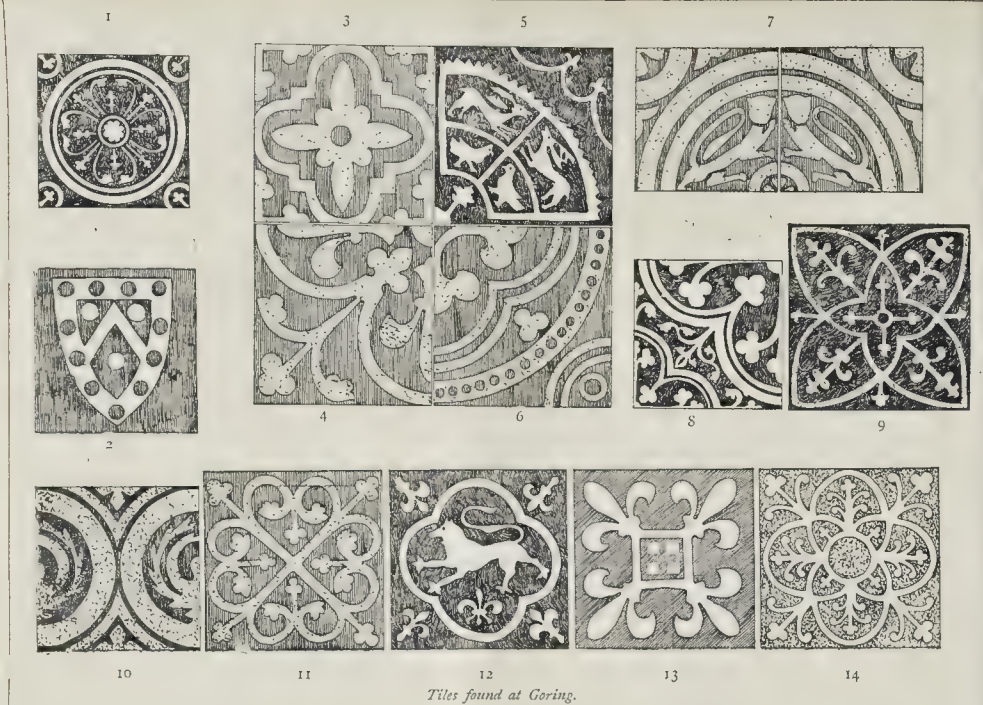
And in architecture we have our influences, for Burges, E. W. Godwin, and Sedding should be no mere names. What I think should be most desired by us is that some common sentiment should invade our work, which would not mean monopoly of style, since there would be no agreement as regards expression, wherein, I may remind you, lies the stumbling-block of academies.

It is where two or three are gathered together that enthusiasm burns, and a guild or association of students thus holds latent immense possibilities. Our time is especially for the young, in spite of the anxiety of our parents as to what they shall do with their sons. Well directed effort is no longer decried as innovation. It is towards a right direction of effort that criticism tends, and giving to this quality its due weight, it is for us to go forward.

[A brief discussion followed. We give a few notes of it on another page.]

PROFESSOR AITCHISON'S ROYAL ACADEMY LECTURES.—We are obliged to postpone the fourth lecture till next week, as there is not space available this week to give it in full along with the illustrative diagrams which should accompany it, and we do not wish to divide it.

FETTER-LANE CONGREGATIONAL CHAPEL.—We hear that the Charity Commissioners have made an order for the sale of this chapel, which stands on the lane's western side, close to Norwich-court (*præcis* "Magpie-yard") and Barnard's-lane. The existing fabric was built about 130 years ago. Dr. Thomas Goodwin, at one time in high favour with Cromwell, was minister here, according to Mr. Walford's "Old and New London," during the interval 1660-81, having been forced to leave Magdalen College, Oxford, at the Restoration. It has been proposed by the trustees to devote the proceeds of the sale to building a chapel at Leyton, and to establishing a branch in the City.



Tiles found at Goring.

TILES FOUND AT GORING.

INTO the circumstances attending the finding of these tiles there is little object in entering. They were turned up promiscuously during my recent excavations of the site of the Priory of St. Mary, at Goring, in Oxfordshire. By whom this convent of nuns was founded, and under what rule it was established, is a vexed question, owing to the absence of any chartulary of the monastery. Speed says they were Benedictines, while Tanner alleges that they followed the rule of St. Augustine. All the light that I have been able to shed on the subject tends to confirm my opinion that the community was established by Robert Doyley (the second of that name) in the first half of the twelfth century, and that the nuns were of the Austin order.

The tiles, which range in size from 4 in. to 6 in., are excellent specimens of their kind, and the wonder to me is that they were used in the pavement of an establishment worth but £80 a year at the Dissolution, and probably composed of but half-a-dozen nuns at most, even in its palmiest days. Taking them in the order of their numbering, I will endeavour to give some idea of their, to me, very remarkable colouring:—

1. A dark olive-green. Ground pattern, Naples yellow, almost white; in places splashed with raw sienna. A glazed tile. N.B.—This is the only example in which the pattern is laid on, not inserted in the more usual way.
2. Pattern, white. Ground, red. Unglazed. An early form of charging.
3. Pattern, yellow. Ground, red, varied with pattern white. Ground, grey. Unglazed.
4. Pattern, yellow. Ground, porphyry red. Unglazed. Varied with pattern, white. Ground, grey.
5. Pattern, white. Ground, dark grey. Unglazed.
6. Pattern, light and dark yellow in patches. Ground, red, grey, and sometimes black in places. Unglazed.
7. Pattern, Indian yellow. Ground, red. Unglazed.
8. Pattern, Naples yellow, almost white. Ground, red. Unglazed. Varied with pattern, deep Indian yellow. Ground, deep bronze iridescent green. Dull glazed.
9. Pattern, white, splashed with yellow. Ground, grey.
10. Pattern, Indian yellow. Ground, dark-red brown. Dull glazed.
11. Pattern, yellow. Ground, grey and red. Unglazed.
12. Pattern, slightly tinted green. Ground, sage-green. Unglazed.
13. Pattern, white. Ground, grey. Unglazed.

14. Pattern, a toned white. Ground, dark Indian yellow; an unusual colouring.
15. Pattern, Naples yellow. Ground, brown. Unglazed.
16. Pattern, Indian yellow. Ground, red. Varied with pattern, lemon yellow. Ground, sage-green. Unglazed.
17. Pattern, Indian yellow. Ground, warm raw Sienna yellow. Glazed.
18. Pattern, white. Ground, grey. Unglazed.
19. Pattern, light yellow. Ground, dark myrtle-green. Glazed.
20. Pattern, bright yellow. Ground, red. Unglazed.

In some glazed fragments I picked up of design No. 2 the glaze had turned the red a chocolate colour, and the white to a Sienna or Indian yellow.

As may be seen, some of the tiles form part of a larger pattern, obtained in some cases by the use of eight tiles, while the rest form repeats at intervals, probably mixed with the plain tiles which cumbered the ground in every direction. They mostly belong to the thirteenth century, are about 1 in. thick, and are bevelled to allow of the mortar running well into the joint.

PERCY G. STONE.

ROYAL INSTITUTE OF BRITISH
ARCHITECTS:
PALMA CATHEDRAL.

THE eighth general meeting of this Institute for the present session was held on Monday evening last at No. 9, Conduit-street, the President, Mr. J. Macvicar Anderson, in the chair.

The minutes of the previous meeting having been taken as read, the Secretary, Mr. William H. White, announced the death of Lord Northbourne, an Honorary Fellow of the Institute.

Nomination of the Royal Gold Medallist
for 1893.

The Secretary having read By-Law 64 relating to the award of the Royal Gold Medal, to the President said that it was with pleasure that he had to intimate that in accordance with the terms of By-Law 64, the Council had nominated Mr. Richard Morris Hunt, honorary corresponding member of New York and corresponding member of the Institute of France, as the recipient of the Royal Gold Medal for 1893. Mr. Hunt, he need scarcely say, was an architect of culture and eminence in America, and those who

knew him personally, as he had the privilege of doing, could testify to his power and individuality. He was quite sure that the name which had been submitted by the Council would be received by the members of the Institute with approval, and that it would be submitted in due course to Her Majesty the Queen. It seemed to him to be a graceful compliment to pay to the Republic over the sea to offer this recognition of the ability of one of her distinguished sons. Mr. Richard Morris Hunt was the architect of the central building of the Chicago Exhibition, a work of enormous magnitude.

In reply to an exceedingly uncalled-for interference on the part of an Associate member, who appeared to be unacquainted with Mr. Hunt's works, and to imagine that others were no better informed than himself, the President said that photographs of some of Mr. Hunt's works were in the Institute. Before the Council arrived at their decision, he obtained from Sir Henry Trueman Wood, the Secretary to the Royal Commission of the Chicago Exhibition, working drawings of Mr. Hunt's great central buildings at the Exhibition, and he (the President) thought that any one who examined those drawings would be satisfied that the honour proposed to be conferred upon Mr. Hunt would be by no means misplaced.

Palma Cathedral.

The President, in calling upon Colonel Lenox Prendergast to read a paper on "The Cathedral of Palma, Majorca, with some notes of buildings in its neighbourhood," said that Colonel Prendergast was, as they all knew, one of their Honorary Associates whom they saw there often, and who in that respect, showed his appreciation of: honour which had been conferred upon him.

Colonel Lenox Prendergast, in his introductory remarks, drew attention to the situation of the Cathedral: it had been the ancient stronghold of the Moors, and on it, the site of their greatest Mosque, stands the Christian church. The church was designed by Don Jayme of Aragon in 1232, after the rescue of Majorca from the Moors, which took place in 1229. The progress of the Moors in refinement and the arts had been hardly less brilliant and rapid than their progress in empire; and the architectural works undertaken by Don Jayme owed much of their delicacy and refinement to them. The enthusiasm of the Majorcans at their deliverance by the King of Aragon found expression by their founding the cathedral church of Palma.



Tiles found at Goring.

Street, in his "Gothic Architecture in Spain," when speaking of Sta. Maria del Mar at Barcelona, claimed Palma Cathedral for its prototype. In the Governor's palace there were traces of Moorish work, especially in the foundations; but of Moorish architecture, as such, he could find none. The west front of the cathedral faced the entrance to the Palace; the upper portion had only recently been completed, and though its design might have been worse, at a distance it did not jar with the rest of the building. The south front was, however, a marvellous creation in Santany stone, and the effect singular in the extreme. The west door was considered a work of importance. The interior of the church, owing to the formation of the ground and the difference of space separating the arches between the north and south entrances and the remaining arches, appeared considerably larger than it really was. A bishop's throne occupied the centre of the east wall, and above rose the chapel of the Holy Trinity, standing many feet above the floor of the rest of the church. The finest work, architecturally, was that carried out by Bishop Pedro Cima about 1373; to that period also might be assigned the three easternmost bays of the nave; and at that time the effect of the interior of the Cathedral must have been singularly fine as a specimen of Gothic architecture and fittings. Having given certain measurements of the columns, length and width of the church, the height of the central nave and side nave, Colonel Prendergast turned to the question of lighting. To a Spaniard the practice of admitting the sun anywhere was not to be entertained for an instant; but the solution of the enormous height of the church, which rendered it necessary to strengthen the supports; although, notwithstanding these precautions, several bays had had to be rebuilt. There was one other solution, viz., where the sun entered in force, battlements of flies followed in its wake; but, whatever the reason, the side-chapels were practically unlighted, and appeared to have been so from the first. Each chapel, of course, contained an altar, and behind the altar-screens were tombs of bishops with carving well worthy of study. Turning to the ground-plan of the Cathedral, the author described the uses to which the building was put, remarking that a knowledge of the purposes for which ancient buildings were erected was necessary if they were to be restored or appreciated. The plan was simple: three full-sized naves or aisles were placed side by side, the centre one having at its eastern extremity the sanctuary which contained the high altar. The choir was situated in the nave; two bays westward of the sanctuary arch, which was the usual Spanish arrangement, to explain which he described in detail the ceremonies of the Good Friday and Easter-Day services in relation to the

planning of the building, and pointing out the utility of the various parts of the church, said there could be little doubt that the architects thoroughly understood their business and for what they had to provide. The high altar, consecrated in 1346 by the seventh Bishop of Majorca, was of marble, and above it was a singularly fine "retable" in sculpture, while several niches on each side contained figures of saints, all admirably carved in wood. In the treasury were several reliquaries of the best period of the architecture of the church. Of these the author mentioned a few, giving the approximate date of each. Those who had charge of the church never seemed to have relaxed their efforts to obtain what was most fitting, the best artists being apparently always engaged. Referring to the stability of the structure, which had at different periods to undergo a process of reconstruction in several directions, he quoted from a document concerning a commission of architects appointed to examine the mischief going on subsequent to the completion of the building, and gave reliable Spanish authorities for the dates at which every portion of the work was executed. Going beyond the precincts of the Cathedral, towards the head of the harbour, the author described a remarkable building erected as an "Exchange" for the merchants of Palma, on land placed at their disposal in 1232: the building was not completed, however, until the middle of the fifteenth century. It consisted of a rectangular hall divided into three divisions by a double row of spiral columns, three on each side, which supported an arched and vaulted roof. Traceried windows and carved doorways of the fourteenth century combined to exhibit what appeared to him an altogether new experience of Gothic pointed architecture as applied to civil buildings. A month had passed since his arrival before he visited the Lonja, or exchange, and during that period mischief of a serious kind had been done. The authorities had decided to renovate the interior. The walls were certainly darkened and stained by age, but there was a tone of colour on the flutes of the spiral columns and ribs of the vaulting which enhanced the effect to such an extent that to scrape off the patina seemed little short of sacrilege. Colonel Prendergast then described the injury which was being done, and quoted a letter written by himself, in which he referred to his membership of the Institute, to Mr. F. W. Mark, the British Consul, and stated that, in consequence of their united efforts, and a local newspaper publishing his letter with a communication in similar terms from the Consul, a strong feeling arose in the city against the work being continued. That reached the ears of the Government at Madrid, who stopped supplies, and before he left he had been gratified to know the scraping had ceased. With reference to the Casa Consistorial, another civil building at Palma, which the letter urged was worthy to be preserved with jealous care, it was, he was told,

not to be pulled down, as had been contemplated, to make room for a feeble imitation of the Lonja; but that the roof was to be repaired and the building preserved.

The President, in inviting discussion, said that it was gratifying to find from the paper that Colonel Prendergast had not merely gone to Majorca for the purpose of enjoying a holiday, but that he had been engaged in such an intellectual pursuit as the thorough examination of the ancient buildings of the island; and, further, that his visit had been productive of so much good in bringing about the preservation of the Lonja.

Mr. William White, F.S.A., in proposing a vote of thanks to Colonel Prendergast for his paper, said that, although he had not had an opportunity of visiting the Cathedral of Palma, the building had been brought before him in such a vivid manner by the lecturer that his only wish was that he could go and visit it. It seemed to be a most wonderful building, and the account which had been given of it was made the more interesting by the description which the lecturer had given of the functions which were performed in it.

The President said that they had the pleasure of having with them that night a gentleman, Mr. H. W. Brewer, whose remarkable and beautiful drawings of Majorca they had had the privilege of studying, and he was sure they would all be glad to hear some remarks from him.

Mr. H. W. Brewer said that the drawings referred to were not his, but were his son's, who had been to Majorca, while he (the speaker) had not. He was, therefore, only able to judge of Palma and its cathedral from photographs, drawings, and descriptions, and from conversations which he had had with his son and others. There was one very remarkable feature, it seemed to him, about the treatment of Palma Cathedral. The plan was undoubtedly purely southern, and was like the great Church of Sta. Maria del Mar at Barcelona, which could not possibly be by the same architect, Jayme Fabre. That architect was supposed to have had something to do with the Church of Sta. Maria del Mar, although the late Mr. Street did not seem to be quite certain whether he was the architect or merely the consulting architect. Undoubtedly he was the architect of the great cathedral at Barcelona. This architect was called for by the Bishop of Barcelona, because he had built a large Dominican church in Palma, which was supposed to be one of the most wonderful churches ever erected, on account of its great space and the smallness of the supports with which that space was covered. Its size, however, was small compared with that of the enormous cathedral at Palma, which, he presumed, was not built at that time, or, at any rate, not completed. It was astonishing to think of a cathedral with a span of about 65 ft., with aisles about 30 ft.; the whole, with chapels, making a width of about 200 ft. One was not surprised at what Colonel Prendergast had told them about the very serious disturbances which had taken place at the building, and that some of the arches had fallen down. But the cathedral must be pretty firm, for when the very serious earthquake took place in Palma about two years ago,—at the time of the earthquake disturbances in the Riviera,—it merely succeeded in cracking one of the arches of the tower. If the cathedral could endure such a shock as that, it was to be hoped that it would not succumb to misfortunes which had befallen other cathedrals. He should like to refer to the peculiarity of the large blocked-up tracery windows which Colonel Prendergast had mentioned. He thought that they indicated a Northern origin or a Northern influence about the details. It was not likely that an architect working in the South, where he wanted, perhaps, to build a church, would invent large tracery windows, and it seemed to him as though the architect had some German notions in his head. He could not help seeing, in many respects, a great similarity between the cathedral at Palma and some of the great churches on the Baltic. Those very lofty, perfectly plain, octagonal columns, without any shafts attached to them, which were found in Palma Cathedral, were to be found also in the Church of St. Mary, Lubeck, and many other churches in Germany. It was by no means impossible that Don Jayme as we called him, was a German of the name of Faber, or possibly he may have descended from a German family. But at any rate there was a singular German look about the details of the building, which seemed a little incongruous, although they had been splendidly blended with the Southern plan. Of course

we found exactly the same thing at Milan, where we knew German architects were employed. The German architects, it seemed to him, adopted the great Southern plan and welded in with it their German detail. Moreover, illustrations of churches in the island of Cyprus, which he had seen, showed the same peculiarities. The whole point was one of very great interest, because, as Colonel Prendergast had shown, the Cathedral of Palma seemed to have had nothing exactly like it which had gone before it to lead to the kind of development of architecture which they saw there, and that rather led one to suppose that the general plan of the building might have been adopted from Spain, but that the pure and very beautiful and simple detail which was to be seen there, might somehow or other have found its way from some part of Germany,—probably from the north. At any rate, it was one of the most noble and interesting buildings in Europe.

Mr. Octavius Hansard, in seconding the vote of thanks to Colonel Prendergast, said that, as a body interested in the preservation of ancient monuments, they ought to specially thank that gentleman for the action which he had taken in preventing the destruction of such an interesting building as the Lonja.

Mr. W. H. J. Weale said he wished to point out that between the Netherlands and Majorca, both in the fourteenth and the fifteenth centuries, there was considerable inter-communication. He had very little doubt that just as on the mainland in Spain the art of the Netherlands had a very great influence, so also the architecture of the Netherlands might have influenced the details in the Cathedral of Palma.

The President, in putting the vote of thanks to the meeting, said that they felt very grateful to Colonel Prendergast for the steps he had so successfully taken for the preservation of the Lonja.

The vote of thanks having been agreed to, Colonel Prendergast briefly replied, and the meeting terminated.

Illustrations.

REREDOS, COLYFORD CHURCH, DEVON.

THIS reredos, designed by Messrs. Tait & Harvey, Exeter, and executed by Messrs. Luscombe, Exeter, has lately been placed in this church. It is of oak, and the central panel is after the well-known pieta of Fra Bartolommeo, carved from a cartoon made by Mr. C. J. Tait, the author of the able paper read at the last meeting of the Architectural Association, and published in our present issue.

PULPIT, ST. MATTHEW'S CHURCH, EXETER.

The chancel of this church was completed last year, and this pulpit was at the same time given. It is of Corshill stone and green Irish marble. The architects for the completion were Messrs. Tait & Harvey, and Messrs. Luscombe were the contractors and the sculptors of the pulpit.

BISHOP'S THRONE, ST. MARK'S CHURCH, TORQUAY.

This throne, with sedilia, altar, and reredos, and furniture of a new morning chapel in south aisle, were among additions recently made to the above church. They were designed by Messrs. Tait & Harvey,* and the carving executed by Mr. Hems, Exeter.

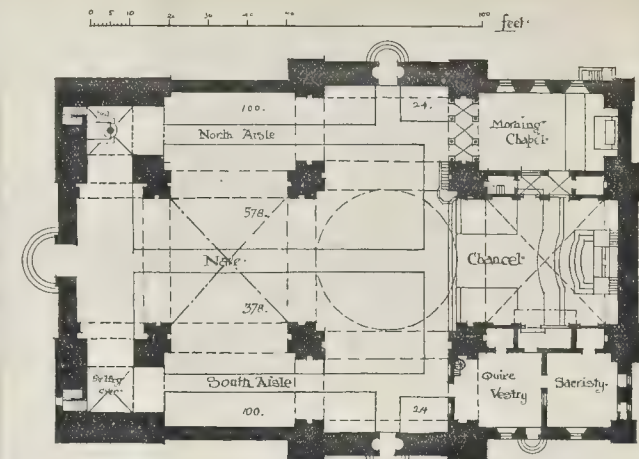
DESIGN FOR EAST END OF A CHURCH.

This was the subject given this year by the Institute of Architects in competition for the Tite prize, the object of which, as most of our readers are aware, is to promote the study of the Italian style of architecture.

The design which we publish, by Mr. C. A. Nicholson, is the one to which the prize was awarded. In explanation of his design, Mr. Nicholson writes:—

"The subject of the design was an 'east end' and organ. The general scheme of the church was a parallelogram, with central lantern covered by a timber dome, and with two small bell towers at the west end. The materials intended were Doubling or other similar stone for the main architectural features of the building, and for the exterior facing. The roofs of oak, leaded. The vaulting and interior wall surfaces plastered for

* The firm was at the time under the style of "Fulford, Tait, & Harvey," as given on the inscription in the corner of the illustration; Mr. Fulford has since retired.



Key Plan to Tite Prize Design (see Lithograph).

colour decoration. Screens and pavement and reredos of coloured marbles; stalls and organ-case in walnut.

The imagery of the organ case is designed to illustrate Ps. civ. i the pipes would be of bright metal, and the 'swell' box is planned to form a feature in the general design."

EXTENSION OF PREMISES FOR THE MORNING POST.

THIS building, which stands on the site formerly occupied by the *Field* and *Queen* offices, at the corner of Wellington-street and the Strand, is an extension of the existing premises of the *Morning Post*—the old portion being shown on the left-hand side of the view—and will, when completed, more than double the area of the whole.

The intention has been to carry on the lines of the old building to such an extent as to make it appear that it is all one building and in one occupation, the upper part of the walls being faced with red brick to correspond with the old, but in the new building Portland stone has been substituted in all cases for stucco.

Accommodation will be provided on the ground-floor for the advertisement and cashier's department, at present very inadequately housed on the opposite side of the street; on the first-floor for the manager, editor's and sub-editor's rooms; on the second-floor for other members of the editorial staff; on the third-floor for the caretaker; and on the fourth-floor for an extension of the present composing-room, readers' rooms, &c.

In the basement will be the machine-room, to be fitted with three new machines now being constructed, each capable of turning out 24,000 copies an hour. In the basement will also be placed the new boiler and engine for driving the machines.

The corridors on upper floors have been so arranged as to afford continuous communication with the old building on every floor, but the openings are in all cases fitted with double iron doors to prevent any danger from fire, and the whole of the new building has been constructed of fire-resisting materials,—the floors being on Fawcett's system and the partitions of concrete and iron.

The building has been slightly varied in execution since the view was made, notably in regard to the main entrance and the turret at the angle.

The general contractor for the whole of the work has been Mr. D. Charteris, Mr. J. Snook acting as clerk of the works, and the architect, Mr. H. O. Cresswell.

NEW ROOM, CROM CASTLE.

THIS room was built in 1890; it is at the first floor level on the north side of the quadrangle of the castle, and has replaced several smaller apartments which previously occupied that position. The entrance to the quadrangle is by an archway under the centre of the room.

As far as possible the existing windows were retained, others being added where necessary.

The doors shown at the end of the room on either side of the fireplace open into a corridor communicating with the principal apartments; at the opposite end there is a fireplace, and doors to lavatory, &c., and servants' staircase. A recessed bay at west end of south side has windows looking into quadrangle.

The room is covered with a truss-raftered roof plastered on the under side with moulded ribs and carved paterae fixed on. The floor is of pitch pine in narrow widths and the moulded joiners' work in oak.

Several slight alterations were made in carrying out the work, and two old marble and oak fireplaces were used in lieu of that shown in sketch.

Crom Castle, in County Fermanagh, Ireland, is the seat of Lord Erne, for whom the plans for these additions were prepared by Mr. Thomas Garratt, architect, of London, the structural part of the work being executed by the estate workmen, and the oak work, ceiling, and decorations generally by Mr. F. Muntzer, of London.

INTERIOR OF HALL AND BALL-ROOM.

THIS is a sketch, with a plan, of an interior of a hall for a large house, by Mr. J. Armstrong Stenhouse. It formed one of the exhibits in the Architectural Room at the Royal Academy last year.

PART OF SECOND COURT, ST. JOHN'S COLLEGE, CAMBRIDGE.

THIS illustration is reproduced from an etching by Mr. W. H. Thorp, which was exhibited at last year's Royal Academy. Mr. Thorp writes:—

"The original sketch was made in pencil in 1885, and I transferred it to the copperplate a year or two ago.

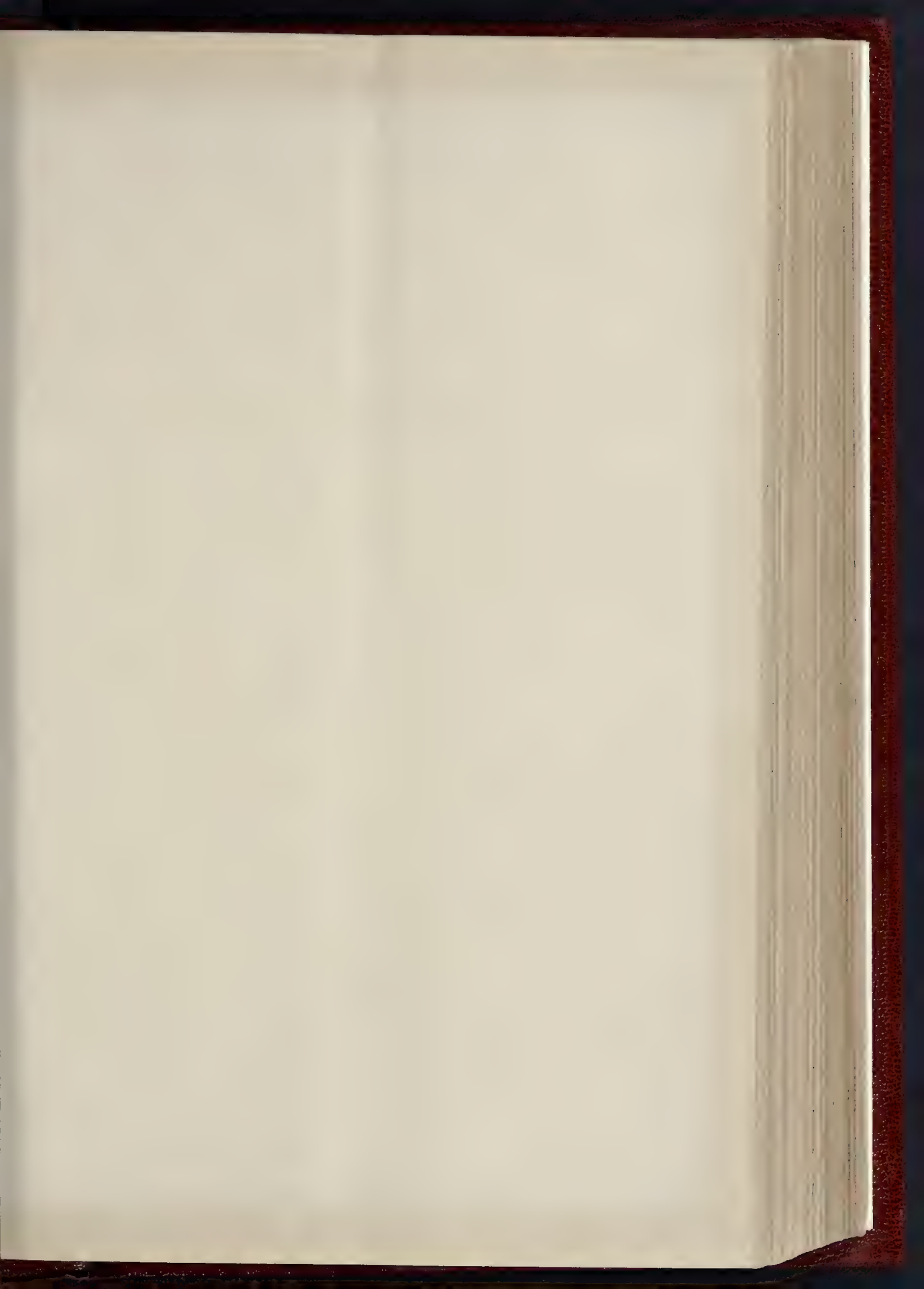
The subject of the sketch is the central feature of the west side of the third court of St. John's, and is noteworthy for its picturesque architectural composition. A cloistered arcade, a survival of an earlier disposition of plan, is carried across this end of the court, and above it are rooms occupied by the students.

An archway in the south-west angle gives access to the college walks and garden, reached by crossing a three-arched bridge of antique appearance.

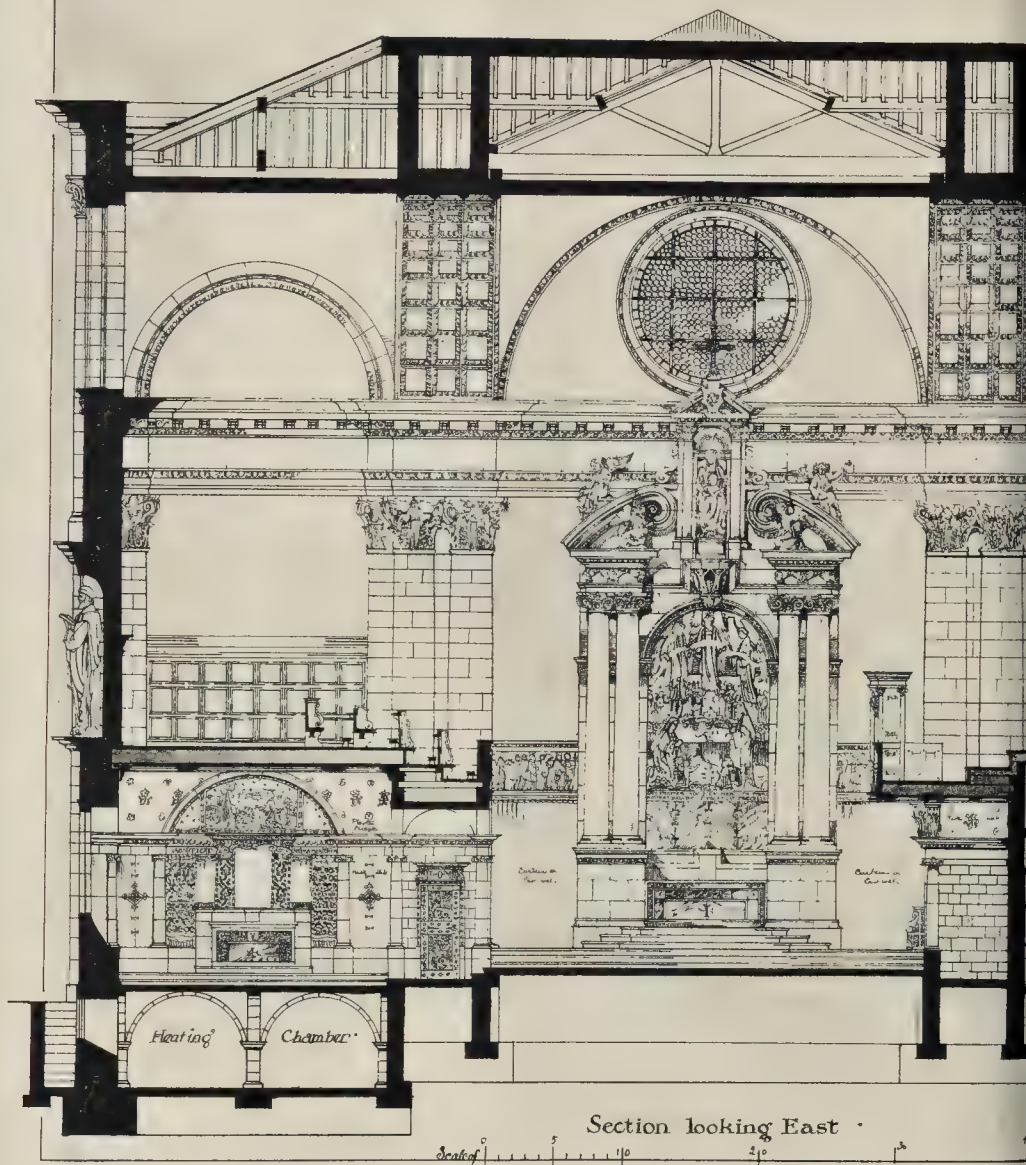
The library on the north side of the court was completed in the year 1624. The western side, however, is later in date, and was added towards the latter part of the century.

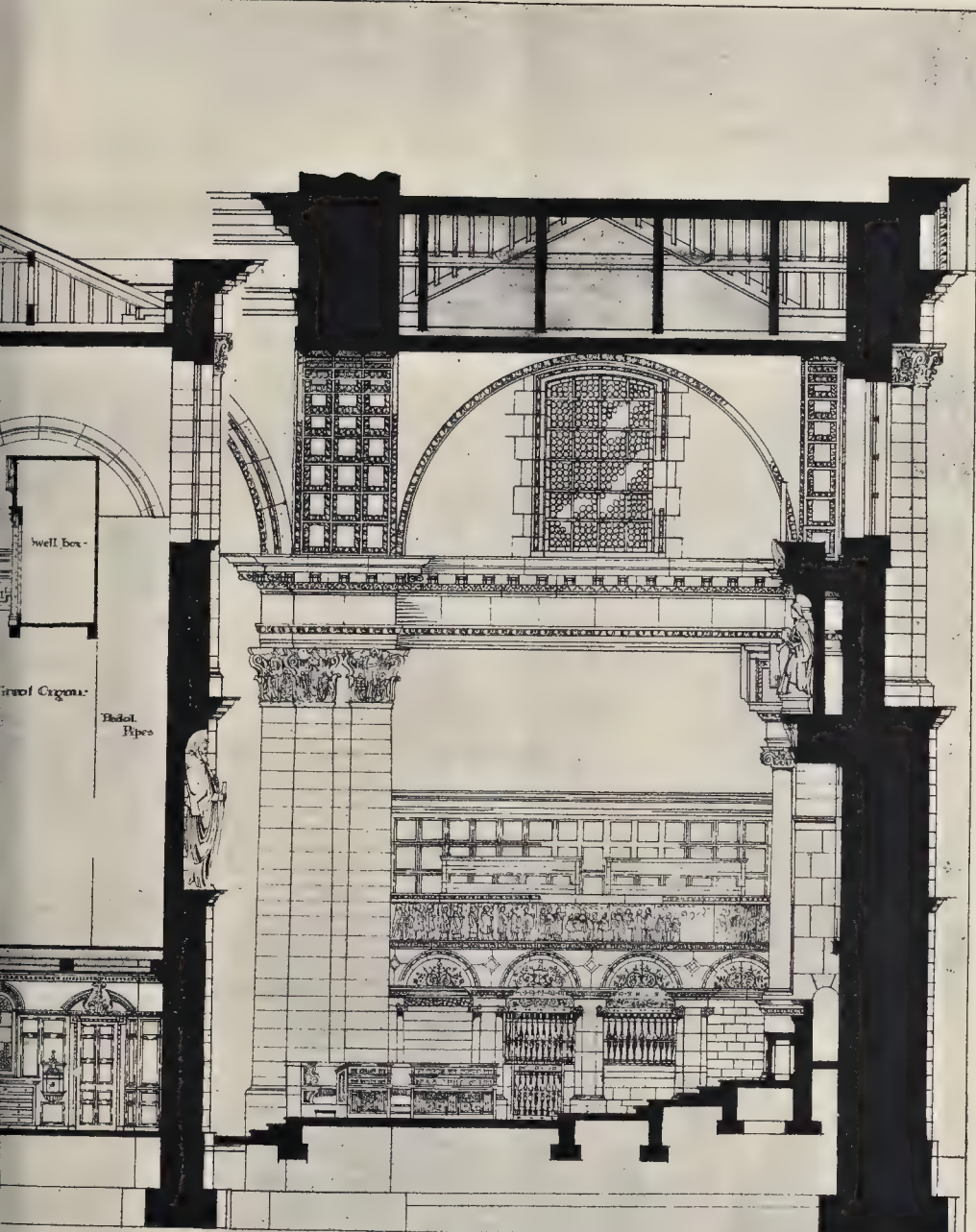
Local tradition attributes the work to Sir Christopher Wren, but probably without any trustworthy evidence to support it."

ERRATUM.—The illustration of part of the large window in Bath Abbey Church was, by a clerical error, mentioned in the text as "west window;" it should of course have been "east," as given on the title of the plate.



*TITE PRIZE COMPETITION 1892-3 ·
Design for EAST END of a TOWN CHURCH ·
by Mr C. A. Nicholson.*

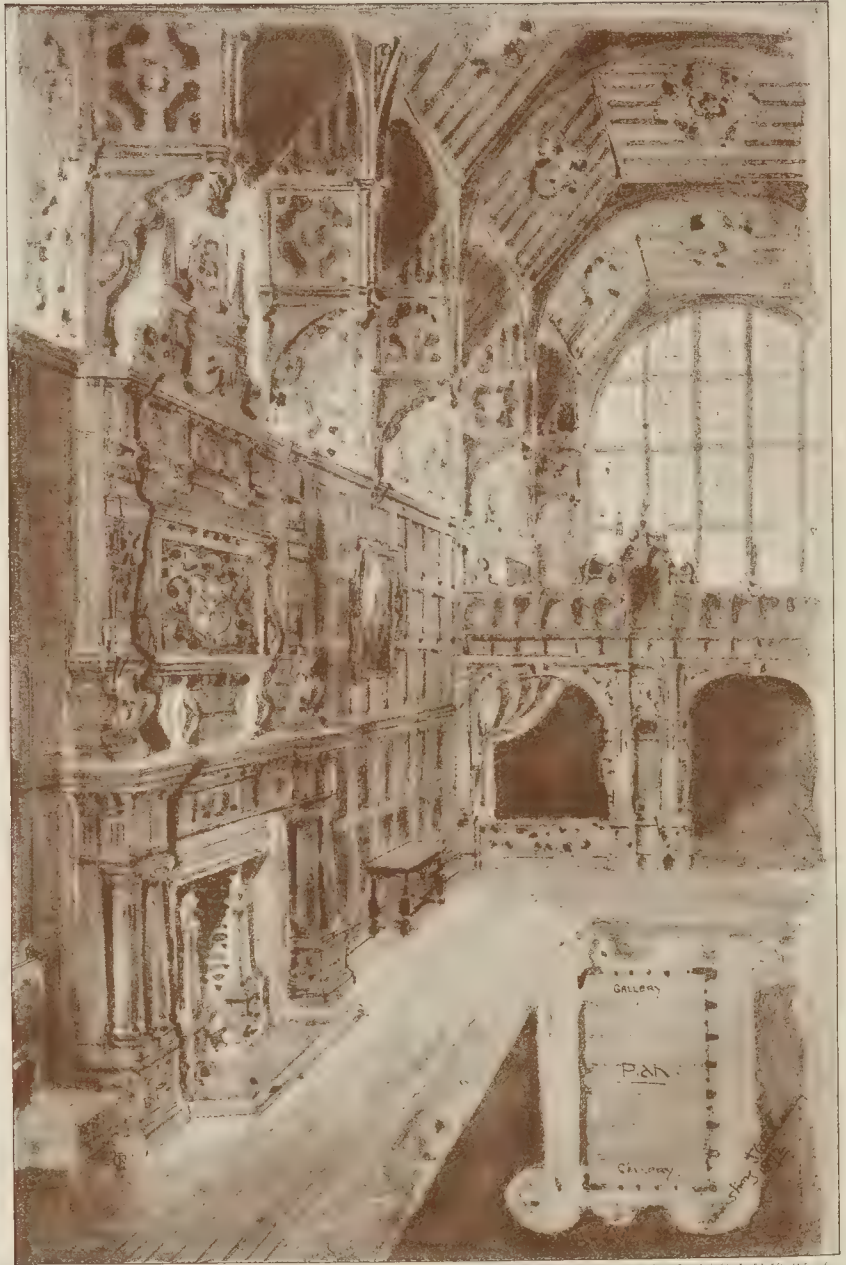




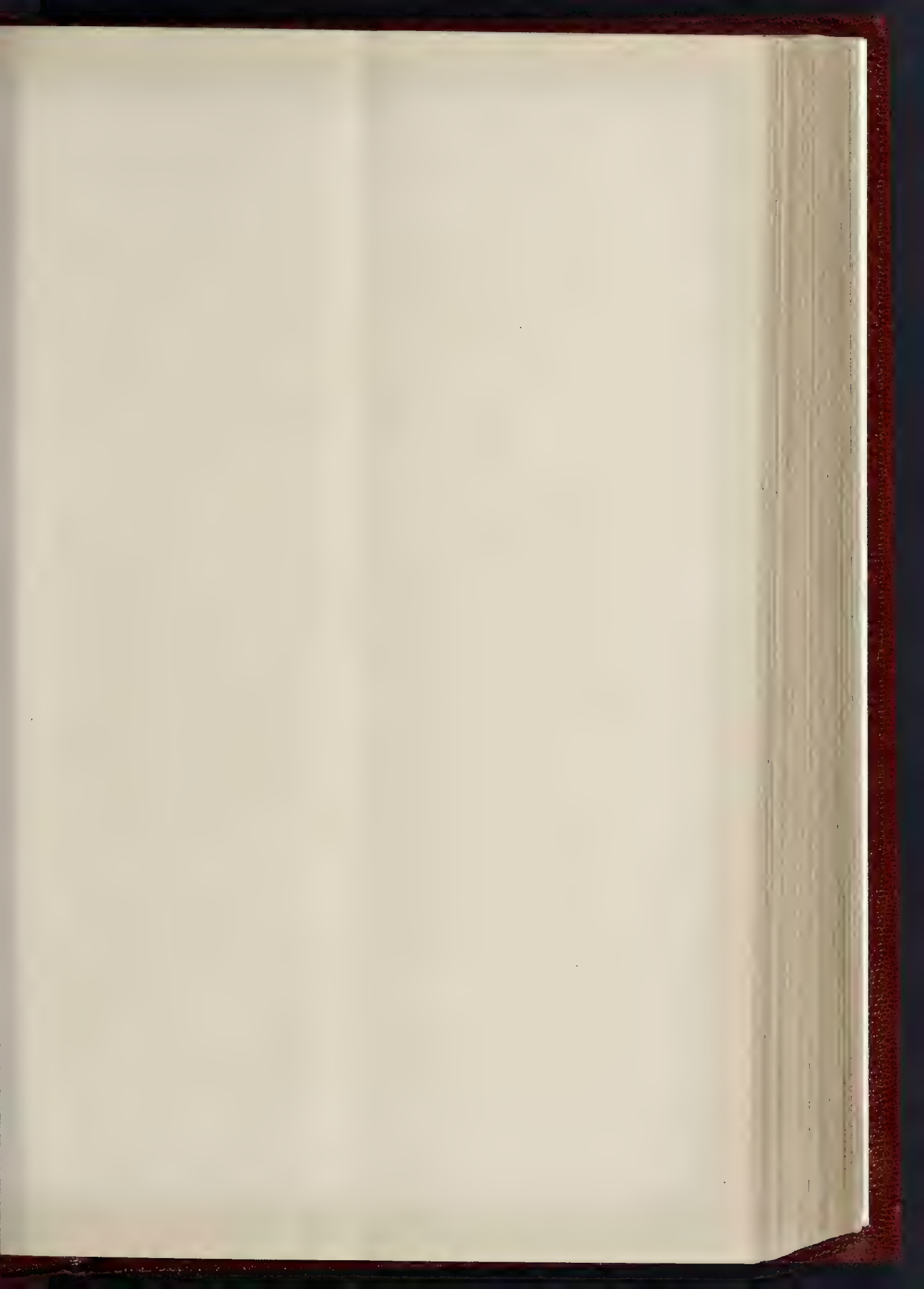
Section looking North.

50
feet.



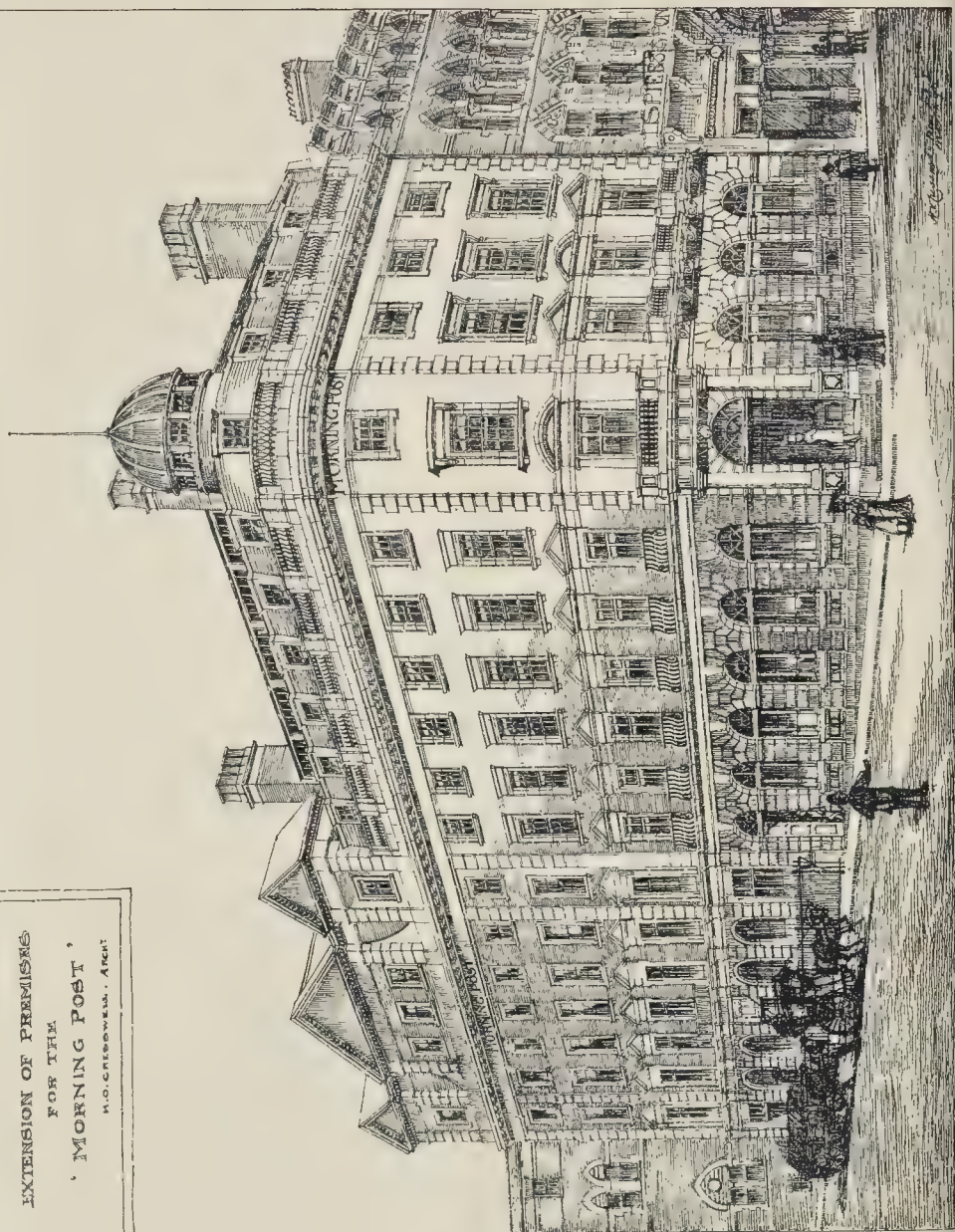


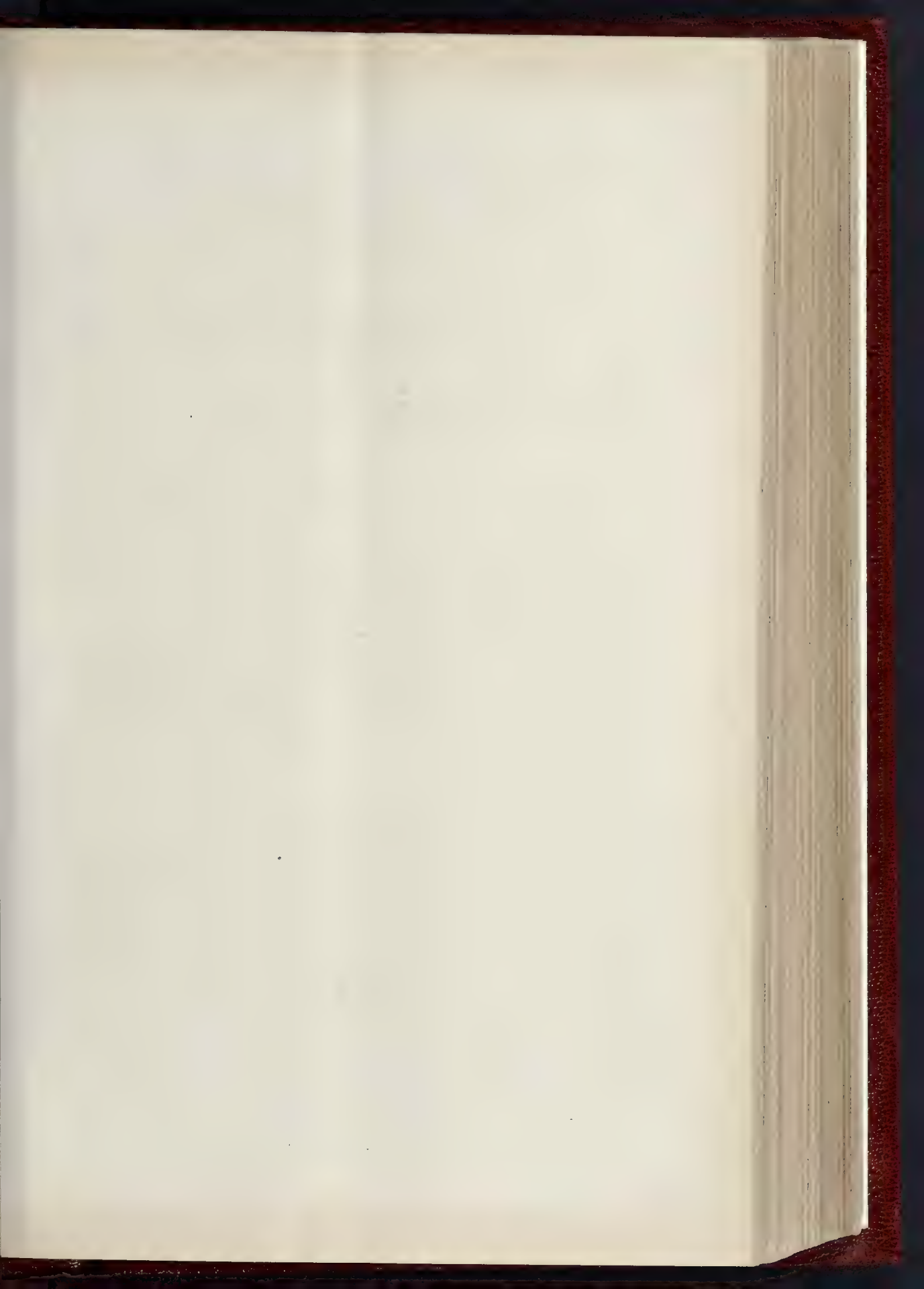
INTERIOR OF A HALL AND BALL ROOM.—By Mr J. ARMSTRONG STENHOUSE

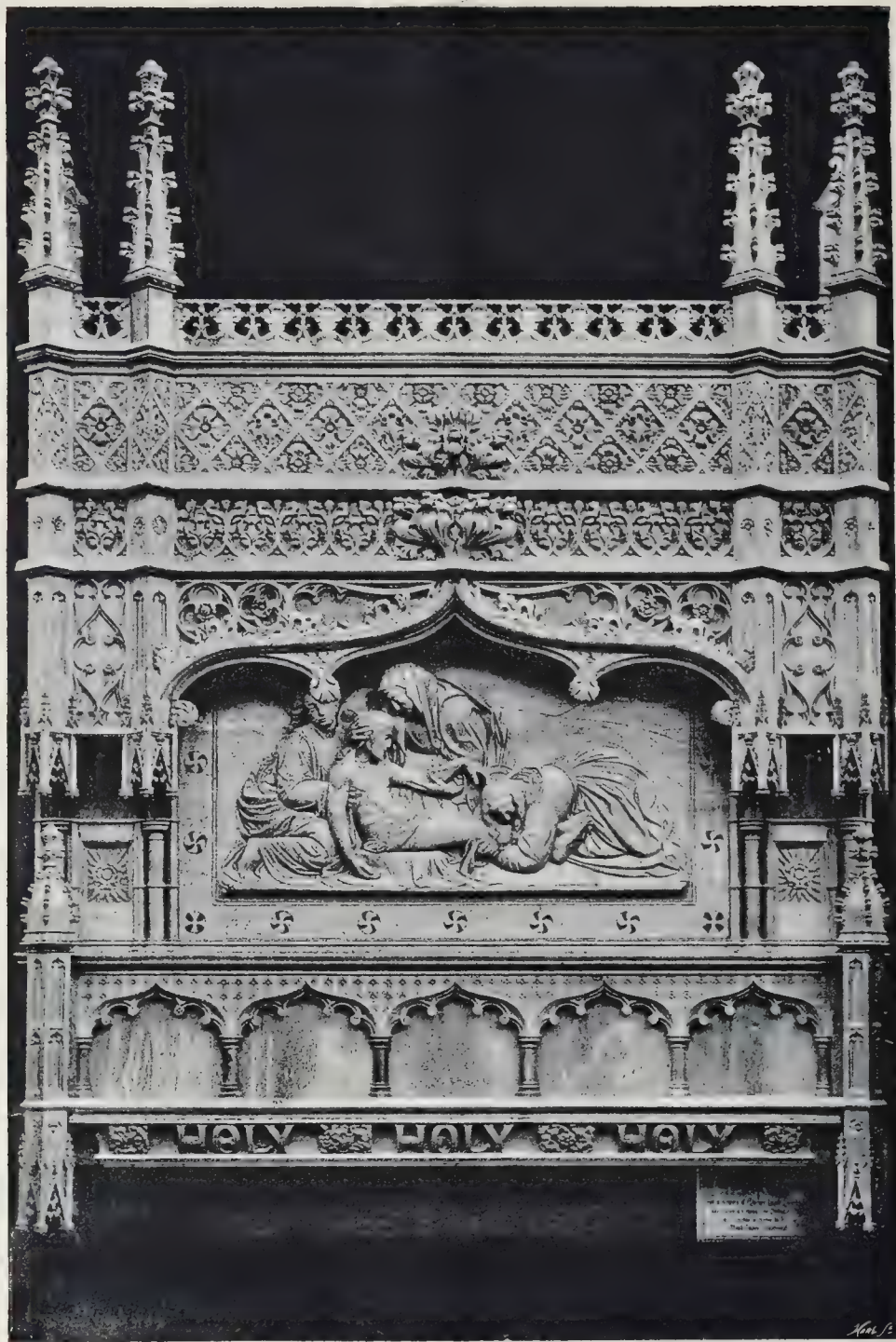


THE BUILDER, FEBRUARY 18, 1893.

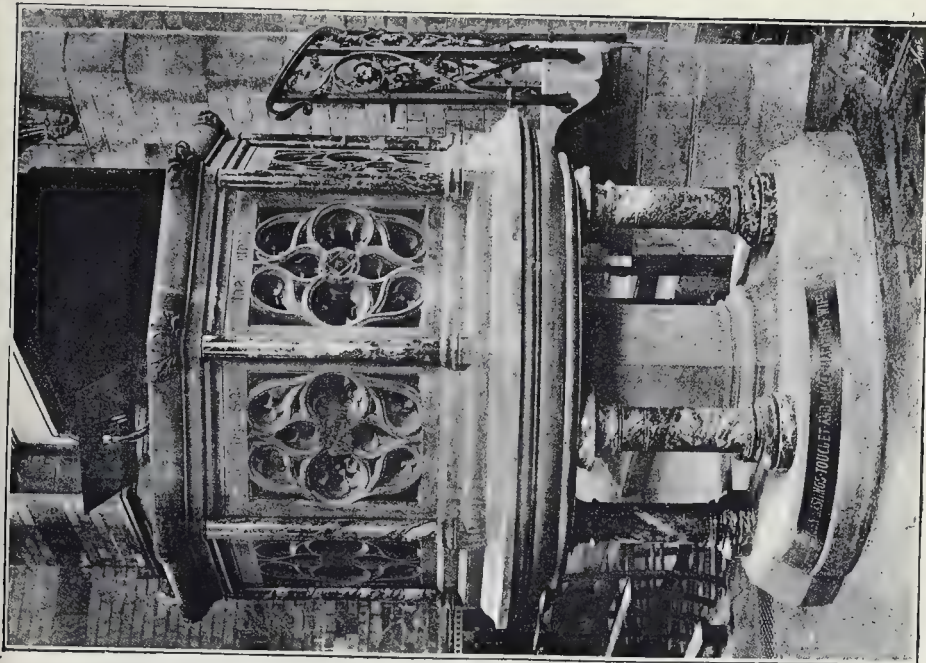
346 STRAND
EXTENSION OF PREMISES
FOR THE
' MORNING POST '
H.O. CRENSHAW, ARCHT.



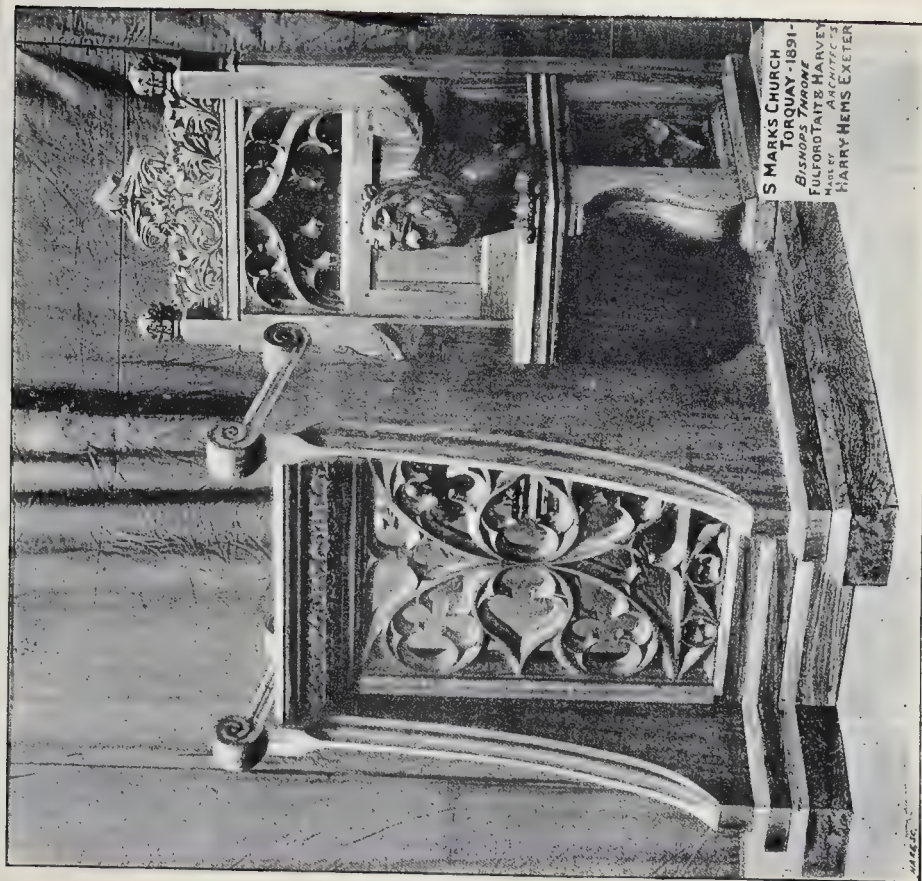




REREDOS, COLYFORD CHURCH, DEVON.—MESSRS. TAIT & HARVEY, ARCHITECTS.

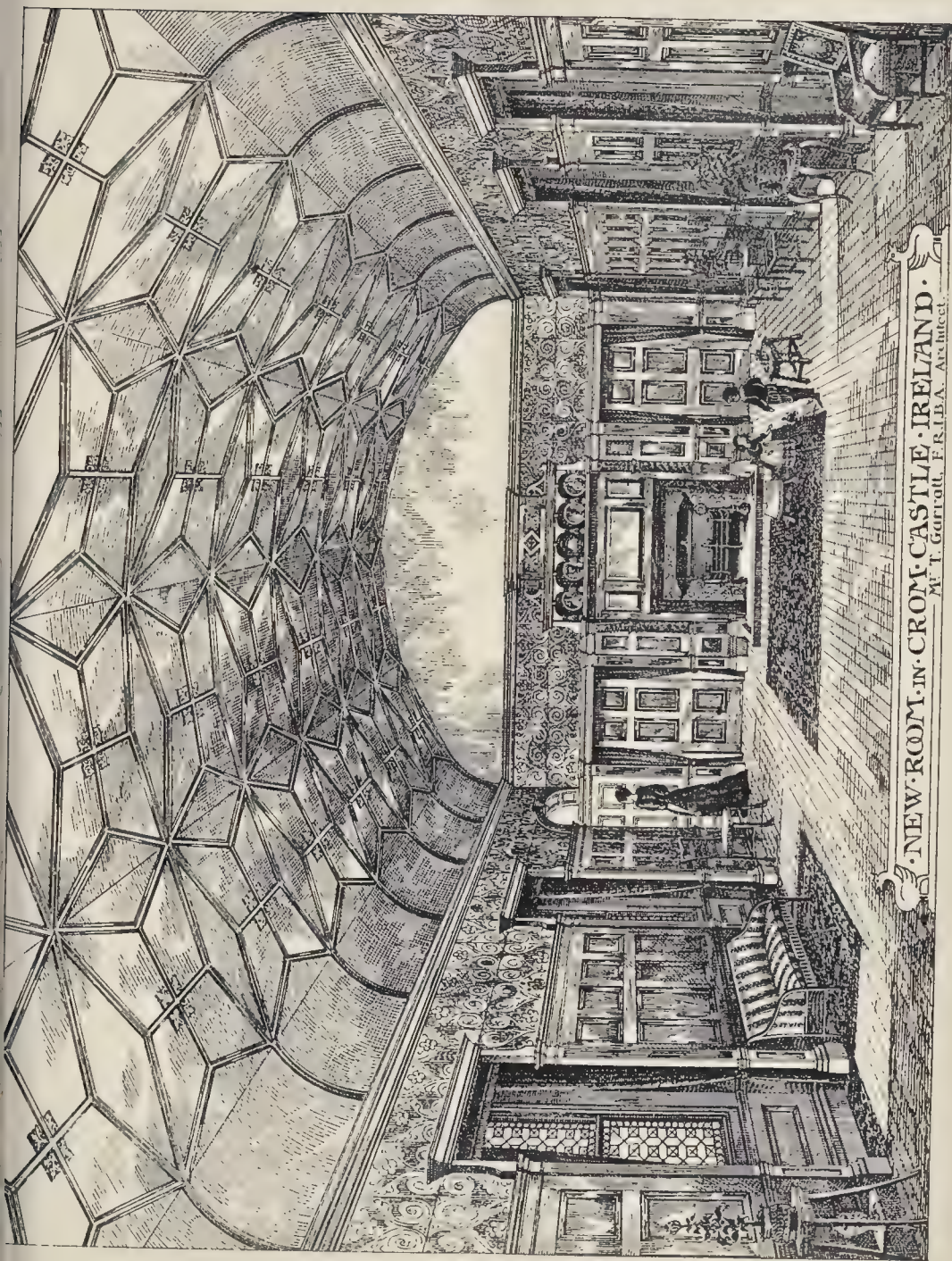


PUHP, ST. MATTHEW'S CHURCH, EXETER.



S MARKS CHURCH
TORQUAY - 1891 -
BISHOPS THORNE
FULFORD TAIT & HARVEY
HAGLEY ARCHITECTS
HARRY HEMS EXETER

BISHOP'S THRONE, ST. MARK'S CHURCH, TORQUAY
MESSRS. TAIT & HARVEY, ARCHITECTS.



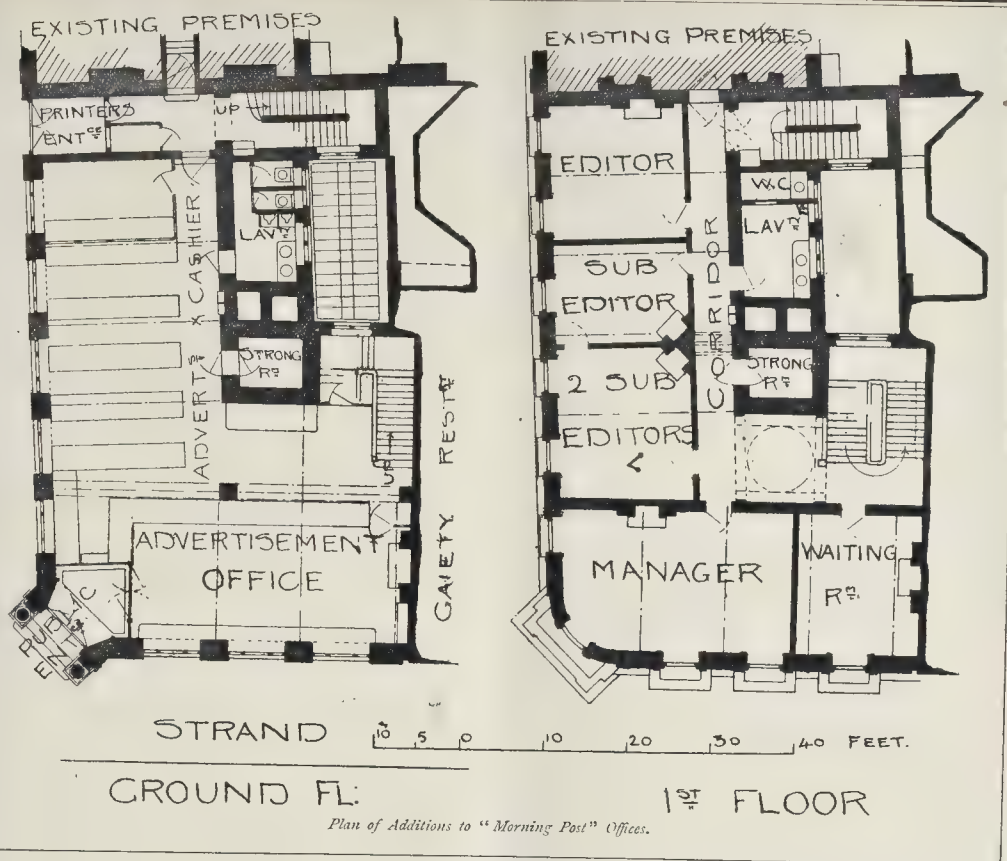
NEW ROOM IN CROM CASTLE, IRELAND.

Mr. T. Garratt, F.R.I.B.A. Architect.



THE PHOTOGRAPHIC & CYCLOSTYLLING CO. ST. JEFF. PETTER. ANE. E. C.

PART OF SECOND COURT, ST JOHN'S COLLEGE, CAMBRIDGE. -FROM A SKETCH BY MR. WILLIAM H. THORP, F.R.I.B.A.



THE ARCHITECTURAL ASSOCIATION.

THE eighth ordinary meeting of this Association was held on Friday, the 10th inst., in the meeting room of the Royal Institute of British Architects, Mr. H. O. Cresswell, President, in the chair.

Mr. F. T. W. Goldsmith, hon. sec., read the minutes of the previous meeting, which were confirmed.

Mr. H. F. Waring and Mr. T. H. Bell were elected members of the Association, and two other gentlemen were nominated for election.

The President announced that the Association had received a very liberal donation from the Clothworkers' Company, viz., 50*l*. The Company had been informed by Mr. Wyatt Papworth of the good work which the Association was doing, so, in moving a vote of thanks to the Company, he (the President) desired to include in it the name of Mr. Papworth.

The vote of thanks was carried by acclamation. Mr. C. J. Tait, A.R.I.B.A., of Exeter, then read a paper on "The Value of Criticism." We print the paper in *extenso* elsewhere.

In the discussion which followed, Mr. Leonard Stokes, in proposing a vote of thanks to Mr. Tait, said that the paper was so able and covered such an extent of ground that its discussion was attended with some difficulty. He was not quite sure that he understood Mr. Tait as saying that there were only two styles of architecture, and that Greek was the best.

Mr. Tait explained that he did not mean to say that Greek was better than Gothic. What he did mean to say was that Gothic architecture could not be described in the same manner as Greek architecture. The strong point of Gothic architecture was its individuality, the marks which it bore of the touch of the individual craftsman. But the charm of Gothic was very difficult to describe, as there were so many elements in it which were difficult to trace.

Mr. Stokes said he was obliged to Mr. Tait for his explanation, and he was glad to hear that Mr. Tait had not meant to cry down Gothic art

on account of its individuality, because he thought that we ought to try to develop individuality in our modern architecture. Although he was quite prepared to admire Greek architecture, and did admire it, it depended upon certain more or less rigid rules, and he could not think that the highest form of art was that which was bound down by rules, such as that the height of a column must be equal to a certain number of its diameters. In his view, such a system of rules could not lead to such good results as when the architect had a free hand and could build to satisfy the eye, the eye, of course, of a trained man. Although no doubt that satisfactory results would have been obtained by their builders, for he thought that after all the rules of Greek architecture were more elastic than they were generally supposed to be. But on the whole he was strongly of opinion that the less a man was trammelled by rules the better work would he produce. One important lesson to be learnt from Greek architecture was the quality of restraint or reserve in ornament, for he thought that perhaps the greatest fault of our modern work was that we put too much ornament on our buildings, and paid too little attention to repose and breadth of effect.

Mr. E. W. Mountford said he had much pleasure in seconding the vote of thanks to Mr. Tait for his admirable paper. He (the speaker) more or less agreed with everything that Mr. Tait had said, and he admired his courage in contending against the most recent ideas as to the unity of the arts. He quite agreed with what had been said as to the necessity of restraint in our modern work, but it was his opinion that restraint only came with experience. The tendency was for the young architect, when erecting his first building, to put all he knew into it; as he went on in his

career he took out more and more, or rather put in less and less, and his last buildings were better than his first ones. There was no doubt whatever in his mind that more buildings had been spoilt by over-elaboration of detail than by any other method by which they could be spoilt.

Mr. A. O. Collard, Mr. T. E. Pryce, and Mr. F. T. W. Goldsmith supported the vote of thanks to Mr. Tait, and the President, in putting the motion, expressed his sense of the great kindness which Mr. Tait had shown in coming up from Exeter to read so very admirable a paper to them.

The vote of thanks having been agreed to, and Mr. Tait having replied to some points raised during the discussion, the meeting terminated.

THE ROYAL COMMISSION ON METROPOLITAN WATER SUPPLY.

THE Commissioners have this week held their last sittings for the taking of evidence.* In addition to further analyses of water as delivered by the companies and additional statistics, from the Registrar-General's department, evidence has been adduced as to the capacity of the Lea basin to afford additional supplies of water. The Commissioners have also continued the investigation, initiated by themselves, into the feasibility of utilising the water from the chalk that is escaping into the Thames and the sea below the district of the Kent Waterworks Company. On this project statements had been made by Mr. W. Whitaker and Mr. W. Topley, and also by Mr. Edward Easton, whose evidence has been taken this week.

Mr. Easton had been requested to give information (1) as to the capacity of the chalk strata in the watersheds of the Thames and the Lea for yielding supplies of water larger than those

* For previous reports of the evidence given before this Commission, see the last two volumes of the *Builder*, as per references given in footnote on page 518 of the number for December 31, 1892; see also page 93, *ante*.

which are at present drawn therefrom, (2) as to the permanence of any such yield of larger supplies, and (3) as to the effect of pumping upon surface waters and upon adjacent wells. He has constructed waterworks for fifteen places which are supplied from the chalk by means of wells and tunnels; for thirteen places that are supplied from wells and boreholes, and for three that derive their water from natural springs. He has had an extensive experience of chalk districts, and points out that in every instance three general features present themselves which are common also to the chalk areas of the Thames and Lea basins. They are—the total absence of streams on a very large area of the extreme upper levels of the chalk; the smallness of the streams flowing from that area; and the absence of floods as shown by the sizes of the waterways of those streams as compared with others flowing from a more or less impervious surface. In every case there exist phenomena which show that there are underground channels or streams conveying the water which falls on the chalk to its nearest outlet. The chalk of the Thames and Lea basins bears a sufficient resemblance to that of the other chalk districts of England to justify the application of the facts and data relating to the water-producing capabilities of the latter to the former. It was, he said, impossible to demonstrate the actual delivery of the water into the nearest outlet in the cases of the chalk areas in the two basins, but there were two outside areas which could be gauged with a fair amount of accuracy. These gaugings made it evident that the absorption of water into the chalk was very much greater than was at present generally supposed, and that the method hitherto adopted of calculating the percolation and evaporation was fallacious. At Brighton the minimum amount of absorption required to furnish the quantity actually pumped could not be less than 10 in.; and that did not take into account what passed into the sea at low water, nor what was stored in the chalk during the six winter months when there was scarcely any evaporation.

East of Dover the figures indicated an absorption of at least 16½ in., or about two-thirds of the rainfall in dry years. Applying these facts to the watersheds of the Thames and the Lea, it was evident that the capacity of the chalk strata for yielding supplies of water larger than those now drawn therefrom must be very great. None of the rivers issuing from a chalk area showed a percolation of more than 3 in., or at the outside 4 in. of rainfall; the remainder gets through underground channels to some outlet. It was not easy to define that outlet in the case of the chalk areas above London, but to the north and east of London there were plain evidences of a flow direct into the bed of the river Thames. The hydrostatic level of gradient in the chalk invariably sloped towards the river. On the north side its highest point was along a line drawn from a little north of Stevenage to a few miles south of Bury St. Edmunds. On the south the line runs from Down, in Kent, passes two miles north of Maidstone, thence north of Charing to the head of the Elham valley, and continues on about four miles north of Dover to within three or four miles of Deal. The water in all this area gravitated towards the tidal Thames, i.e., towards the sea. At Gravesend and Northfleet the fresh water could be seen flowing out of the chalk base at mean tide level. Wells and borings on both sides of the river indicated a larger flow underground. At Grays large supplies were pumped by the South Essex Water Company. The Thames Paper Company pumped 1,500,000 gallons daily without lowering the water more than a few inches. From numerous wells and borings at Northfleet, Dartford, and other places large quantities were pumped which would otherwise flow to waste. These facts answered the first of the three questions as to the capacity of the chalk strata.

As to the permanence of the supply, Mr. Easton said that as long as the rainfall of this part of England remained as it was and had been for probably many centuries, there was no reason to doubt the recurrence of the phenomena which rendered the chalk the most trustworthy and certain source of supply. Diagrams relating to the Kenley pumping station of the East Surrey Water Company, and the Addington station of the Croydon Corporation, were corroborated by diagrams from Brighton and Wisbech, and all went to prove the probable permanence of any supply that might be obtained.

The question of the effect of pumping this extra quantity of water upon the surface waters and adjacent wells was a more difficult one to answer. It was necessary to determine the different ways in which water was conveyed

through the chalk to the outlet, whatever that might be. In describing some of these, he said that the water which was intercepted at the Kenley station of the East Surrey Water Company was that of an underground river running under pressure having its outfall at sea level, most probably below London. The theory that by pumping a gradient shaped like a cone was formed in the surrounding water-level was, for the most part, erroneous. Speaking generally, experience showed that the abstraction of water at a low level did not affect the upper waters, whether flowing above ground or in subterranean channels. The conclusions Mr. Easton draws are that there exist, in all the subsidiary chalk areas of the basins of the Thames and the Lea, a very large quantity of water which is passing away into the sea without being of the slightest benefit to anybody; that if this water be intercepted at or near its outlet, it can be abstracted without any fear of injury to existing interests, and that the supply will be permanent so long as the present rainfall is maintained.

We reserve some further notes of the evidence.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

ST. BARTHOLOMEW'S CHURCH, SMITHFIELD.

The first spring visit of the session took place on the afternoon of Saturday, February 11, under the guidance of the Junior Honorary Secretary, Mr. F. T. W. Goldsmith, to the Church of St. Bartholomew the Great, West Smithfield, and the large number of members who attended the visit testified to their interest in the building. Mr. Aston Webb, under whose control the restorations have been proceeding, met the party, and before going over the building contributed a most interesting account, historical and architectural, of the church, and the vicissitudes of its fortune.

Founded in 1123 by Rahere, commonly reputed to have been either a jester or an ecclesiastic. He fell ill on a pilgrimage, and not only vowed to do great things upon his recovery, but lived to carry them out. St. Bartholomew's Hospital also began its existence under the same auspices, and though in its early life a small institution compared to the church and monastery, it has now become a much more important institution in the eyes of the public than the church.

The interest of the church principally lies in the fact that it is a remnant, unique in itself, of the churches in the City prior to the fire of London. All that remains of this once extensive Priory of Canons Regular of St. Austin is the chancel of the church, which was retained for the use of the parish when destruction overtook the rest of the monastic buildings after the dissolution of the monasteries in the reign of King Henry VIII. Since that time the history of the building has been unusual, and to base uses parts of this church have been put.

The transepts are now nearly complete, and the dividing wall of the north transept will shortly be removed, with the exception of the memorial screen. This portion of the church will be used as a morning chapel. The elevations of the north transept and of the west end, which have been illustrated in this journal, are treated with flint and stone diaper, giving a pleasing variety to the building. Figures in stone of St. Bartholomew and Rahere over the north and west doorways are the able work of Mr. Frith. The monuments, in which the church is unusually rich, add an additional interest to this unique building.

COMPETITIONS.

COUNTY ASYLUM, ISLE OF WIGHT.—This competition was limited to sixteen architects invited by the committee of visitors, and Mr. C. H. Howell, of 3, Lancaster-place, was appointed the assessor. His award, which the committee will submit for the approval of the County Council next month, gives the first place to design marked "Stet," by Mr. G. T. Hine, of 35, Parliament-street, S.W.; second, a premium of 50*l.*, to "Y Z," by Messrs. Giles, Gough, & Trollope, Craven-street, W.C.; third, a premium of 30*l.*, to "Luna," by Mr. B. S. Jacobs, of Hull; and fourth, a premium of 20*l.*, to "Q. E. D." by Mr. R. Stark Wilkinson, 14, Funnell's-inn, E.C. The asylum is designed to accommodate 280 patients, including a separate block for 30 private patients, and administrative buildings for 380 patients. It is to be erected on an elevated site near Blackwater, and about two miles and a half from Newport.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION. At a meeting of the Edinburgh Architectural Association held on the 8th inst. in the Royal Institution—Mr. W. W. Robertson, President, in the chair—Mr. A. N. Paterson, M.A., A.R.I.B.A., of Glasgow, read a paper on "Colour as a Means of Architectural Expression." By way of introduction, he stated that the materials which the architect employs having each their colour value, his art was essentially chromatic, and that, in consequence, the study of colour was of first importance. Nevertheless, it had been much neglected by architects, and to that, among other causes, was due much of the monotony of present day architecture. Architectural expression was regarded to be as much a matter of colour as of form, the term expression being used to indicate the individuality which differentiated one building from another, as well as the quality and character of the design in any one building. Three main lines of colour-study were laid down as being of most advantage to the architect. In conclusion, the tendency towards a more widespread use of colour in the present day was noted; and in this connection particular reference was made to buildings in Edinburgh and Glasgow. Even if a colour effect in smoky towns was limited to a few years' duration, it was, he said, none the less worth being carried out, for that beauty was none the less beautiful because it was transient. After discussion, a vote of thanks was accorded to Mr. Paterson.

GLASGOW ARCHITECTURAL ASSOCIATION. The usual monthly meeting of this Society was held on the 7th inst., in the studio of Mr. Wm. Guthrie, West George-street, who delivered a lecture on "Glass Staining." He introduced the subject by referring to the different varieties of glass employed by the glass stainer, with an explanation of their qualities and appropriateness when used in different combinations. By means of a large number of examples he illustrated the practical execution of the work and the different methods of obtaining effective results. A short discussion followed, and at the close a hearty vote of thanks was awarded the lecturer.

LIVERPOOL ARCHITECTURAL SOCIETY.—A special general meeting of this Society was held on the 13th inst., at the Library, Cable-street, Liverpool, the President, Mr. T. Harnett Harrison, F.R.I.B.A., in the chair. The following resolution was passed unanimously:—"That, in the opinion of this meeting, there is great need for a School of Architecture in Liverpool; that the work would be best carried out by University College, who should appoint a practical architect as lecturer, capable of efficiently teaching all the subjects required for the qualifying examinations of the Royal Institute of British Architects; and that the Council of this Society be authorised to take such steps as may be necessary to bring about the accomplishment of this object."

MR. IRWIN C. WALLAS, late of Kilburn and Hindle-street, has been accepted as the manager of the English branch of the business of Mr. H. Heim, warming, ventilating, and sanitary engineer, of Vienna and Oxford-street.

LIVERPOOL ENGINEERING SOCIETY.—The eighth ordinary meeting of the present session of the Liverpool Engineering Society was held on the 8th inst., in the Royal Institution, Colquitt-street, Mr. R. E. Johnston presiding. The premium of the Society for the eighteenth session, consisting of books to the value of 20*l.*, was awarded to Mr. Ivan C. Barling, for his paper on "Sounding Apparatus." A paper on "Automatic Sprinklers" was read by Mr. Jas. Henry Lynde, M.Inst.C.E., who, after describing the general arrangement of sprinkler installations, and the construction of the "Grinnell," "Witter," and "Titan" sprinklers, proceeded to demonstrate the properties of sensitive solder, and ended with a short review of the results that have been attained by the adoption of automatic sprinklers.

"A. A." LYRIC CLUB.—A Cinderella Dance was given by this club at the Portman Rooms on Wednesday last, February 8; under the presidency of Mr. E. A. Rüntz, at which 295 members and their friends were present. The specially designed tickets and programmes were made an artistic feature, and there was an exhibition of the designs submitted for a club-badge, of which that of Mr. R. D. Warty was awarded the prize by the assessor, Mr. Walter Crane.

APPARATUS FOR INDICATING WATERLEVEL IN TANKS, &c.—At the Suffolk County Asylum at Melton arrangements have been made for the installation of Jennings & Bower's Electro-Mechanical Apparatus to indicate and record in the engine-house of the pumping-station the variations at every inch in level of the water in the tower tank.

LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon at Spring gardens, the Chairman, Mr. John Hutton, presiding.

Tenders.—Tenders were received for an extension of the Holloway to Hackney storm relief sewer. The list will be found on another page under the heading of "Tenders."

Technical Education.—The remainder of the sitting was almost entirely taken up by further discussion of the report and recommendations of the Special Committee on Technical Education. We gave this report, nearly *in extenso*, in our last. The first two recommendations of the Committee were agreed to as amended, last week, as we then reported.

On Recommendation 3, which was as follows:—

(3) "That the Technical Education Board should be appointed for a term of three years, and should consist for the present of not more than *thirty-five* members, of whom *twenty* should be members of the Council; that in the first instance the following bodies should be requested to nominate representatives for appointment by the Council, *five*, the London School Board *five*, the City and Guilds Institute *three*, the Governing Body of the City Parochial Charities *two*, the Head Masters' Association, the National Union of Teachers, and the London Trades Council *one* each; and that other members, not exceeding *two*, should be selected by the Council from outside its own body."

On the motion of the Hon. Robert Grosvenor, it was agreed to omit the words "for a term of three years" in the first sentence, and to insert *in lieu thereof* the words "annually in the month of March."

Mr. Roberts next moved an amendment reducing the number of representatives of the School Board from five to three, and increasing the number of representatives of the London Trades Council from one to three. Mr. Roberts said that as a builder he was conversant with the needs of the case. He expressed a very decided opinion that the scheme proposed had too much of the amateur element and of the school about it, and not enough of the workshop, and he therefore thought that there should be more than one skilled artisan on the proposed Board.

Mr. Alderman H. K. Taylor seconded the amendment, which was carried, on a division, by 49 to 41. The recommendation, as amended, was then agreed to.

The next Recommendation:—

(4) "That the Technical Education Board should be directed to present to the Council, in the month of April in each year, a report of its proceedings during the preceding financial year of the Council, together with detailed accounts of all payments out of the funds administered and complete list of the institutions aided by it; and that interim reports of the progress of its work should be presented to the Council every three months."

was agreed to without discussion, and the subsequent recommendations, as printed by us last week, were all agreed to in substance, after considerable discussion, one amendment to recommendation 5 providing that no scholarships of less than £40 to be given.

After transacting other business, the Council adjourned at half-past seven o'clock.

CLERKS OF WORKS' ASSOCIATION :
ANNUAL DINNER.

THE tenth annual dinner of the Clerks of Works' Association of Great Britain was held on Monday evening last in the Venetian Saloon of the Holborn Restaurant, Mr. Thomas Blashill, F.R.I.B.A., Superintending Architect of the London County Council, in the chair, supported by Mr. H. O. Cresswell, President of the Architectural Association, Professor Banister Fletcher, Mr. J. E. Drower, Mr. Howard Colls, and other friends of the Association.

The usual loyal and patriotic toasts having been given by the Chairman (Colonel-Sergeant Aitchison replying for "The Army, Navy, and Reserve Forces"),

Mr. F. Dashwood, the Secretary of the Association, proposed "The Architects and Surveyors," and spoke of the great help and countenance which the Association had received at the hands of those gentlemen, and particularly at the hands of the architects. The result of the encouragement which they had received at the hands of professional gentlemen was that the Association was now a thoroughly recognised and well-established society, doing increasingly good and useful work. Mr. Dashwood, in his characteristically humorous way, went on to allude to the newest "new departure" of the London County Council in proposing to be "its own builder." Well, he hoped that the interests of the clerks of works would not suffer; if they did, he trusted that the Council would behave handsomely to a very deserving body of men, and would instruct Mr. Blashill to prepare plans for a magnificent building in which to house displaced clerks of the works. Perhaps after a time the Council would feel impelled

to do something for displaced builders also. After alluding to the responsibilities of the surveyor, Mr. Dashwood concluded by coupling with the toast the names of Mr. H. O. Cresswell, President of the Architectural Association, and Mr. J. E. Drower.

Mr. Cresswell, in replying, said he thanked the company for this honouring, not only architects, but, he hoped, architecture also. A great deal had been said and written of late on the question whether architecture was to be regarded as a profession or an art, but he thought it was a question which might be decided here and now. It seemed to him that if architects carried out their work artistically, and if they threw their whole soul and energy into it, with the view of making it as good as possible, others would probably be able to decide whether it was artistic or not; but whether architects called themselves "artists" or anything else seemed to be of very little importance. Let them leave that question to be answered by the next generation, who would be able to judge of them by their works.

There was no doubt, however, that the architect must be a practical man; if he were not, he would be laying up a good deal of trouble for himself and a great deal of expense for his clients. Mr. Cresswell went on to say that he had recently heard Professor Aitchison describe architecture as "the art of building properly," and by "building properly" he no doubt included "designing properly." Now when a building had been designed properly it ought to be executed properly, and it was at that point that the clerk of works came in and was of great service. He (the speaker) was not one of those who looked upon a clerk of works as being a sort of watch-dog over a dishonest builder; a good clerk of works was and ought to be something far better than that, and he was very glad to testify that so far as his experience went, the clerk of works was generally a most careful, capable, and reliable man.

Mr. J. E. Drower, in an able and amusing speech, responded on behalf of "The Surveyors."

The Chairman, in proposing the toast of the evening, "The Clerks of Works' Association," congratulated the Association on the satisfactory and successful position which it had attained. The clerk of works was, no doubt, as had been suggested by Mr. Drower, an official of some antiquity. As would be well known to many of them, the poet Chaucer was a clerk of works, but not very much was known about him in that capacity, except that he was a Government *employé* engaged on royal palaces, &c., and that one Saturday afternoon he was stopped and robbed of a bag of money which he was carrying on his way to pay the wages of the workmen,—an incident which one could conceive as more likely to happen to a poet than to a clerk of works in the present day. As allusion had been made to the vexed question whether architecture was an art or a profession, he would venture to say that he had no doubt it was an art, and he thought it was a profession; he did not think it was a trade, but it certainly was a business which of all businesses he knew demanded great knowledge, great tact, and the most absolute integrity. He had naturally had a great deal to do with clerks of works in the course of his professional life, and he had almost invariably found that they were men of ability and resource, and men worthy of the greatest confidence and respect. After again congratulating the Association upon its progress, and upon the excellent and useful little *Journal* which it publishes, the Chairman concluded by proposing the toast, coupled with the name of Mr. W. R. Cubitt, the President of the Association.

Mr. Cubitt briefly replied, and stated that the Association now numbers 140 members.

Mr. J. Brady, editor of the Association's *Journal*, proposed "The Worshipful Company of Carpenters," coupled with the name of Professor Banister Fletcher, past Master of the Company. Mr. Brady referred to the great and valuable aid which the Company had given to the Association, and to the cause of technical education in the building trades generally. The toast was very heartily received.

Professor Banister Fletcher, in replying, detailed the efforts now being put forth by the Carpenters' Company in the cause of technical education, and referred to the antiquity of the carpenters' craft, and to the important functions which the Carpenters' Company formerly performed in regard to London buildings.

Mr. W. S. Woollacott proposed "The Treasurer, Mr. John Oldrid Scott," whose services to the Association were very warmly spoken of. In the absence of Mr. Scott, Mr. J. Wilkinson replied on his behalf.

Other toasts followed, including "The Visitors," proposed by Mr. E. W. Nightingale, and coupled with the name of Mr. J. Howard Colls, who, in replying, raised a laugh by saying that, though as a practical builder he naturally did not believe in the success of the London County Council's proposal to abolish builders, he believed the builders of London were such a noble body of men that, if they could be persuaded that their effacement would be for the good of the public, they would at once proceed to efface themselves.

Finally, the toast of "The Chairman" was proposed by Mr. T. Spooner, and enthusiastically received.

SANITARY INSPECTORS' ASSOCIATION :

ANNUAL DINNER.

THE tenth annual dinner of this Association was held on Saturday evening last at the Criterion Restaurant, the President of the Association, Dr. B. W. Richardson, being in the chair, and Mr. H. Alexander, Chairman of the Council, in the vice-chair.

The usual loyal and patriotic toasts having been given,

General Webber, who responded for "The Army and Navy," gave an interesting account of the outbreak, in a mysterious manner, of an epidemic of enteric fever in the British camp near Kassasin during the 1882 expedition to Egypt. It was simply the result of ignorance of the first principles of sanitation. The outbreak might have been prevented by merely following out the Levitical prescription for the camp of the Israelites in this very region. Failing to apply the necessary "covering of earth" every morning in the latrines, their contents became desiccated in a few hours in the burning sun, and were carried back daily into the camp, in the form of fine dust particles with which the air was charged. That was an illustration of the importance of a knowledge of the practical details of sanitary work, which, though a common characteristic of the sanitary inspector, could hardly be expected from all professors of the science of medicine.

Mr. John Hutton, Chairman of the London County Council, proposed the toast of the evening, "Success to the Sanitary Inspectors' Association." He congratulated the Association on its prosperous career during its ten years of existence—a period in the course of which there had been a great awakening of public interest in the Association's work, an awakening which afforded the best hope of future prosperity and future progress. The more enlightened public opinion became and the greater the attention the public gave to sanitary matters the more docile and receptive it would become, and the more ready to make sacrifices for the maintenance of public health. He was disposed to think that the increase in the numbers and importance of that Association was in a great measure due to the eminent services rendered to sanitary science by their Chairman, and in his devotion to the interests of the sanitary inspectors as their President. From the growing appreciation of the public, of their work, he augured that the Sanitary Inspector had a brighter future before him. When they saw the School Board compelled to stand aside until the sanitary inspector had performed his important duties, he could not but feel confident that the time was coming when not only the office but the remuneration of the sanitary inspector must grow and increase. With such a record for honesty and devotion as the sanitary inspectors could show, it was impossible not to believe in the brightness of their future prospects. It was a great gratification to him to have been asked to propose "Success to the Sanitary Inspectors' Association," which he did with the utmost cordiality, and he would couple with the toast the name of his friend, their President, Dr. Benjamin Ward Richardson.

Dr. Richardson, in replying to the toast, referred to the career of the Association as one of continuous success. It had been a great success from the very first. It was a great success when they secured the late Sir Edwin Chadwick as President, that Edwin Chadwick who had been justly called the "Napoleon of sanitary science." Last year had been the greatest success of all. They had received the greatest compliment that any Association could receive from a foreign nation, from the sanitarians of France. They had been invited to lay their views before their foreign brethren in a conference at Paris, and they had been shown not only all that was most worthy of the attention of sanitarians in that city, but they had been taken everywhere, and had been fêted and feasted during several days in the most generous manner. Then there was the Berridge Fund, the 3,000*l.* derived from which gave them greater independence and solidity. The sanitary inspectors were "the hodmen" of sanitary science. It was their mission to make England a garden in which no impurity would be allowed to grow, and that they would accomplish by the simple command given by the prophet to Naaman, "Go, wash and be clean." But they must be learned men, and they must work out their own independence by securing more remuneration. That was necessary, not only for their own advantage, but for the good of the public itself. They must work manfully to secure such a measure of independence and such security of tenure in their offices that no power, save that of a Government, could remove them. The President concluded by an assurance of the readiness with which he had acceded to the wish that he should succeed him which had been expressed by Sir E. Chadwick, to whom it was in the greatest measure due that they had so well prospered, and by assuring the members of the Association of the earnestness with which he should always devote himself to their interests.

Other toasts were given, including "The Houses of Parliament," responded to by Mr. Colman, M.P.; "Science and Art," proposed by Mr. Macmillan,

and responded to by Mr. Clodd and Canon Harford; "The Visitors," proposed by Mr. Tidman, and responded to by Mr. H. R. Williams, Chairman of the Hornsey Local Board, and Mr. B. F. Jacob, the Master of the Carpenters' Company; and "The Executive," to which Mr. H. Alexander replied on behalf of the Council.

Books.

Encyclopédie de l'Architecture et de la Construction. Directeur, P. PLANAT. Vol. VI: Premier Fascicule. Paris: Dujardin et Cie.

THE new half-volume of the "Encyclopédie" contains more than the usual number of articles on large and important subjects. M. Garczynski contributes the article on "Nivellement," which goes pretty fully into the subject of levelling, with a number of practical illustrations of instruments and methods. M. Saint-Paul contributes the article on "Ecole de la Normandie," in which the existence of some work of this school in England is (for a wonder) recognised, and it is even admitted that England surpassed the continent, "thanks to the wealth of the prelates brought over by William the Conqueror," though it is not of course thought necessary to give any illustrations of Norman architecture on English soil. The article on "Les Ordres" by the editor is sufficiently full and comprehensive, and admirably illustrated. The article on the "Parthenon" is by M. Loviot, who claims credit for having taken, a few years since, careful measurements of the building, and ascertained that its base was slightly convex, which he regards as a means for ensuring the carrying off of rain-water. Not a single word is said as to Mr. Penrose's elaborate measurements many years previously, nor of the optical reasons for the curvature of the lines. Is M. Loviot really ignorant of the existence of Mr. Penrose's work, or is it that he resolutely refuses to recognise a priority of discovery and a much fuller investigation on the part of an English architect? In either sense the omission is discreditable to him. From the article, it would be supposed that M. Loviot was the first person who had ever accurately measured the Parthenon. One gets almost tired of noticing this patriotic egotism on the part of French architects. The article on the architecture of Holland and Belgium ("Pays Bas"), by M. J. Van Ysendyck, is really valuable for the number of well chosen and carefully executed illustrations. Persian architecture is also ably treated and largely illustrated by M. H. Saladin, and is followed, as an effective contrast, by a very full practical article on "Persiennes et Fermetures" by "P. A. D.," with a number of constructional diagrams and sections. The long article on "Perspective," by M. Julien, is rather too much occupied, in the first portion, by considerations and diagrams of the construction of the eye and the optic nerve, &c., which really does not concern the subject in any practical sense; the whole problem of the draughtsman in regard to perspective is outside the eyewall; he is concerned with *what* the eye sees; *how* it sees is a matter for oculists. When the author gets to the real subject, however, he treats it in a simple and practical manner, aiming at making general principles clear rather than showing highly elaborated problems with a multitude of lines, which has been the general fault of English treatises on perspective. "Pierres de Taille" is a good practical article by M. B. Garczynski; and the signature of "B. G." to the equally practical article on "Planchers et Parquets" is we presume that of the same painstaking contributor. Of the deficiencies of the article "Pont" we have already spoken. "Porche," by MM. Saint-Paul and Nodet, is a well-illustrated but almost exclusively French treatment of the subject, and the same may be said of M. Rivoalen's article on "Porte." "Porte de Ville," signed "R.," and probably by the same contributor, is a little wider in its survey, and is at any rate illustrated with a great many charming and picturesque examples.

The general article on "Postes et Télégraphes" is by M. Guadet, architect of the new building of this class at Paris, who remarks that a post office building is only a kind of instrument of service which changes, or should change, with every change and improvement in the method of postal service; and he adds that he is well aware that the building which he has just completed in Paris must, in a certain time, longer or shorter, become antiquated, when the post is carried on in quite a different method from now,—"*peut-être* sans

chevaux ni voitures." He gives plans of the London, Berlin, and Bremen post-offices, rather by way of history of the subject, as the two former, at all events, must be considered out of date as models; that of Bremen is a recent building. M. Rivoalen ("E. R.") adds some account, with plans, of M. Guadet's own building. The same contributor treats "Prison," in a rather too succinct and hardly adequate manner. "Profiles, Moulures" is a large subject most inadequately treated by the editor, who again knows nothing of any Gothic mouldings except French, and to anyone acquainted with our grand and varied English mouldings (in which detail at all events English Gothic can fear no comparison with any other country), the poor and weak sections of Gothic mouldings given in this article must appear a most pitiful illustration of this type of architectural detail; nor is the writer much more at home in the treatment of Greek mouldings, of the peculiar refinements of which no one would get the slightest idea from his description and examples.

Six Months in the Apennines; or, a Pilgrimage in search of vestiges of the Irish Saints in Italy. By MARGARET STOKES. London: G. Bell & Sons. 1892.

THE object of the tour which this book recounts was partly to find in Italy examples of the style of ornament which was prevalent in Ireland in the early Mediaeval period, by way of tracing the artistic and historic connexion of these Irish forms of ornament with what the writer is disposed to regard as the land of their origin; in fact, "to find a clue to the origin of Irish art." A good deal of the book is occupied with matters of ecclesiastical history which do not much concern us, but in regard to the question of art history the author calls attention to some interesting examples in Italy of details of ornament with which early Irish art certainly seems to have some connexion. The ornament on the ciborium of St. Giorgio de Valpolicella, dated 712, from the Vatican museum, is a curious example in this respect, in which one half-arch has a reminiscence of the Roman guilloche, and the other half an interlaced pattern of what we are accustomed to call the Celtic type. A more marked and more distinctly Celtic-looking example is that from the cloister of San Lorenzo fuori le Mura, at Rome. These and other examples certainly support the author's view that the idea of the Irish or British origin of this type of ornament must be abandoned by those who have hitherto held it, and that Italy was the half-way house in this respect between Byzantine and Ireland.

The remainder of the book is somewhat desultory in arrangement, and is occupied with the search, about the neighbourhood of Luca, Bolio, and other places in North Italy, for traces of the history of saints who have become more especially associated with the Irish church,—St. Frediano and St. Columban, and others: but this is accompanied by sketches of and remarks on various old churches and decorations which are more or less interesting, especially the illustrations of the bas-reliefs on the sarcophagus of St. Columban at the church dedicated to him at Bobio. The book is agreeable throughout; but a considerable portion of its contents do not come properly within our scope.

J. Overbeck Geschichte der Griechischen Plastik, Vierte ungarbearbeitete und vermehrte Auflage. Erster-Halband mit 76 Abbildungen. Leipzig: J. C. Henrichs. 1892.

IT is impossible to pass over the appearance of the fourth edition of Overbeck's Greek Sculpture without a word. Now that in England we have our own standard histories of Greek Art as well as translated handbooks innumerable, we do not so inevitably refer our students to Overbeck, but we can never forget that but for his work our own English school of archaeology would scarcely have existed. There is not an English archaeologist over thirty who did not get his preliminary training from the great German compiler. Compiler in the best sense, Overbeck always was; a collector of facts, apt in the sifting of evidence, and the weighing rather than originating of opinion. The section on Mycenaean antiquities is, of course, practically new, and it is a good example of Overbeck's manner; his tone in dealing with this still burning question is a model of moderation. He fully realises how much yet remains problematic. Scarcely anyone will quarrel with his general conclusion that there are elements in the Mycenaean civilisation that originated independently of but were much influenced by contact with Egypt and the East.

Details cannot be entered into here; it is enough to say that the book is on the whole brought up to date, and we suppose the publisher is to blame for re-admitting such inaccurate reproductions as that of the Corinthian puteal on p. 251.

Correspondence.

To the Editor of THE BUILDER.

PROPOSED BYE-LAWS UNDER THE PUBLIC HEALTH (LONDON) ACT, 1891.

SIR,—The draft bye-laws are being circulated among the Sanitary Authorities, doubtless in order to afford opportunity for criticism. I have not, however, met with any objection or expression of approval by builders, architects, or surveyors, though they will all feel keenly the effect of the bye-laws. Perhaps you will allow me to elicit remarks by calling attention to one or two of the proposed provisions. When the bye-laws have received the sanction of the Local Government Board, the local Sanitary Authorities will be obliged to see that they are enforced, and will have apparently no power of dispensation. The County Council may do any work neglected by the Sanitary Authority, in the way of securing the punishment of offenders, if it chooses.

1. *As to Water-closets.*—Under these bye-laws a new w.c. cannot be constructed in the central portions of a building, unless it has an external wall on one side, abutting on an open space of not less than 100 sq. ft. of superficial area. Water-closets, lighted and ventilated by roof lights only, of whatever form, will not be allowed. In expensive sites the closets will thus be confined to upper stories. Even on a top story the w.c. must be thrust against the boundary wall of the site—unless the difficulty as to carrying down the soil-pipe on the inside of the building is got over.

In a valuable site, 100 ft. from back to front, and with a frontage to the street of sixteen ft., it would often be a subject of regret if the soil-pipe had to be brought down on the narrow street frontage. Shops in crowded thoroughfares will be awkwardly placed, when they have no back fronts and no internal areas; the water-closets must be against the street, but there must be no basement where the soil-pipe descends. There can be no manhole between the foot of soil-pipe and the sewer—for a soil-pipe passing through a basement (even a vault under a street pavement) will be illegal.

A recognised form of warehouse building on small sites, with the lower floors lighted by open wells with skylights over them, each floor covering the whole area, cannot be erected under the proposed bye-laws, unless water-closets are omitted. The 100 superficial feet required for dwelling-houses under the 1855 Act will thus come in by a side wind for warehouses also. It will be an exercise in planning to place a goodly number of water-closets adjoining a small area, and to give each an external wall in which a "window, not less than 2 ft. by 1 ft., exclusive of the frame, may be placed."

2. *As to Soil-pipes.*—The proposed bye-law as to these states that they must be erected outside the building. Some of the inconveniences of this iron rule have been already hinted at. Perhaps the simplest way of dealing with a soil-pipe from upper stories in the central portions of buildings will be to put little open areas—large flues in fact—to contain the pipes. It would be necessary to make them large enough to be accessible, say 2 ft. square. The most liberal District Surveyor knows nothing thinner than a 9-in. wall, so that a space of 3 ft. 6 in. by 2 ft. 9 in. will be gouged out for the passage of the pipe, which, up to the present time, would be placed in a chase and reached by the removal of a wooden casing.

While recognising that soil-pipes should be placed outside the walls when it is convenient to do so, I think it may be well to point out, what has so often been pointed out before, that some people have not the warm affection for external soil-pipes in all imaginable positions, which stirs the minds of some writers about them. They are affected by frost on the cold sides of buildings, and by the heat of the sun on the other side, and they frequently exhibit themselves very awkwardly. The design of an important building ought not to hinge on the position of a soil-pipe. When a thousand things, all of them all-important, require attention, one of them should not elbow the others out of its way.

A soil-pipe, ventilated at the top and reaching a drain near a ventilated manhole at the bottom,

cannot be a fearful source of danger. It has, in good work, no connexion with any foul drain or sewer, it is not unduly large, is made of thick lead, and well scoured by flushes.

These remarks have been thrown out in order to show that there is debatable matter in the bye-laws; there are in them a number of other provisions which deserve a thorough scrutiny. No one would object to the abolition of the dark w.c. tucked into a small vault of too limited height under a street pavement; nor of dark water-closets with four story air-shafts; nor of water-closets opening into central staircases lighted only down the well holes, and other similar insanitary makeshifts. Some of these people, however, who know the difficulties of making the best use of expensive sites, devoted to modern complicated buildings, may think that legal obstruction might stop short of the proposals in the bye-laws.

F.R.I.B.A.

THE ORIENTATION OF CHURCHES.

SIR,—Adverting to the remarks of Mr. Loftus Brock (Feb. 11) it was desired in my previous letter, to which he alludes, to emphasise the facts that a shadow from an upright pole at sunrise may give several diverging lines in the same latitude on the same day, whereas the rule deduced from calculation would give but one line for each day, varying only with the latitude, with unerring precision; and thus avoid a complication of lines from which apparently no further information, than that a reference to one day was intended, could be gained, as would be the case with a single line.

Moreover, the rule supplying an angle by calculation could be applied at any time—in the same way that we by referring to azimuth tables can ascertain the angle of sunrise in any latitude, for any season of the year, and with a knowledge of the true north can, therefore, at once lay down any required line—and consequently be free from that serious objection, to which the other rule is open, of waiting for a particular day, with the grave doubt whether the sun would be seen or not at the required time when that day arrived.

Mr. Brock adds truly "that the axis of a square body, if set out to sunrise at the summer or the winter solstices, will, for many positions in our island, have its angles directed to the cardinal points." But it may be noticed that those positions must be to the north of the Tweed, for it is not until the 56th deg. of north latitude is approached that the true bearing of the sun at rising is 45 deg. north of east at the summer solstice, and the same number of degrees south of east at the winter solstice,—as can be seen by reference to the tables before mentioned or to Mr. Francis Jones's table—obviously a necessary condition in any of such cases.

J. HOUGHTON SPENCER.

Taunton, February 14, 1893.

P.S.—In referring in my last letter to certain days as being the same in name only from century to century, consequent upon the increasing error in the Julian Calendar if such error were left uncorrected, the expression "nominally so" was used. This in the type has been rendered "nominally twenty," but the idea of specific number was not intended to be conveyed.*

SIR,—Mr. J. H. Spencer in his letter on the above subject in your issue of the 11th inst. says, "it is believed that Wordsworth is responsible for" the poetical idea of ancient church founders waiting for the rising sun in order to get a guiding line for their work." What Mr. Spencer alludes to appears to be a note appended by Wordsworth to his (second) poem, "To the Lady —, on seeing the foundation prepared for the erection of — Chapel, Westmoreland," and which is as follows:

"Our churches, invariably perhaps, stand east and west, but why is by few perhaps exactly known; nor that the degree of deviation from due east, often noticeable in the ancient ones, was determined, in each particular case, by the point in the horizon at which the sun rose upon the day of the saint to whom the church was dedicated." The question is—where did Wordsworth get his information from? or what authority had he for his assertion? And is it really anything more than a mere "poetical idea"? The extract which Mr. White has given from Durandus seems to show unmistakably that in his time (the middle of that great church-building epoch, the thirteenth century) no such rule as that referred to was known. His object in what he says seems to be merely to remind church-builders that they wish their churches to stand due east and west (which he appears to assume they, as a matter

of course, will do), they must be guided by the point at which the sun rises at the equinoxes.

H. E. T.

PASSAGE OF AIR.

SIR,—Can any of your readers give the formula for the reading of an anemometer in calculating the lineal feet of air passing in at, say, a 3 in. circular pipe, and also at a square shaft 9 in. by 9 in.?

CONSTANT READER.

The Student's Column.

CHEMISTRY.—VII.

FOG.

WHEN the air in the vicinity of any large surface of water becomes warmed, it is capable of absorbing a considerable quantity of the water in the form of water vapour; but when this air again becomes cooled, the water it absorbed when warm, condenses out in very minute drops, which float in the air and form a visible mist. If, however, the surfaces upon the earth become cool more quickly than the air, the water vapour in the air condenses upon these surfaces, and forms dew, instead of forming a mist.

It follows from what has been said that all places in the neighbourhood of large surfaces of water, such as rivers, marshes, and seas, must be always more or less subject to mists, and that these will be most frequently formed where the changes in the temperature of the air are greatest and most frequent.

Now if this mist is formed within a large town, it will carry down with it all the floating solid matter in the atmosphere through which it passes, and a considerable quantity of the gaseous impurities. In a town like London, the air always contains large quantities of "smoke," of carbonic acid, and of a gas called sulphurous oxide, which, although an antiseptic, greatly irritates the lungs; and in addition, traces of sulphuretted hydrogen and other sulphur compounds. All these are products of the combustion of coal, and by far the largest quantities are sent into the air by private householders, not by manufacturers. When a mist is formed in London and carries down with it these products of the combustion of coal, it constitutes a "pea soup fog," or, as Dickens calls it, "a London particular." But this is not the worst feature of a London fog. There are always present in the air of a town a large number of organic germs, produced by decaying, and sometimes diseased, organic matter. These also are carried down in the fog, and are taken into the system in the act of inspiration.

Further, when either a dense mist or fog forms, it is impossible for the air respired from human beings and other animals to rise to any great distance through it, and, moreover, the fog clouds are constantly rising and falling and moving about in great waves. It is no uncommon occurrence for the air in a London street to change from clear to foggy five or six times in one morning. The consequence of this is that, in London, the four or five million people are constantly inhaling, for a time, portions of one another's respiration products, which, as we have seen, always contain a quantity of highly decomposable organic matter. In winter time, when fogs and mists are most frequent, and infectious ailments most rapidly spread, the extent to which they spread will, therefore, depend largely upon the frequency and duration of the fogs, but also, of course, upon the density of the population, the previous state of the health of that population, and upon the sanitary condition of the town.

Disinfectants and Antiseptics.

Many kinds of disease are capable of being transmitted from one person to another by means of the minute living organisms expired in the breath. As Baldwin Latham very truly remarks: "It is difficult to conceive how small an amount of matter the germ may be in zymotic diseases, and how rapidly it may develop." The disease-producing germs are, in fact, quite invisible, except under a very powerful microscope, but they are capable of starting an epidemic of fatal disease, and may remain harboured for years in clothing or bedding without losing their power of carrying some particular form of illness to a fresh victim. It appears, however, that for the development of some forms of disease by germs it is necessary for the person operated upon to be previously in a weak state of health.

The words disinfectant and antiseptic are unfortunately often used as synonymous terms.

This should not be so. A disinfectant, as understood by the sanitarian, is a substance capable of destroying disease-producing germs, while an antiseptic is a substance that merely prevents the development of these germs. Thus, while mercuric chloride is a disinfectant, camphor and eucalyptus oil can only be regarded as antiseptics.

One of the methods of comparing the destructive power of the various disinfectants is to cultivate some germs in a tube containing a soft mass of gelatin. In this substance they rapidly increase, forming "colonies," and when a certain number of colonies have been obtained, the disinfectant is brought into contact with them, and the time taken to completely destroy them is noted.

At the present time there appears to be much doubt as to which of the so-called disinfectants are true disinfectants, and which merely antiseptics. Thus, carbolic acid, which has hitherto been generally regarded as an excellent disinfectant, is now classed by some with the antiseptics, although apparently there is little reason for doing so. From the distinction drawn between the two terms, it will be noted that whereas all disinfectants are antiseptics, antiseptics are not necessarily disinfectants.

In some cases, such as when sulphurous oxide is employed, the question whether the material will act as a disinfectant or an antiseptic probably depends upon the thoroughness with which it is applied.

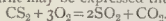
For efficient disinfection, a solution of mercuric chloride (HgCl₂) commonly known as corrosive sublimate, is recommended. It is much used in hospitals. The great objection to its use is its very poisonous character. As it forms a colourless solution, it is generally coloured with indigo or other colouring matter to prevent its being mistaken for water.

Of late years, superheated steam has been much recommended for the disinfection of all substances such as bedding and clothing. The materials are placed in a cylindrical oven heated by a steam jacket, and then through the oven itself superheated steam is passed. By this method, the materials are heated through and through to a temperature of above 212 deg. Fahr. without scorching them, and at the same time without wetting them. It is said to be a most efficacious method for completely destroying germs, and also parasites of all kinds.

For disinfecting liquids by oxidation, permanganate of potassium still ranks very highly. When brought into intimate contact with sewage, its deodorising and disinfecting properties are beyond all doubt.

In London, sulphur dioxide (SO₂), or sulphurous oxide as it is called, is most commonly used for disinfecting the atmosphere, walls, and furniture of a room, notwithstanding the fact of some doubt having been expressed as to its action as a true disinfectant. This compound is formed when sulphur is burnt in the air, a little methylated spirit being usually added to make it burn more readily. When disinfecting a room by this method, all openings by which the gas might escape must be closed, and the sulphur dioxide should, moreover, be allowed at least twelve hours to complete its action. All doors, windows, and flues should then be opened, and when the atmosphere of the room is once more in its normal condition, the room should be thoroughly cleaned. Sanitary inspectors usually employ carbon bisulphide (CS₂) as a more convenient method of generating sulphurous oxide. Carbon bisulphide is a highly inflammable, colourless liquid, and if it is desired to rapidly generate a large quantity of sulphur dioxide, one or two ounces of the liquid are ignited in a saucer. As the liquid will not mix with water, when once ignited water is useless for extinguishing the flame. A safer method of burning bisulphide of carbon is to burn it like an oil in a lamp. This latter method is much used in hospitals.

The reaction which occurs when bisulphide of carbon is burnt may be expressed thus:—



When subjected to a pressure of about three atmospheres, sulphur dioxide gas condenses to a liquid, although, immediately the pressure is diminished, the liquid returns to the gaseous condition. Liquefied sulphur dioxide is sold commercially in iron or glass syphons, and should prove very useful to sanitarians. Immediately the cock of the syphon is opened, the sulphurous oxide rushes out in the form of gas and of a fine spray.

Chlorine gas is sometimes employed for disinfecting, and is then generally obtained by pouring commercial hydrochloric acid, i.e., "spirits of

* The "so" in the MS. was misread for "20" in the original.—Ed.

salts," upon some bleaching powder exposed in a saucer. As chlorine gas attacks iron bedsteads and other furniture, it can only be used in certain cases.

Eucalyptus oil, the favourite antiseptic during the recent epidemics of influenza, possessing genuine antiseptic properties, and being volatile and non-poisonous in small quantities, is very valuable for preventing the spread of infectious diseases; but there are said to be so many species of the eucalyptus tree that do not yield the true antiseptic oil, and the sudden and great demand for it has led to such extensive adulteration, that purchasers should take every precaution to obtain the genuine antiseptic oil. The use of a sophisticated article, especially during epidemics, may lead to very serious consequences.

The eucalyptus tree is much grown in the South of Europe, especially in malaria districts, like those near Rome, because the tree grows so rapidly that it absorbs an appreciable amount of moisture from the ground; and the exhalations from the leaves, moreover, purify the surrounding air to a certain extent. Eucalyptus oil is used in the preparation of certain medicinal compounds, both for internal and external use; it is also utilized in perfumes and for scenting soap.

Common **camphor** is a valuable antiseptic obtained from the *Laurus camphora*, and is closely connected with the series of hydro-carbons termed the terpenes.

Many good antiseptics and disinfectants are completely spoiled by being mixed with some substance which neutralises them. Thus in some of the so-called **carbolic acid powders**, the basis of the material being lime, a mixture of carbonate and cresylate is formed with the carbolic acid, which is worthless for disinfecting.

Santitas and several other well-advertised preparations have undoubtedly genuine disinfecting or antiseptic properties, as the case may be; but sanitary inspectors and others whose duty it is to constantly use and recommend disinfectants and antiseptics should know their composition, and thoroughly understand their value before doing so.

A great number of other disinfectants are known, but those mentioned above are among the most important.

Experiments, Group 4.

Qualitative Examination of Air, Fog, &c.

1. **Aqueous Vapour**.—Nearly fill a clean, dry tumbler with pieces of ice, and observe the fine mist which condenses on the cold outer surface of the glass, and that after a time drops of water of considerable size trickle down the outside of the tumbler.

The amount of aqueous vapour may be estimated quantitatively by drawing a known volume of the air through a U tube containing fragments of pumice-stone moistened with concentrated sulphuric acid, and ascertaining the increase in the weight of the tube. (Fig. 7.)

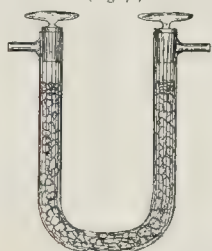


FIG. 7

2. **Organic Impurities**.—Nearly fill a cylindrical tube (Fig. 8) with very dilute acid potassium per-

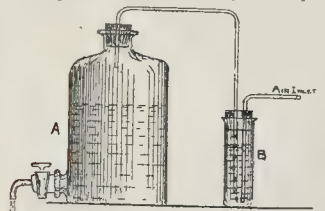


FIG. 8

manganate solution (see examination of water),

and draw through it a large volume of the air in the manner shown in the figure. The aspirator A may be filled and emptied several times in order to draw a large quantity of air through the tube B.

As in the case of water, the delicate pink colour will fade more or less rapidly, according to the amount of organic matter present.

3. **Carbonic Acid**.—Nearly fill the small cylindrical tube shown in Fig. 8 with clear lime water or barium hydrate solution, and draw air through it as before. A white precipitate will gradually be formed if carbonic acid is present in the air.

4. **Ammonia**.—Draw a large volume of the air through some distilled water contained in a cylindrical tube in the manner described above, and ascertain whether any ammonia has been absorbed by the water, by means of Nessler solution (see "Examination of Water").

5. **Sulphuretted hydrogen**.—Moisten some white blotting-paper with some solution of acetate of lead and expose it to the atmosphere to be tested for an hour or two. If traces of sulphuretted hydrogen are present in the air, the paper will become brown. All air should be quite free from this impurity.

6. **Sulphurous acid**, like ozone, causes white blotting-paper moistened with a solution of potassium iodide and starch to become blue. Moisten some white blotting-paper with these solutions and expose it to the air. When applying the above tests, it must be remembered that the percentage amounts of impurities, even in very unhealthy air, are comparatively very small.

Preservation of Food.

The putrefaction of food is caused by the deposition in or upon it of certain organic germs which are always floating about in the atmosphere, and by the development of these germs. The germs, however, cannot develop or act unless moisture is present and the temperature is moderate.

Hence food may be preserved (1) by sealing it out of contact with air; (2) by removing all moisture from it; or (3) by keeping it at a temperature at which the germs are incapable of acting.

1. The first method is employed in the case of tinned provisions. To preserve meat, the meat is placed in a tin and the lid then soldered down, leaving, however, a pin-hole in it to allow steam and air to escape. The tin containing the meat is then heated in a solution which has a higher boiling-point than water, to about 230° F. This treatment sterilises any germs and causes a considerable proportion of the air in the tin to be expelled through expansion. While still hot the pin-hole in the cover is closed with solder, and the tin is thus rendered air-tight.

2. The preservation of food by drying it is a very old method. It is seen in the case of dried fruits and dried South American beef. It was a method much employed by the ancient Egyptians.

3. The third method is that most employed at the present time. Refrigerated meat and other food travels about in enormous quantities in all parts of the world, while many hundreds of tons of ice are daily employed in England alone for the preservation of fish.

GENERAL BUILDING NEWS.

CATHOLIC CHURCH, KIDSGROVE, STAFFORDSHIRE.—The Catholic Church of St. John the Evangelist, Kidsgrove, has just been carried out to the designs and under the personal superintendence of the architects, Messrs. Wm. Sugden & Sons, of Leek. The west gable of the church is its salient feature, and it contains a seven light window, almost entirely tracied, the two central mullions resting upon carved corbels. The gable is flanked by double angle pinnacles, and terminates in a canopied niche containing a crowned effigy of the Virgin Mary. The east gable is occupied by the sanctuary rose window, with a full central panel for the figure of the patron saint. The entrance to the church is by a stone roofed porch on the south side. The church itself is divided into six bays with three-light windows, trefoil headed, on each side, placed at a considerable height from the floor. The church has a spacious sanctuary flanked on the south by the choir, leading into the sacristy. The confessional occupies the angle between the church and the choir. The sanctuary roof is carried by carved winged angels. Internally the walls are faced with bastard bricks, above a dull polished wainscoting of Lequeux wood. The font enclosure and the seats are of the same wood and oak similarly treated. The floors are of oak blocks to the sanctuary, and red wood elsewhere. The nave is lighted by sun-lights. Externally the walls are faced with Woodville sand stocks with dressings of Sheen and Grinshill stones, and the

roofs are covered by Broseley tiles. The altar and reredos are in Bedfordshire and Bath stone, the tabernacle safe door being enriched by repoussé brass facings representing the vine and corn canonicalised. The reredos central canopied panel is occupied by the monstrance, and two sculptured compartments on either side, one filled by angels kneeling with outspread wings, with tracery above and below, and the pedestals divide these compartments prepared to receive statues of the saints. The font, which is octagonal in form, is moulded and carved, and has a cover of tracied oak.

STONE.—The freehold building land known as the Hill House Estate in the parish of Stone (Kent) and consisting of about 20 acres is about to be laid out and some 200 cottages built thereon as a model village for the employees of the cement factories and other industries in the immediate neighbourhood, the majority of whom have to walk some three or four miles to their homes. The scheme includes also some eight shops and larger residences, and the owners, Messrs. Mathews & Wyatt, propose to give for the free use of the tenants on the estate a village hall and institute with recreation grounds for the children. The architects and surveyors for the works are Messrs. Fryer & Fitzgerald of London and Bournemouth.

WESLEYAN CHAPEL, PENRYN.—On Tuesday last, Dr. J. H. Rigg, President of the Wesleyan Conference, opened the new Wesleyan chapel at Penryn, which has been erected at a cost of £4,000, from designs by Mr. J. W. Trounson, F.R.S.B.A., of Penzance. The new building is Norman in style, and the principal feature of the front is the colonnade, entered through two large openings, and the three-light window over. The window is filled with stained glass by Fouracre & Co., of Stonehouse. The front of the chapel is built of polished Aberdeen and gray granite facings, cut and polished by Freeman & Co., of Penryn. The interior of the chapel provides seating accommodation for 450 worshippers. Its dimensions are 63 ft. by 48, and the distance from the ceiling to the floor is over 36 ft. At the extreme end of the chapel there has been erected an oak rostrum, in the Early English style. The floor is made to slope from the front to the back about 18 inches. The seating is of pitch pine with oak mouldings. From the colonnade the gallery is reached without interfering with the body of the chapel. The gallery, which occupies three sides of the chapel, is built to accommodate 400. By day the chapel is lighted by ten large circular-headed windows in addition to the three-light window in the gable end. The ceiling was manufactured by Messrs. Jackson & Sons, of London, and fixed by Mr. A. Carkeek, the contractor, of Redruth. On the gallery, floor level, behind the rostrum, is the organ chamber, designed by the architect in conjunction with Messrs. Hele & Co., of Plymouth. On each side of the chamber there are choir practice and book rooms and a large class-room for the adult members of the chapel. Behind the chapel on the same level, and immediately underneath the organ chamber, is a ladies' parlour, measuring 26 ft. by 18 ft. On the same floor are the ministers' vestry and ladies' cloak-rooms. Behind the chapel building itself school-rooms have been erected. They contain on the ground floor an institute room and four large class-rooms. At the rear there are lavatories and other conveniences. Wide stairs lead to the schoolroom, the length of which is 63 ft. by 24 ft. Adjoining the schoolroom is a tearoom. The area of the whole building site is about 12,000 ft.

PROPOSED MUNICIPAL BUILDINGS, BRISTOL.—At the quarterly meeting of the Bristol Town Council, held at the Council House on Tuesday, the following report from the Committee on Sites for Municipal Buildings was submitted:—"The Council will remember that your committee were appointed, on October 11 last, to consider and report as to the relative area, cost, and advantages of any site they might deem suitable for the requirements of municipal buildings. Your committee report that in addition to the accommodation stated in the report of the Finance Committee of August 5 last—approved by the Council on October 11 last—to be required in municipal offices, and which your committee consider is absolutely necessary, they are of opinion it is desirable that:—(1) a picture and fine arts gallery; (2) a hall capable of seating 1,000 persons; (3) a banquetting hall capable of dining 100 persons, with reception-rooms, kitchens, &c.; and (4) a central library, reference library, and reading-room be provided in the new municipal buildings. Your committee have obtained information as to the area of the various sites, the probable cost, and the cost of the municipal buildings in several of the larger boroughs in which such buildings have been recently erected. Your committee have had their attention called to a number of sites, but are of opinion that it is desirable that, before further considering or having ground plans prepared of these or any sites, they should visit some other towns, with a view to ascertaining what accommodation is provided in these municipal buildings; and they are also of opinion that they should be able to engage such professional assistance as they may think expedient, to advise them upon and to otherwise assist them in the consideration of the subjects on which they are required to report. Your committee therefore recommend that they be authorised to visit other towns and engage such professional assistance

accordingly." After a good deal of discussion had taken place relative to the proposal of the Committee that they should be empowered to visit other towns where municipal buildings had been carried out, the report was received and the last paragraph adopted.

PORTER BUILDINGS, WOODVILLE, BURTON-ON-TRENT.—A large new slip house is about to be erected at Woodville, near Burton-on-Trent, for Messrs. Outram & Co., earthenware manufacturers, from the plans and under the supervision of Mr. R. E. Carpenter, architect, Burton-on-Trent. The contract for the builders' work has been let to Mr. J. Varlow, of Burton, and those for the engineers' works to Messrs. Buxton & Thornley, of Burton, and Mr. W. Boulton, of Burslem.

HARRIS FREE LIBRARY, PRESTON.—This is now almost completed, and we understand it is intended to open the building this summer. The pavements of the building have just been completed by Messrs. J. and H. Patteson, of Manchester, on a consistent design by the architect, Mr. James Hibbert, of Preston. The grand staircase and central hall on the ground floor are laid with a combination of rouged, grained, dove, black, vert antique, and white-veined marbles with Hopton wood stone. The pavements of the principal and upper floors are in Roman mosaic, the borders chiefly in black and white marbles, and the centre a mixture of rouge Verona and Carrara marbles.

FOREIGN AND COLONIAL.

FRANCE.—Besides the Meissonier exhibition at the Georges Petit Gallery next month, the Ecole des Beaux-Arts is organising another in which works not exhibited or engraved will be seen, especially some bronzes cast after Meissonier's models, his bust in marble commissioned from M. Saint-Marcou, for the Institute, the medallion in bronze by M. Chaplain for his tomb at Poissy, and the model for the commemorative monument for the Louvre gardens, by M. Antonin Mercier.

M. Jules Guiffrey, keeper of the national archives, has been appointed manager of the Gobelin manufactory in place of the late M. Gerspach. He is a learned and well-known writer on art; among his works may be specially mentioned his biography of Van Dyck and "Histoire de la Tapisserie."—M. Mayeux, government architect, and designer of the Venetian masts in bronze which adorn the Place de la République, has just been appointed professor of decorative composition at the Ecole des Beaux-Arts, in place of the late M. Galland.—By a decree of the President of the Republic, Mr. George Donaldson, member of the Royal Institution of Great Britain, has been created Chevalier of the Legion of Honour for services rendered to art in France. Mr. Donaldson was vice-president of the jury of awards at the 1889 exhibition.—The forty-three designs sent in competition for the Hôtel Boucicaut are on exhibition at the Hôtel de Ville of Paris.—The "Union libérale des artistes Français" is to open its second exhibition in May, in the central dome of the Champ de Mars.—At the Ecole des Beaux-Arts the Labarre competition (subject, a "Palais de Justice") has just been decided in favour of M. Olivier, pupil of MM. Daubet, Girault, and Esquié.—The Department of Public Instruction has just commissioned from M. Falguère a statue of the Republic to be placed in the French section at the Chicago Exhibition. The sculptor has engaged to deliver the statue, finished in plaster, in two months.—At the town of St. Flour (Cantal) a competition has been opened for a monumental hotel intended as a Mairie and a savings bank for the town.

The Rouen Museum has acquired the portrait of Delacroix by Gérault; the only portrait, it appears, which the celebrated author of the "Raft of the Medusa" is ever known to have painted.—The Town Council of Mézières has decided that the statue of Bayard, the model of which has been just finished by the sculptor, M. Croisy, shall be erected in the middle of a new square in course of construction in the town.—M. Jean Paul Laureys, the painter, has been appointed director of the Ecole Nationale des Beaux-Arts at Toulouse, in place of M. Garipuy, recently deceased. M. Labade has been appointed Conservator of the Museum in the same town.—The Société Académique de l'Architecture de Lyons has awarded a gold medal to M. Armbruster, a silver-gilt medal to M. Montaland, and a bronze medal to M. Debry. M. Armbruster was the author of a very original design for a suial, illustrated in the *Builder* of April 5, 1890.—M. de Maréay has been appointed Commissary-General of the International Exhibition at Lyons, which is to take place in 1894.—The death is announced, at the age of 46, of M. Bouillot, member of the Société Centrale des Architectes, and the author of some important works on Paris, as well as of the reconstruction, in the style of Louis XIII., of the remarkable chateau of Monty, in which the preliminaries of the treaty of peace of 1871 were exchanged.—We learn, at the last moment, that the Senate has determined, by a large majority, to institute a competition for the rebuilding of the Opera Comique at Paris. This is very satisfactory, considering the universal wish expressed by the architectural societies, both of Paris and the provinces,

MISCELLANEOUS.

THE HOUSE OF COMMONS.—The question of the enlargement of the House of Commons, in regard to sitting accommodation for its Members, has again come to the front. In the words of the *Spectator*, "the intensity of the party struggles, and the growing keenness of Members, is rendering the want of accommodation in the House more than ever a burning question." Our contemporary advocates the enlargement of the present House by making it broader by three rows of benches on each side, and longer by, say, 20 ft. It does not venture to give details as to the way in which this enlargement could be effected. On the other hand, the *Speaker* deprecates any proposal to enlarge the size of the Commons' chamber, contending that the chamber is quite large enough for the average attendance of working Members, and that any attempt to enlarge it would spoil it acoustically. It seems to be only on "show" occasions that any inconvenience is felt. Mr. Labouchere, of course, has a scheme of his own, referred to by Mr. William H. White, in an article in the current number of the *R.I.B.A. Journal*.

FREE LECTURES AT CARPENTERS' HALL.—Many of our readers will be glad to have their attention drawn to the programme of free lectures at Carpenters' Hall, commencing on Wednesday evening next, as stated in our advertising pages and calendar of meetings.

THE ENGLISH IRON TRADE.—But little change is to be recorded in the English iron trade, and the majority of the leading districts report a limited demand in both crude and finished material. Prices generally are barely upheld, and in a few instances lower rates have been accepted. The tinplate branch, however, shows a further improvement in demand. The allied industries, such as engineering and shipbuilding, are still in a dull condition. The coal trade remains dull.—*From*.

RAILWAY RATES AND THE BUILDING TRADES.—Last week the Nottingham Master Builders Association unanimously passed the following resolution, coupled with the request that the Secretary would send copies to the railway companies serving the town:—

"That this annual meeting of the Masters Builders' Association of Nottingham, held Thursday, February 18, 1893, protests most strongly against the unwarrantable increase of railway rates to the building trades, and respectfully requests the various companies serving the town and district to bring the rates back to such levels as will be conducive to the preservation of the trades referred to."

"AN ARCHEOLOGIST'S UNEXPECTED WEALTH."—Referring to the paragraph under this heading in our issue for February 11, Miss Mary A. Way, daughter of the late Mr. Albert Way, says in a letter to the *Spectator*, that the story of her father having had a fortune left to him under the singular circumstances mentioned by Mr. Ingress Bell is without foundation. In an editorial note appended to the letter it is suggested that the story is applicable to the Rev. Lewis Way, the father of Mr. Albert Way.

FALL OF A CHURCH TOWER NEAR KENDAL.—According to the *Leeds Mercury* the work of building a new church at Selside, near Kendal, has come to a sudden termination. The building of the masonry was progressing satisfactorily, when, on the 8th inst., half of the tower fell to the ground, through the big arch pressing out the buttress at the north side. One side and end of the tower have gone to the foundation, and some of the standing portion is shattered. The falling tower has carried with it a portion of the roof of the church. The tower had reached a height of over 40 ft.

ARCHITECTURAL ASSOCIATION: DISCUSSION SECTION.—The seventh meeting of the session was held at the rooms of the Association on Wednesday evening, the 15th inst., the chairman, Mr. S. B. Beale, presiding. A racy and suggestive paper on the subject of "Domestic Stoves and Ranges" was advanced provoked a lively discussion. The opinions were vigorously opened by Mr. C. H. Brodie, and was sustained by a large number of the members present. The subject of draughts in rooms in connexion with the question of independent air supply to stoves received particular attention, and many useful hints were contributed. It was announced that the subject of Mr. A. H. Clark's paper at the next meeting is to be "Hints on Town Houses." Instead of that announced in the syllabus, and the hope was expressed that the interest of the subject would attract a large attendance.

SANITARY ASSURANCE ASSOCIATION.—The twelfth annual meeting of the members of the Sanitary Assurance Association was held on Monday, the 13th inst., at the offices, No. 5, Argyle-street, W., Surgeon-General Cornish, C.I.E., F.R.C.S., President, in the chair. Mr. Joseph Hadley, Secretary, read the annual report, which referred to the work of the Council in promoting the Sanitary Registration of Buildings Bill, and stated that Mr. R. Biddulph Martin, M.P., had undertaken the charge of the measure in the new Parliament. The report was adopted.

CAPITAL AND LABOUR.

EDINBURGH TOWN COUNCIL AND THE CONTRACT SYSTEM.—A meeting of the Edinburgh Town Council was held on the 7th inst., Lord Provost Russell presiding. The Lord Provost's Committee

submitted the findings of the various committees in reference to the proposal to insert in the form of offer for city contracts a declaration to the effect that in the execution of these, contractors shall pay the standard recognised rate of wages, or such wages as are generally accepted as fair in the trade.—Mr. Sloan moved that the recommendation of the Cleaning and Lighting Committee be the finding of the Council—namely, that the insertion of any declaration such as that recommended would be an unwarrantable attempt to interfere with the security of contracts by importing into them a dangerous and contentious principle.—Mr. Cranston seconded.—Mr. Mackenzie said it seemed from the findings of the different committees that the matter could not be very well understood by them. He moved, accordingly, "That the whole matter of the city contracts be remitted to a special committee to inquire into all the circumstances, and report on an early day to the Council."—After much discussion, which turned on the meaning to be attached to the declaration, Bailie Steel proposed an amendment to remit to the Lord Provost's Committee to define the terms of the proposed declaration, and Mr. Pollard seconded.—A vote was taken on this amendment by itself, with the result that the amendment was carried by 18 votes against 17.—Mr. Sloan asked if the division had the effect of shelving his motion?—The Lord Provost replied in the affirmative.—Subsequently, on the motion of Messrs. Mackenzie and Mitchell Thomson, the standing orders were suspended and the whole matter of the city contracts was remitted to the Lord Provost's Committee to inquire into all the circumstances and report to the Council.

MEETINGS.

FRIDAY, FEBRUARY 17.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. H. H. Collins on "Sanitary Building Construction." 8 p.m.
Society of Arts (Howard Lectures).—Professor W. C. Urwin on "The Development and Transmission of Power from Central Stations." VI. 8 p.m.

MONDAY, FEBRUARY 20.

Royal Academy of Arts.—Dr. A. S. Murray on "The Sculptures of the Mausoleum." III. 8 p.m.
Surveyors' Institution.—Mr. G. M. Freeman on "The Arbitration Act, 1889." 8 p.m.
Society of Arts (Cantor Lectures).—Professor J. A. Fleming, M.A., F.R.S., on "The Practical Measurement of Alternating Electric Currents." IV. 8 p.m.
Leeds and Yorkshire Architectural Society.—Mr. H. V. Lancaster on "Colour Decoration." 7.30 p.m.

TUESDAY, FEBRUARY 21.

Institution of Civil Engineers.—Further discussion on Dr. Edward Hopkinson's paper, on "Electrical Railways." 8 p.m.
Society of Arts (Applied Art Section).—Mr. T. R. Spence on "Wall Papers and Stencilling." 8 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Professor W. H. Corfield on "Sanitary Appliances." 8 p.m.
Glasgow Architectural Association.—Mr. S. Hembest Capper, M.A., on "The Monks and their Abbays." 8 p.m.

WEDNESDAY, FEBRUARY 22.

Carpenters' Hall, London Wall.—Professor T. M. Thomson on "The Chemistry of Building Materials: Pigments and Protective Agents." 8 p.m. (Admission Free).
Liverpool Engineering Society.—Mr. George Farren on "Some Dimensions of Units." 8 p.m.

THURSDAY, FEBRUARY 23.

Institution of Electrical Engineers.—Mr. W. M. Mordey on "Testing Alternators." 8 p.m.
Society of Antiquaries.—8.30 p.m.
Dundee Institute of Architecture.—Mr. A. Macpherson on "Theories of Architectural Proportion." 8 p.m.

FRIDAY, FEBRUARY 24.

Architectural Association.—Mr. A. E. Street on "Individuality and Originality in Art." 7.30 p.m.
Institution of Civil Engineers (Students' Meeting).—Mr. R. Hansford Worth on "The Methods usually adopted in Devon and Cornwall for Dressing China-clay and Tin-ore." 7.30 p.m.
Royal Institution.—Dr. Edward Hopkinson on "Electrical Railways." 9 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Wright Clarke on "Details of Plumbers' Work." 8 p.m.

SATURDAY, FEBRUARY 25.

Architectural Association.—Visit to the Institute of Chartered Accountants, Coleman-street Buildings, Moorgate-street, by permission of the architect, Mr. John Belcher. 3 p.m.
Builders' Foremen and Clerks of Works' Institution.—Annual Dinner, Holborn Restaurant. 8 p.m.
Edinburgh Architectural Association.—Visit to S. S. C. Library.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

22,243.—**PAVING:** T. Bretherton.—This invention relates to improvements in paving roads, or the like, and consists of a so-called "ironcrete" pavement, formed of small blocks of cast-iron filled in with concrete, pitch, and other suitable material. When laid between tramway lines it prevents the wearing down at each side, as is the case with wood or stone paving. It is specially constructed to prevent the slipping of horses, and considerably reduces the noise of traffic. It is also claimed that it will stand the ordinary wear of main roads for fifteen years without re-laying.
66.—**VENTILATION:** H. S. Simister.—This specification

3,466.—SEWER PIPES: *D. G. Andrew*.—This is an invention relating to the construction of an expanding appl

ance adapted to be placed in the interior of drain and other pipes when being laid, so as to hold them in position while the joint is being turned. It is adapted to be placed in the pipes to stop or dam them in any required point in searching for leaks, &c. It consists of an indiarubber ring, to be expanded by means of a frame having a number of pointed arms movable in such a manner that when the appliance is placed in position by turning a screw the joint arms are moved outwards, so as to expand the ring, and press it against the interior periphery of the pipe, thus covering the joint, and the joint while the cement is being run round the exterior of the pipes. When the appliance is to be used for stopping or damming a pipe, one end or side of the ring is covered in by any suitable flexible waterproof fabric.

3-77B.—ROOFING CLIP: J. T. Allen.—This invention relates to a clip for holding and fixing slates or tiles when used to repair roofs, and is intended to supersede the metal strips now in use. It consists of a strip of any suitable metal, such as zinc or galvanised iron. In one end of this strip is pressed up, formed, or attached a lip standing sufficiently proud of the strip to receive a slate or tile. Near the other end of the strip are holes for the fixing of the nails.

4-533.—PORTLAND CEMENT: F. Knight.—In burning the material used in making Portland cement, the object is to obtain a hard clinker which will not fall to dust when exposed to the atmosphere. Any dust formed in the kilns seriously diminishes the strength of the cement. To prevent this the inventor uses common salt (chloride of sodium), which is placed in the kiln with the raw material and the fuel, and is then a layer of fuel, a layer of raw material, and a sprinkling of salt. During the heating of the kiln the salt is absorbed by the cement, and prevents the formation of dust. If the salt is incorporated into the raw material, instead of being sprinkled in the kiln, it will not produce the strength of the cement, and potassium may be used instead of chloride of sodium with the same effect.

5-393.—PAVING BRICKS: J. Hamblet, jun.—This invention consists in making the front of the end, or pucked surface, forming the tread of the brick on both faces of it, instead of only on one face as in paving bricks of the ordinary kind, so that the brick can be laid with either treading face up or down, and the channels extend to the worn brick can be inserted, so as to bring its unworn treading face uppermost, and relaid in that position. The treading surface is made by pressure after the brick has been moulded.

11-891.—SAWS: W. and C. Jung.—This inventor provides hand and similar saws, having on one or both sides channels designed to allow the passage of the waste water, and the channels extend to the back of the blade. To straight or curved line from the front edge of the teeth obliquely to the back of the blade. At the front part of the teeth they are deepened, so as to form the teeth with sharp edges for cutting the sides of the kerf, whilst they are preferably widened a little towards the back of the blade to facilitate the passage of the waste. Along the channels are ribs of any desired section, the front part of which is generally undercut, and is sharpened to cut the base of the kerf. Either of the two cutting edges of each tooth may be straight or curved, and form any desired angle with the other. According as the channels are formed on one side, or on both sides of the blade, the saw will cut on smooth and one comparatively rough surface, which is required for certain classes of work, or two smooth surfaces. In the former case the edge for cutting the base of the kerf has also to cut one side of the latter, and must, therefore, be sufficiently undercut to effect this purpose.

NEW APPLICATIONS FOR LETTERS PATENT.

January 23.—1,404, J. Merrill, Automatic Flushing Syphons.—1,410, E. Lea, Hinges.—1,418, E. Nowell and T. Chitham, Combination Saw Set.—1,422, T. Avill and others, Miter Cramp.—1,446, G. C. Colwell, Window-fasteners.—1,458, H. B. Hines, Fire-bricks.—1,460, J. J. Wilson, Chimney and other Window-fasteners.—1,467, W. Webster, Manufacture of Cement.—1,468, J. Muller, Water-closets.—1,703, T. Blow, Saws.—1,737, C. and J. Smith, Roofs for Buildings.

January 25.—1,704, H. Sichelshmidt, Parquet Flooring.—1,746, C. Showell, Hinges.—1,794, J. Fall, Fastening for Doors and Windows.

January 27.—1,795, W. and W. Westwood, Fanlight, Skylight, and other Window Fittings.—1,828, W. Butterfield, Paint Cans.—1,841, J. Jones and others, Cements for Windows and Doors.

January 28.—1,907, J. Hancock, sen., Connectors for Water-closets.—1,910, J. Barnsley, Ball Taps.—1,921, T. Bury, Device to do away with the Wall Plate and Upper Plate in Glass Houses constructed with Wooden Rafters by a Combination of Iron and Wood.—1,922, R. Harrison, Apparatus for Boring Tunnels.—1,925, J. A. Bridgman and D. House, Saw Benches.—1,926, H. Saqui and others, Bolts or Fasteners for Doors, Windows, &c.

January 29.—1,927, J. Hancock, jun., Connectors for Water-closets Basins.—1,985, J. Sumner, Attaching Door-knobs to Doors.—1,994, W. Sheas and A. Barratt, Device for the use of Bricklayers.—2,043, S. Johnson, Disinfecting and Ventilating Houses.—2,046, H. Lake, Apparatus for Boring Tunnels.—2,055, J. A. Bridgman and D. House, Saw Benches.—2,056, H. Saqui and others, Bolts or Fasteners for Doors, Windows, &c.

January 30.—2,057, W. and W. Westwood, Fanlight, Skylight, and other Window Fittings.—1,828, W. Butterfield, Paint Cans.—1,841, J. Jones and others, Cements for Windows and Doors.

February 1.—2,059, W. Kelvin, Taps for Doors, Windows, &c.—2,098, J. Moscrop, Inspection and Cleaning Eye on Drain Pipes.—2,100, M. Carmody, Window Fasteners.—2,105, J. Barton, Preventing Chimney Smoking.

February 2.—2,160, W. and W. Scherer, Paints.—2,095, R. Worrall, Wrought Metal Gages, Grills, and Railings.—2,275, H. Lake, Sash-fasteners.—2,277, J. Lumley, Larking or Striking-out the Moulds of Stair Handrails.

February 3.—2,321, H. Hall, Sections for Girders or Ribs for Architectural or other Purposes.—2,326, W. Swain, Sash-fasteners.—2,327, J. A. Bridgman, Ventilators or Down Draught Brackets.—2,335, J. K. Lewis, Floors and Ceilings.

February 4.—2,374, F. Stokes, Continuous Treatment of Cement, Limes, and other Substances.—2,438, J. Jemson, Stoves and Fireplaces.—2,440, J. Allen, Number and Letter Plates and other Attachments for Doors and Frames.—2,441, C. Hancock, Clusters and Windows.

February 4.—2,470, H. Sutcliffe, Water-closets and Apparatus connected therewith.—2,487, S. Browne, Cabinets and their Internal Fittings.—2,497, J. Dean,

Fireplaces.—2,498, W. Horn, Wood Moulding Machines.—2,533, A. Fowler, Water-closets.—2,534, T. Kemp, Plug Stopper with Purchase Handle for Testing Pipe Drains with Water.

PROVISIONAL SPECIFICATIONS ACCEPTED.

20,708. T. Payne, Fire Grates, Stoves, Ranges, and Slow Combustion Stoves.—23,282, W. Smith, Protecting Timber Structures from Sea Worm.—23,556, W. Allardice, Domestic Fire-grates.—23,743, C. Henderson, Sash Fasteners.—23,804, J. Adair, Baker's Ovens.—24,022, J. Harrison, Sash-fasteners.—24,067, F. Kyles, Pulleys, or Axle Pulleys.—255, A. Yates and others, Closets.—357, W. Taylor, Ventilator or Chimney Cowl.—657, J. Wallace, Saws.—684, W. Clarkson, Draught or Weather Guards.—691, J. Moore and others, Construction of Lead or other Pipes to Prevent their Bursting.—836, H. Hughes, Stained Glass Panels.—22,772, J. Jones and J. Rawson, Window Sash-fastener and Rattling Preventer.—23,056, T. McKenzie, Chimney Cowl.—23,075, W. Horne and F. Hain, Non-slippery Pavement.—246, A. Morrison, Securing Door-knobs or Handles to Spindles.—349, P. Mooney, Flushing Clusters, or Apparatus for Water-closets, Urinals, &c.—352, W. Oates and others, Gully Traps.—713, W. Oates and J. Green, Square-top Gully Traps.—384, J. Merrill, Flushing of Water-closets.—406, L. Gough, Draught Preventer.—556, S. Gelson, Iron or Metal-covered Buildings and Materials therefor.—586, G. Sparrow, Preventing Water-pipes from Bursting.—679, J. Green and W. Oates, Kilns, Traps, and Syphons.—743, J. Cahrelin, Door Bolts.—1,067, J. Sherson and H. Sprix, Tops or Guards of Chimneys and Ventilating Pipes.—1,102, J. Blackburn, Raising, Lowering, Sustaining, Balancing, and Securing of Sashes for Windows, Doors, &c.—1,104, J. Hamblet, jun., Roofing Tiles.—1,145, W. Edwards, Gas-lighting Appliances.—1,174, A. B. Hines, Fire-bricks.—1,189, Retaining Window Sashes at any desired height.—1,465, H. Bray, French Windows.—1,552, W. Magrit, Fire Bricks.—1,707, C. & J. Smith, Roofs for Buildings.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

4,067. G. Williamson, Kitchen Ranges.—5,054, A. Ransome, Bar Sawing Machines.—5,072, W. Morton, Constructing Parts of Wall, Partitions, and Ceilings.—6,009, S. de Ferranti and J. Noad, White Lead and Chrome Pigments.—12,648, W. Munns, Water-closets.—23,003, J. Hunt, Roof, Gutters, and Valleys.—24,216, J. E. Fletcher, Moulding Paving Slabs, Building, Ornamental, and other Blocks and Bricks.—5,047, J. Dungey, Fittings for Gas and other similar Pipes and Tubes.—5,050, W. and others, Cast-iron Casements or Bridges to connect the across, and leave clear as required the entrances to Graving Docks, Wet Docks, Harbours, Rivers, or Estuaries.—5,446, M. Perret, Stoves or Fireplaces.—5,606, H. Sutcliffe, Domestic Fireplaces.—5,610, J. Williams, Caps, Pots, or Tops for Chimneys, Ventilating Shafts, &c.—21,925, J. Anderson, Fastenings for Doors and Windows.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

FEBRUARY 6.—By *Weatherall & Green*: 4, Blue Cross-st., Leicester-sq., f. r. 654, 1,300; 5 and 6, Pannell-st., Southgate, u. t. 83 yrs., g. r. 404, 2,150; 9 and 10, Canonbury-sq., Canonbury, u. t. 25 yrs., g. r. 44, 705; i. g. r. of 474, 148, High-st., St. John's Wood, u. t. 8 yrs., g. r. 104, 115, 200.

FEBRUARY 8.—By *F. J. Bailey & Sons*: 11 and 12, Martin-st., Bermondsey, u. t. 45 yrs., g. r. 104, 108, r. 574, 48, 400; 13 and 14, Martin-st., u. t. 45 yrs., g. r. 116, r. 574, 48, 400.—By *R. V. V. & Son*: 2 to 5, Arthur-st., Oxford-st., f. r. 284, 5,800; 6 to 9, Arthur-st., f. r. 262, 5,200; 10, 11, and 12, Arthur-st., f. r. 145, 2,745; 14 and 15, Arthur-st., f. r. 102, 3,500; 17, Arthur-st., f. r. 110, 2,200; 18 and 19, Arthur-st., f. r. 102, 2,000; 20 to 23, Arthur-st., f. r. 210, 3,850; 24 to 28, Arthur-st., f. r. 196, 3,945.

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The Builder.

VOL. LXIV. NO. 2672.

FEBRUARY 25, 1893.

ILLUSTRATIONS.

Porch, Adel Church, Yorkshire.—Drawn by Mr. Percy Rolinson	Double-Page Photo-Litho.
The New House of Parliament, Finland.—Professor Gustaf Nyström, Architect	Double-Page Ink-Photo.
New Buildings, South Audley-street.—Messrs. T. Chatfield Clarke & Son, Architects	Double-Page Ink-Photo.
Design for Proposed Church of All Saints, New Eltham, Kent.—By Mr. Richard J. Lovell	Double-Page Ink-Photo.

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The Hospitals of the World.



HE hospital is one of the institutions of which, notwithstanding all imperfections, the modern world has reason to be proud. There is nothing in which ancient life and modern are more

conspicuously in contrast than in their treatment of the poor, and especially the sick poor; and, if modern progress is to be gauged impartially, modern hospitals must never be left out of view. We some time ago noticed the first two volumes of Mr. Burdett's comprehensive work on the asylums and hospitals of the world. Those volumes dealt with asylums for the insane; they are now followed by the two remaining volumes,* and an atlas of plans dealing with the hospitals of the world, and thus is completed an undertaking which must have required some courage to begin and undaunted constancy to pursue to its end. We can sincerely congratulate Mr. Burdett on having accomplished not only a difficult but a very useful task, of which this second portion appeals in all probability to a larger number than the first part did; for hospitals are widely, as well as deservedly popular, and we are sure that a very large number of persons will welcome a book of reference of this comprehensive nature.

Briefly and broadly stated, Mr. Burdett deals with three subjects: the history of hospitals, their administration, and their construction. Postponing any consideration of the first two heads, we will turn to what naturally most interests the majority of the readers of this journal,—namely, hospital construction. To this subject the portfolio of plans and practically the bulk of the fourth

volume of letter-press is devoted, the remainder of such volume being occupied by a voluminous bibliography or catalogue of books bearing on the subject.

The various hospitals described, and of which plans are given, are stated to include all the hospitals in London in the Queen's Jubilee Year, and the chief provincial, colonial, and foreign ones, with a certain number of medical schools. The arrangement is systematic and very convenient. The plans usually include the ground floor and first floor of each institution illustrated. In some cases there is also a block plan, in others a site plan, and occasionally a detail of a special arrangement, or even of furniture. The author, in his preface, acknowledges the assistance he has received in this branch of his work from Mr. Keith Young and Mr. H. Hill; and we can fully believe that it must have taxed the energies even of these well-known specialists to reduce the vast mass of information which the drawings contain to the orderly and systematic shape in which it is presented to the reader. The title-page states that all the plans are reduced to a uniform scale, and this, while very advantageous for purposes of comparison, has introduced the necessity of employing large folded sheets which seriously interfere with the convenience of the reader. We think that the freer use of reduced and enlarged scales (both of which very occasionally occur) might have rendered the volume more manageable; but this is, after all, a small matter. What is of importance to the reader is the careful selection of the examples, the clearness of the explanations, and the fulness of the information; and here those readers who will only remember that a book which aims at being universal must not attempt to be too minute, will have cause to be satisfied. It is perhaps fair to remind the reader that he ought not to expect faultlessly strict accuracy, any more than profuse detail in a book of this sort. The author is necessarily dependent upon many sources of information, and it is quite out of his power to check every particular furnished either on plans or in descriptions; and though we

have reason to know that extraordinary pains have been taken to ensure correctness, it would be miraculous if in occupying so very extensive a field no oversights had occurred. In two particulars, especial evidence of care is conspicuous. The singular absence of architects' names, upon which we had occasion to remark in dealing with the volumes on asylums, is corrected, and each plan in this atlas bears the name of the architect, or architects, who have acted for the hospital. Another slight but valuable feature is that the drainage of a considerable proportion of the buildings is shown on the ground plan; indeed, we believe this to have been done wherever reliable information was obtainable. The plans are sufficiently and clearly lettered, and the classified mass of information which they present, is very great, and ought to be suggestive in some cases of what to avoid, in others of what to accomplish.

Mr. Burdett has in his volume on construction wisely contented himself for the most part with putting plans and statements before his readers, leaving them to make their own use of them. Here and there he assumes the severe critic, and still more rarely he praises; but on the whole he restricts himself, as far as relates to hospital construction, to the quite sufficiently important work of supplying facts.

The unit in a hospital is the bed, and a hospital's capacity for receiving patients is measured by the number of beds contained in it; and its commodiousness or otherwise largely depends on the amount of floor surface, of air space, and of site per bed. A group of beds is gathered together into a ward, and the modern system of hospital planning is to isolate the ward, accompanying it with the rooms and conveniences necessary to its working as much as possible. A building, containing one, two, or three such wards, according to the number of stories, is a *pavilion*, and one administrative block may serve as the central nucleus to which many pavilions are connected by corridors,—the more airy the better,—and from which they receive rations, supplies, medi-

* "Hospitals and Asylums of the World," by Henry C. Burdett. Vols. III. and IV., and Atlas of Plans. London: Churchill, 1893. (Vols. I. and II., dealing with "Asylums for the Insane," were reviewed in the *Builder* to March 12, 1892.)

cines, &c. Our author's definition of the pavilion system is, that it is one "in which the ward is a parallelogram, entirely detached on at least three sides, with windows of both its longer sides facing each other, and attached to the main block at one end only." He divides hospitals on the pavilion system into several groups, first, the "single pavilion" or straight plan, *i.e.*, two pavilions placed end to end with the administration interposed. Plans of the German Hospital at Dalston, Addenbrook's Hospital at Cambridge, and a few other examples illustrate this class. Next comes the "double pavilion," *i.e.*, two pavilions joined together by a corridor in the centre of which the administration is placed. This arrangement commonly results in a block roughly resembling a capital E or a capital U. Eight plans of examples of this mode of planning are engraved, including an interesting plan by Mr. Ernest Turner for a building in Persia, to some of the details of which the author very needlessly takes exception; and plans of an American hospital, the minutiae of which are explained at length, though the somewhat doubtful planning of the sick-wards is not objected to. Next follows what may be taken as the normal type for hospitals of large size. "The multiple pavilion," namely, a number of pavilions arranged either on one or both sides of a corridor. St. Thomas's Hospital, designed by Mr. Currey, is the chief London example of this system, though in another section of the volume the Herbert Military Hospital at Woolwich, designed, early in his career, by Sir Douglas Galton, and still an excellent specimen of hospital planning, is to be found. Examples of this type could have been almost indefinitely extended, and, indeed, very good ones occur under the separate heading of "Poor Law Infirmaries" further on. Here about twenty buildings of this class are illustrated. Hospitals introducing the comparatively novel form of circular wards follow, and hospitals made up of scattered pavilions conclude the chapter. This series of pavilion types will serve as a specimen of the careful and systematic grouping of the examples selected, and the same system obtains through the entire atlas of plans. "Block Hospitals" form the next main division. These consist of buildings in which the isolation of the ward is less complete. There are six sub-divisions, starting with four blocks arranged round a square, but not joined together at the corners of the square. Bartholomew's Hospital is a London example of this distribution, and were it not unfortunately the case that the wards are double ones, *i.e.*, two wards built side by side, each having, therefore, windows at one side only, the plan of this ancient establishment would be a really excellent one. Most of the older hospitals are to be found in one or other sub-section of this division.

The next group are the Corridor Hospitals, *i.e.*, where wards are arranged along one or both sides of a corridor. Netley Military Hospital has long been notorious as an example of the serious defects inherent in this system, of which so important a building as the old Manchester Infirmary may serve as the type; and as it is a convenient mode of arrangement, and its sanitary imperfections were not originally understood, this plan has been often followed in early hospital buildings abroad and at home. Lastly, the classification is completed by a very convenient division of "Irregular Hospitals." This, like the traditional entry of "Sundries" in the accounts of the inexact, includes many and very varied instances, most of them of old standing. Among them Guy's, with its extremely complicated plan, is the best known London hospital. A portion of Guy's Hospital is interesting to specialists as the seat of the most resolute attempt yet made to introduce artificial ventilation into the wards of a London, if not of an English, general hospital. "The fresh air is taken in at the top of two towers and drawn down to the basement, where it

is warmed and sent up to the wards and admitted at the floor level, and the foul air is extracted from the ceiling level and drawn off through shafts to the top of a lofty tower by means of heat." This sounds like the description of a system which, properly carried out, on a sufficiently large scale, and with sufficiently powerful motive power, ought to succeed. We are sorry to learn that it is said to be "condemned unanimously by the medical staff, who find it utterly inefficient, and who regard these wards as the least healthy in the hospital." Notwithstanding this want of success, we cannot but feel that in an uncertain and often ungenial climate like that of London, the sick, in medical wards at any rate, if not in surgical, ought to be able to receive the same kind of supply of fresh air taken in at a level considerably above the ground, and properly cleansed, warmed, and, when necessary, moistened, which is furnished, for example, to the House of Commons. Open windows on each side of a ward, if they afford the means of rapidly renewing the atmosphere, which they undoubtedly do, also let in chill and damp air, if the day be chill and damp; and that air comes upon the beds of invalids, many of whom are in a critical condition.

After an exhaustive review of present hospitals, which includes continental and some colonial examples, a chapter is given to the hospitals of British India, followed by a very long chapter on special hospitals.

The Indian hospitals all present the feature which the climate forces upon the architect, of a verandah or arcade screening the main walls from the direct rays of the sun. Partly owing to the possession of this sheltered space, and partly to the general conditions of Indian life, such hospitals, as for example the Sassoon hospital at Poonah and the Cama hospital at Bombay, here illustrated, require less ample provision in their administrative portions than is essential to the completeness of a European one.

Among special hospitals there exist some for diseases which could, without any disadvantage, be treated in general hospitals, but this remark does not apply to children's hospitals or to those for consumption and for infectious diseases.

Several examples of children's hospitals are illustrated, ranging from the extensive Pavilion Hospital at Pendlebury, near Manchester, and the well-known one in Ormond-street, London, to the small one on Paddington Green. The touching narrative of Dr. Hickford's devotion of his life to the establishment of the children's hospital at Shadwell is here very briefly told in connexion with a notice of that institution.

Among hospitals for infectious diseases, the London Fever Hospital and the hospitals erected by the Metropolitan Asylums Board are to be found illustrated in the atlas, but the descriptions of the latter are not very detailed. The London Fever Hospital, which seems to succeed in defiance of some of the accepted principles of hospital arrangement, is not only illustrated, but very carefully described. An excellent example of a small hospital for infectious cases, the Heathcote Hospital at Leamington is among those illustrated, and is described at what is comparatively considerable length. Another interesting example is the Kendray Fever Hospital, Barnsley, erected with each portion of it entirely isolated, so that the administration, the fever wards, the small-pox ward, and the laundry departments each occupy a detached, self-contained building not connected by even a covered way to the others.

We hardly need go through the list of special hospitals, but we may point out that it includes several interesting examples of convalescent homes.

A division is appropriated to poor-law infirmaries, and another (with a very careful statement of the conditions of the problem) to school sanatoria: a brief, too brief, description of the requirements of a medical school is illustrated by a plan of the very

extensive and complete buildings of the Edinburgh Medical School, one of the largest in existence. The folio of plates closes with illustrations of one or two military hospitals; but the companion volume, besides various matters of interest by way of appendix, is supplemented by a bibliography or enumeration of the books bearing on hospitals which bears marks of having been industriously and intelligently compiled.

One omission there appears to be, and, in a book aiming at completeness, it seems to us to be a regrettable, if not inexcusable, one. Cottage hospitals are not illustrated or described. Mr. Burdett has certainly not considered these buildings too insignificant for notice, as he is the author of a work upon them, to which, in a brief chapter of two half-pages, he refers his readers. We cannot but regret that some adequate notice of a group of buildings which fairly comes within the purview of this work was not here attempted; with this exception, however, these volumes seem as near attaining the aim set forth on the title page as any work of the sort can reasonably be expected to reach, and in addition to information as to what has been done, they contain a considerable amount of guidance as to what should be done in building a hospital. The early chapters of the volume on construction, which deal with situation, structure, drainage, plumbing, and planning, are full of good practical advice, though we cannot quite include in that category some of the rather contradictory counsel given by our author in his preface, to persons about to build a hospital.

Of the suggestions as to practical matters, we learn from the preface that, in part at least, they emanate from a very well-known and very experienced architect. And we have pleasure in quoting words of frank acknowledgment which run as follows:—"Mr. Keith D. Young has devoted a great amount of time to the volume which deals with hospital construction, and without his co-operation and assistance it would have been impossible to have made the fourth volume anything like as complete and exhaustive as it will be found to be."

We have in this notice dealt only with that part of the book which deals with the hospital buildings; those who are curious about their history will find a concise and interesting account in the earlier pages of the third volume. The remainder of the 943 pages which make up its great bulk is devoted to many questions of interest to persons responsible for or engaged in the management of a hospital; some of these subjects are controversial, others are matters on which practice does not perhaps differ more than is inevitable in different countries and under varied conditions. We do not propose to attempt anything like an analysis of the contents of this volume; it will perhaps suffice to say that after a general historical review, all the principal questions that have been raised about hospital maintenance and management are gone into; the reader is then told something of the administration and management of these institutions in every considerable European country, in some Eastern countries, in the colonies, and in the United States; and the writer then turns to questions such as military and naval hospitals, the administration of medical schools, paying hospitals, Samaritan funds and hospital housekeeping and management.

We are glad in closing this notice of a very remarkable book to be able to speak with less reserve upon the merits of the two volumes and the accompanying atlas of plates than when we were noticing the two first volumes. Defects and deficiencies to which we felt bound to draw attention, especially where structures and plans were dealt with in those volumes, do not reappear in the present section of the work; the amount of information put together is enormous; it has been most judiciously concentrated; and the plans which accompany and elucidate it are

very valuable—in short, it is a work which no architect intending to take up hospital construction as part of his professional work can afford to neglect.

On special points special books may be fuller and more complete; but for a general view of what has been done in the past, and for a comprehensive statement of the present position of hospitals for the sick, the volumes before us are cordially to be recommended.

"BURR v. RIDOUT."

HIS case, of which we give on another page a report condensed from the unusually full report given in the *Times*, which evidently (and rightly) regarded it as a case of some importance, is one which ought hardly to be passed over in these columns without some special comment.

The action was one brought by an architect to recover from his client, a speculating builder, the amount of the commission due on a building of which the plans had been completely drawn out, but which was not executed. Under ordinary circumstances the settlement of such a claim is a matter the rights of which, as established by professional custom, are very simply formulated, and should be easily adjusted. It is considered, and fairly on the whole, that the preparation of working drawings from which an estimate can be made and from which the work could be carried out, represents roughly about half of the architect's work, and that consequently his claims would be met by a commission of 2½ per cent. on the estimated outlay, in place of the usual 5 per cent. on the actual outlay; with an additional ½ per cent. if tenders had actually been procured.

In connexion with the present case, however, there were circumstances which took it out of the ordinary category. The defendant was about to build two houses on the Cadogan estate, with the view of making money by them, and was bound by the terms of his lease to expend not less than 4,000*l.* on the two houses; *i.e.*, he was to build houses up to a certain minimum standard, having regard to the class of property on the estate. His case was that he instructed the plaintiff, whom he engaged to design and plan the houses, to this effect, and that the houses were not to cost more than 4,000*l.*, but that the plaintiff designed houses which were so much beyond this limit of cost that the lowest tender offered for them was over 7,000*l.* The defendant hereupon declined to entertain the idea of "cutting down" the design—and indeed it is difficult to understand how any system of "cutting down" could reduce the cost of a building, on the same plan, to little more than half the estimated amount—abandoned the plans entirely, and put the commission into the hands of another architect. Upon this the plaintiff brought the action to recover the 3 per cent. due upon the estimated cost of a building for which working drawings had been made and tenders obtained but which had been abandoned; alleging as part of his case the authority of the rules of professional charges laid down by the Institute of Architects.

Of course we all know well enough that very often excess of cost of a building above what the building owner had specified his intention of expending is to a great extent his own fault; that clients will change and enlarge their ideas as the work proceeds, and then express unreasonable surprise that the cost exceeds the stipulated amount. But there is nothing in the evidence to prove that this was the case in the present instance. The plaintiff endeavoured to maintain this position as part of his case, but (on the published evidence) he certainly failed to do so; and, as the judge remarked, seeing that the defendant was under obligation to expend 4,000*l.*, and was building the houses to make a profit out of them, it was not very likely

that he would wish to spend more.* And that being so, it may be questioned whether in justice (it is not our business to expound law) he had any fair claim at all against the defendant; whether in fact it was not rather the defendant who had in fairness a claim against him for having wasted his (the defendant's) time in preparing plans which were not what he had asked for and which were of no use to him. No doubt, to throw over the architect entirely was an unnecessarily harsh measure; the defendant might have given him another opportunity; he obviously lost his temper over the matter, and perhaps had lost confidence in the plaintiff and did not feel inclined to commission him again. Still, had he done so, he very likely might have ended in getting what he wanted without the disadvantage of having to defend an action and to pay part of the architect's claim for the first set of plans.

So much for the defendant's part in the matter. But what are we to think of the architect's sense of right and justice, who, having produced a design of nearly twice the cost that he was commissioned to produce, proceeded to claim a percentage on the whole estimated cost of the design, and furthermore to charge the Institute of Architects with abetting, by their rules, such an illogical extortion? It is not surprising that the judge should have commented strongly on this point. Lord Coleridge put it thus:—A man wishes to build a house to cost about 50,000*l.*, and an architect prepares plans for one which would cost 150,000*l.*, and then says, "Well, you may not be able to build it, but whether you do or not, you must pay me a commission on 150,000*l.*" And Lord Coleridge very naturally said "he confessed that his legal soul fired at it." So, we can assure him, do many souls which are not legal; and it is needless to say that the Institute of Architects has never laid down any such position. They have laid down a rule which may be disingenuously construed into meaning that, but which was never for a moment intended so. They have laid it down that an architect has a claim for 2½ per cent. commission on plans drawn out but abandoned, but they did not contemplate that architects should produce plans to cost double what they have received instructions for.

The plain fact is that this kind of carelessness on the part of architects in running their clients into expense far beyond what the latter had instructed them for has been far too prominent a failing of late, and is one which is tending to cast discredit on the profession in the eyes of the large number of persons who do not take the trouble to discriminate in such matters, and who jump to the conclusion that what one architect will do, all will do. We have no hesitation in saying that in regard to all the classes of work which can properly be made the subject of a builder's contract (excluding such work, for example, as high-class decorative figure design in sculpture or mosaic), every architect who understands his business can perfectly well know within about 10 per cent. what the building he is designing will cost, and can design a building for a specified cost, within that limit, or thereabouts. If he exceeds his estimate or his instructions much beyond that limit, either he does not understand his business, or he is not acting in good faith or paying proper regard to the interests of his client; and in either case he does not merit the sympathy of those who wish to see the architectural profession maintained at a high standard in regard to honour and efficiency.

But there is something to be said, too, about the views expressed by the learned judge before whom this case was heard. We have never been able to understand the

* One point, however, that we do not understand, is the defendant's statement that the houses were subsequently very satisfactorily built for the sum of 3,500*l.* In that case, what became of defendant's obligation to expend 4,000*l.*?

reason for the peculiar acerbity of feeling which the judges of this realm manifest whenever any reference is made to the Professional Practice code of the Institute of Architects. It requires no lawyer to explain to us that such a code has not the force of law. Every man possessed of sufficient common sense and logic to understand what "law" means knows perfectly well that the recommendations of the Institute of Architects as to what is a fair and a customary standard with regard to professional charges are only evidence of a commonly received custom; neither more nor less. Why should a judge think it necessary to use such ostentatiously contemptuous language about it, and to inform the jury that, unless there was clear proof that they were part of the contract, "he should treat the rules of the Institute as so much waste paper"? It is surely sufficient to point out to the jury that they are not binding in law; and, even from a legal point of view, are such rules, laid down by a representative professional society for the guidance of the profession as to what is fair and proper, mere "waste paper"? Are we not correct in assuming that in many cases the law does recognise, and has recognised, such expressions as to professional custom as at all events an important element in deciding what are the fair claims of a litigant? Our memory of some legal cases we have seen reported is very much at fault, if this be not so. And again, surely, before telling the jury that the supposed support of the Institute of Architects to the plaintiff's claim, in the case under review, was "an unjustifiable attempt by a body of men for their own advantage and to increase their own emolument," Lord Coleridge might at least have taken the trouble to ascertain whether the Institute of Architects really did maintain such a position, instead of thus throwing an unmerited slur on an honourable body of men. Then again, in remarking in regard to the rule of 2½ per cent. for drawings made, but not carried out, what did Lord Coleridge mean by telling the jury that he "would not allow the Institute to dictate to juries what sum was to be paid for work not done"? This latter expression is merely one of many instances which go to show that lawyers not only do not understand, but (as it appears to us) do not even endeavour to understand, the true principle and method of an architect's work and of the claims which he may rightly make for it. The 2½ per cent. (in general principle and apart from the conditions of this particular case) is *not* for "work not done"; it is for work *done*, and often the hardest part of the work, *viz.*: the brain-work, the contriving, planning, and designing. Suppose a man commissions an architect to make plans for a large building, involving two or three months of labour, and then, for some reason entirely personal to himself, abandons his original intention of building; would the highest exponent of English law in that case maintain that the architect had not a claim, not only in justice but in law also, for payment for the heavy work he had done, merely because the client changed his mind at the critical moment? It is evident that juries do not share this view, as the jury in this case showed by awarding the plaintiff a sum amounting to 2½ per cent. on 4,000*l.*, representing the amount of work for which he had been originally commissioned.

PROPOSED IMPROVEMENTS AT TENBY.—At a public meeting held at Tenby on the 3rd inst. a project to build a promenade pier and landing-stage at a cost of 30,000*l.*, from the designs of Mr. Jerram, engineer, was discussed. Passengers from steamers will, if the pier be constructed be able to land at all times. The pier will be 1,500 ft. long, and will have a pavilion for concerts. The Mayor presided at the meeting, and resolutions approving the scheme were moved by Admiral Elliott and Councillor Reid, and unanimously adopted.

NOTES.



ON Tuesday last the Home Secretary moved the second reading of the new Employers' Liability Bill in a clear and temperate speech. This Bill, if carried into law, will abolish the so-called doctrine of common employment, so that if in the future a workman is injured by the negligence of a fellow-workman he will be able to recover damages from his employer just as if he were a stranger. It has long been clear that the artificial doctrine couldn't last much longer, for, as a matter of fact, the master should be just as responsible for injury to a workman in his pay as to a stranger. In neither case is he morally wrong. But while admitting the illogical character, in a certain sense, of this provision, we cannot but fear, nevertheless, that the practical working of an employers' liability act without it will be liable to great abuses, which employers will have to be carefully on their guard against. The exceptions to this rule in the new Bill are that if the workman knows of a defect in machinery or plant, and, having an opportunity of so doing, does not bring it to the notice of his master, or of a person who has some responsibility; or if he contributes to the accident by his own negligence, he may not recover damages if he is injured. It is also enacted that the workman may not contract himself out of the benefits of the Act, which likewise simplifies the legal procedure. Mr. Chamberlain moved an amendment, the intention of which is to make the employer liable for all accidents by which a workman is injured. According to the facts relied on by Mr. Chamberlain, some 40 per cent. of the accidents which occur are what may be conveniently called inevitable accidents. The result of an Act such as Mr. Chamberlain desires would be to render a kind of industrial insurance absolutely necessary for the security of employers. It is shown, however, that Mr. Chamberlain's proposal would put the workman in a better position than any other class of person. A stranger cannot recover against a man if the injury is caused by something in the nature of a mere accident, without negligence. Why, then, should a workman be in a better position? It is a hard law which makes a man legally liable for the negligent act of his servant, though it may be desirable in the public interest. Again, too, a workman may insure himself against mere accidents just as any other man may do; and it is difficult to see why a workman, if he desires to protect himself from injuries which are absolutely in the nature of accidents, should not be satisfied with the opportunities which every other person considers satisfactory.

IT is very fortunate that the Welsh coal owners and their men have come to terms, or next week would have found 100,000 men idle in South Wales. The outlook was very threatening up to the end of last week, when a sliding scale regulating wages by prices was adopted after a long discussion. The basis of settlement involves concessions on both sides, and some of the miners' delegates declined to accept it. The districts represented by them thus still remain free to accept or reject the scale agreed upon by the majority, but the crisis may be considered over. The Miners' Federation passed a resolution on Monday condemning the men's leaders for signing the scale; being probably apprehensive that their action will tend to thwart the efforts of the Federation to maintain the present rate of wages. The miners in several other districts are being pressed to accept reductions owing to falling prices, and it is proposed to stop work again for a week—or longer—in order to keep up the price. The question is to be considered at a conference in Birmingham on the 28th inst., at which all the various miners' associations will be represented. It is to be hoped that the public will have learnt a lesson from the last experiment of this

nature, and will not play into the hands of the merchants by creating a panic. The miners will certainly not voluntarily stop out very long, for a complete surrender of wages for any length of time would be too dear a method of keeping up the rate. Their danger in embarking in such a course—serenely indifferent as to the inconvenience and loss to which employers and their customers may thereby be put—is that complications might possibly ensue, tending to prevent a resumption of work when "play-time" is over. The men of Durham would doubtless be satisfied with a very short holiday—in fact, it would not be surprising if they kicked against the proposal altogether, as they have scarcely recovered from the effects of the great strike—while others may stand out for a longer period than before. It is, therefore, very unlikely that the proceedings at Birmingham will be characterised by that unanimity which is essential for the success (from a miners' point of view) of the scheme.

THE President of the Board of Trade must be getting thoroughly tired of the railway rates controversy, the department having been fairly overwhelmed with complaints and deputations. There are probably few members of Parliament who have not been pressed by their constituents to lay their grievances before the Board of Trade, and but few trade associations who have not also approached the Board, on behalf of their respective industries. Next to the deputation of members of Parliament, perhaps the most important body Mr. Mundella has received was the deputation from the London Chamber of Commerce and its affiliated associations, which waited upon him on the 17th inst. There was a clear indication in Mr. Mundella's reply of the feeling we have alluded to, and although the promise of remedial legislation (should it prove necessary) was repeated, it was added that the Board did not at all wish for any further powers. Allusion was made to the rather acrimonious speech made by the Great Western Chairman, who, a railway organ has remarked, "was in good form on the horrible revision of rates question." Mr. Mundella, on the other hand, characterised this gentleman's attitude as a mistaken and foolish one. As the railway companies seem to have the Duke of Richmond and Gordon on their side in laying the blame of the present state of affairs at the door of the traders, it is interesting to note the views of Professor Jeans in the *Fortnightly Review*. He maintains that "the burden of high railway rates, like the poor, we are likely to have always with us," and that no single interest or influence is responsible for this—distributing the blame among Parliament, the companies, and the traders. He argues, however, that the public have a right to demand that Parliament will protect them from having to carry an insupportable burden of higher rates.

THE best thing that could have been done with Sir J. Blundell Maple's Cheap Trains Bill was to relegate it to a special committee, in which the possible good may be extracted from it without the concomitant inconveniences to which it might give rise. To allow the cheap train working men to return by any train, at the most crowded hour for outgoing suburban trains, would be to inflict an injustice on the railway companies and much inconvenience on the rest of the travelling public. And when it is urged that the railway fare of the working man living out of town must be added to his rent, it might be asked why the accommodation to his circumstances should necessarily or on principle come out of the pockets of the railway companies.

THE French excavations at Delphi have begun at a point in the Sacred Way which had been previously cleared out. The

intention is to follow the route of Pausanias so far as it can be made out, starting from this point. So far the excavators have come upon the remains of two buildings, one of circular shape; a number of architectural fragments, both in marble and terra-cotta, and of inscriptions. The sculptural remains found so far are but few in number, and apparently unimportant. In another sacred way, that from Athens to Eleusis, further excavations are reported (*Adelphi*, the last belated issue—1892, August). The sanctuary of *Διὸς Ἀποδείρης* has been completely cleared out, and a number of votive offerings, among them marble doves, some with inscriptions, have been brought to light. Near at hand a herm was found, with an inscription (*Ζεὺς δῶρυς*) giving the distance from the Dipylon Gate. At Palamidi, near Nauplia, thirty prehistoric graves have been opened. In one of them a Mycenaean vase was found, on both the handles of which an H-shaped sign was carefully scratched in.

MESSRS. ASHER & CO. are to issue almost immediately the great work by Dr. Max Ohnefalsch-Richter, entitled "Kypros, the Bible, and Homer." The English and German editions are to appear simultaneously—we could wish that the English translator had ventured on "Cyprus" instead of the unfamiliar "Kypros." Mr. Gladstone has found time to write a preparatory letter expressing his interest in the subject generally, and we believe his sympathy. Dr. Richter's main contention is that much of early Greek religion and ritual, as well as art, is of Oriental origin. Though the work is hampered by its great bulk (a letterpress volume of 500 pages, royal quarto, and a second volume of 200 plates), and heavy cost, *q.v.*—it may be expected to be far more widely popular than most similar archaeological treatises, for not only is there the preface by Mr. Gladstone, and the question of how far Homer is illustrated by Cyprian art, but Dr. Richter believes that in Cyprus only we find the full analogy and explanation of Old Testament antiquities, of the Tabernacle and temple, structures and furniture. "In Cyprus," he says, "we are standing in the very midst of ancient Canaanitish civilisation as depicted in the Old Testament." "My excavations and researches during twelve years of unremitting toil in Cyprus brought me, on the one hand, to the Greeks and Homer, and, on the other, to the Semites and the Bible." We expect to differ on many points, but of the importance and interest of the book there can be no question.

BY the courtesy of the Master and Court of Assistants of the Drapers' Company, their Hall and reception rooms in Throgmorton-street were placed at the disposal of the London and Middlesex Archaeological Society for the purposes of an exhibition of antiquities discovered in the city of London during the last seven years. The exhibition remained open on Saturday and Monday last, and on Monday evening a large number of members and their friends attended a conversation, and were received by the President, Dr. Edwin Freshfield. The attractions of the evening included the exhibition of London antiquities which have been collected by that indefatigable antiquarian Mr. James Smith. The number of objects is as surprising as their variety, and they date from the Roman times to the present. Pottery-ware is most largely represented, but the bone skates, bone pins and needles, remnants of head-gear and boots, leather bottles, are all of varied interest. Not the least interesting were several good specimens of bronze torques, supposed to have been used as dress-fasteners. Numerous coins of all ages were also exhibited. It is rumoured that this unique collection may be bought by the Corporation as an addition to the local antiquities already in the Guildhall, and it is to be hoped that the rumour is well founded: it would be a thousand pities that

such a good collection should be dispersed. Another exhibit which attracted much attention was the communion plate of the parish of St. Antholin and that of St. Peter's, Cornhill, lent by the rectors and churchwardens. The plate is largely of the seventeenth century, and comprises alms-dishes, chalices, and patens, also some communion flagons, survivals of the spirit of desecration which actuated the Puritans. A considerable quantity of the plate of the company was also on view, and included a fine gold cup by Lambarde, presented in 1578. Some communications were made during the evening by Dr. Edwin Freshfield, by the Rev. J. A. L. Airey on the work of restoration at St. Helen's, Bishopsgate. Mr. Charles Welch also made a few remarks with reference to a sixteenth century wall painting recently discovered at Waltham Abbey, which was on exhibition in the great Hall.

OUR contemporary *Engineering* recently contained an article by Dr. Preller, which has been reprinted as a pamphlet, entitled "The Future of British Engineering," in which the writer, after commenting upon the excellent address delivered by Mr. Harrison Hayter, as President of the Institution of Civil Engineers, seeks to inquire into the causes of the present depression in engineering enterprise, in which "other countries" as he asserts, "are suffering in common with England. The reason alleged is the supremacy of the Stock Exchange and the spectre of an English Limited Company. We do not agree with the writer in the prominence given to Stock Exchange influence over new undertakings. The purely speculative adventurer who leads a company into financial embarrassments is happily more discredited than formerly. The great cause, we think, for want of work among the younger members, and, therefore, among the majority of the profession, is the want of skill and ability. Every engineer who keeps an office knows the difficulty there is in obtaining competent assistants, especially for out-door work. Hence we agree with Dr. Preller in the prominence he gives to the value of colleges and laboratories for higher technical education, as supplying "the tools for becoming an engineer," and also in his emphasis upon the importance of culture, diplomatic skill, and linguistic attainments. Dr. Preller speaks rashly, however, when he states that engineers of the nineteenth century are, "as a body, averse to even the optional adoption of the metric system." Plotting scales level staves, surveying chains, are all decimally divided, and although detail drawings are made with the use of duodecimal scales, the engineer invariably adopts a decimal scale for his stress diagrams and for any trial of dimensions which has not to be sent direct to the contractors' workshop. Mr. Hayter's address is a worthy addition to other presidential addresses given in previous years at the Institution.

AT Berlin there have been recently some very instructive experiments with fire-proof materials and constructions. They were not arranged, as is mostly the case, by those peculiarly interested in the objects examined, but by the Royal Police Fire Brigade, working hand in hand with the Prussian Government, the municipality, and the fire insurance offices. The series of experiments, which lasted three days, took the form of what we might term a competition for some 5,000*l.* in premiums offered by the fire offices, and were carried out in some warehouses lent by the municipality prior to their demolition for street improvements. Every object examined had to be subjected to the most rigid, but what may be called "naturally" arranged trials. The dwelling-house, shop, warehouse, spirit vaults, &c., each had their turn, and in most cases the simpler means of protection had to vie with the modern patented arrangements, generally much to the advantage of the former.

A report is to be published by the committee of fire experts who acted as a jury on the occasion, from which we may hereafter be able to give some extracts.

THE *Journal of the Franklin Institute* for January gives a paper entitled "The Road Movement," in which Mr. Lewis M. Haupt states as his experience that the cost of movement by road is at least $37\frac{1}{2}$ times greater than by rail, supposing the road to be dry and in good condition. Also, that the waterway is the most economical mode of transit, being as low as one-twenty-sixth of the cost by rail. These ratios, though not entirely applicable to British rates, are of interest for comparison at the present time. The writer of this paper points out that roads should be built continuously, and not in patches; that they should have continuous and systematic supervision; and, further, that the essentials for a good road are, first, a good location; secondly, a good foundation; and, thirdly, a firm and durable superstructure. In these remarks we quite agree with him. We also think his comments upon changing control worthy of attention, when he quotes the saying of another writer, as follows:—"Men dealing with interests so vast should not be subject to constant changes. Change of commissioners means change of methods, and change of methods during the prosecution of engineering works is very likely to mean disaster." In a paper on artesian wells by Mr. Oscar Carter, contained in the same journal, the author points out the importance, when a well is finished, of pumping for at least a couple of hours before a sample is taken for chemical analysis, and that unless driven in the solid rock of a hard and compact nature, it is necessary always to case such wells with iron pipe from the surface, the deeper the better.

BRUSSELS is to have what we might term a Democratic Academy of Arts which is to be independent of Royalty and Government. A combination of artists and art connoisseurs is to form a Council of 125 members, with the co-operation of a number of regular subscribers, who, in return for their financial assistance, will have the pleasure of being able to officially call themselves "art patrons" and of visiting all exhibitions with free passes. To what extent architecture will be considered an Art in the new Academy is not yet apparent.

THE new suite of rooms called the Grafton Gallery, of which Messrs. Wimperis & Arber are the architects, is a valuable addition in itself to the public galleries of this kind in London. The entrance is merely the front of a house in this little corner street, with a bay thrown out and a little decorative treatment added; but internally the rooms are a very fine set and admirably lighted for picture exhibitions. We enter by a small square vestibule and inner vestibule and then down a short flight of steps lighted from an arched ceiling filled with stained glass of rather too strong colour; thence into the octagon room, thence by two *entrées* into the large and lofty room called the "Music-Room," running at right-angles to the main line of the galleries. Through this are two long and lower galleries, divided by a small octagon room. The same system of treating the roof has been carried out in all the galleries; the sides are glazed, following the slope of the roof, between principals or brackets the underside of which takes the line of a cove, and which support the solid centre portion of the ceiling; this is treated as a semi-circular waggon ceiling (in the octagon becoming a dome) enriched with plaster ornament in low relief. From the centre line of this ceiling depend the lights. In the daytime this decorative ceiling is in shadow; when the lights are lighted it becomes the bright portion of the roof, reflecting and assisting

the artificial light. The ornament of the frieze in the large gallery is rather feeble, but in general the details are satisfactory. The "Music Room" would probably be an excellent room for sound, and we may suggest that it might be well turned to account for classical quartett concerts, for which it is just a good size. The lowest gallery, called the "End Gallery," seems deficient in ventilation. While the rooms are delightful, one can only regret that the pictures are in many cases so very much the reverse. There are a few beautiful works by Mr. Watts, a good example of Mr. Whistler in his best manner (not a new work), one or two very fine portraits by Mr. Shannon, another by Mr. Lavery, and a few landscapes of more or less vigour and merit, though not in the best style. Beyond this the exhibition is a collection of eccentricities, mostly imitative of modern French fashions in painting, and some of them of such defiant ugliness and vulgarity (in the artistic sense) that the hanging of them seems almost an affront. We could very well compound for less sumptuous exhibition rooms, if one could have them better filled.

WE have received from the "Fitzroy Picture Society" a collection of colour-printed pictures intended especially, as we gather, to be hung on the walls of schools, mission-rooms, club-rooms, &c. They are executed in a broad and simple decorative style, depending on strong outlines and flat spaces of colour for effect; such a style of work as is generally designed for execution in tiles, sgraffito, and other analogous methods of producing pictorial decoration for walls; and this style is no doubt the best suited for colour-printing, in which delicate gradations of tone, and realism of effect, cannot be obtained and therefore should not be attempted. When we say that the designs are by Mr. Heywood Sumner, Mr. C. W. Whall, Mr. Selwyn Image, and Mr. H. P. Horne, it will be understood that this work is something superior to the average standard of school pictures, and is in the hands of artists who thoroughly understand the special style of treatment employed. The subjects already produced include a set by Mr. Whall, "The Pattern Life," in three pictures symbolical of the life of the Christian child; "Jesus Hominum Salvator," by Mr. Image, including "The Annunciation," "The Agony in the Garden," and "Christ in Glory," designs of the "Four Seasons" (landscapes with figures) by Mr. Heywood Sumner, and "Mighty Men of the Old Testament" by the same artist. The decorative borders of the pictures have received careful attention, and form an element in the design. Altogether the Fitzroy Society's plates promise to be a valuable addition to the means of cheap pictorial decoration for the people, carried out in a true artistic spirit.

THE collection of pictures of "Fisher Life" by Mr. Walter Langley, now on view at the Fine Art Society's Gallery in New Bond-street, is a charming one. The scenes and figures are mostly from either the Cornish or the Norfolk coasts. Mr. Langley paints coast scenery, craft, and fishing folk, in a natural and unaffected style, with a realism which is never pushed so far as to lose pictorial breadth and balance.

THE resignation of Mr. Burne-Jones from the position of Associate of the Royal Academy, after having held that position for eight years, at the invitation of the Academy, without any offer of promotion to the position of "R.A.," is of course quite comprehensible. It is also comprehensible that the Royal Academy may not be without good reasons to allege, from their point of view, for their action or inaction. Mr. Burne-Jones's art and genius are quite exceptional in their kind, and his withdrawal is no doubt a loss to the Academy rather than to himself: but it

might be questioned whether it does not also present some deficiencies which a body representing the national centre of artistic training and technique might feel bound to take cognisance of.

WHAT IS ARCHITECTURE, AND HOW CAN IT BE ADVANCED?*

BY PROFESSOR ATCHISON, A.R.A.

THE word Architecture has had many definitions. I have given you my definition of it, and doubtless there are other definitions still more complex; but the old one is a good one,—“the art or science of building”—and has the merit of being understood by all.

The definition of architect, as “a professor of the art of building,” has the same advantage. It is like the word “painter,”—one who paints,—which includes the man who paints a wall in plain colour, and the one who paints “The Last Judgment;” but when we want to class the painters we call one a house painter, another a figure painter, and others landscape, portrait, animal, or still-life painters. It is only in the earliest savage, and in the most highly cultivated stage, that anything is made by man which is not agreeable to his eye. The savage inventor who managed to fix a pointed stone into a cleft stick and tie it with a flimsy twig or a piece of bark, urgently wanted it for use, either to kill his prey, or to defend his life. Directly he got some security, and food enough to have leisure, he formed his weapon into a shape that pleased him.

If architects are to complete their education, having now new wants to meet and new materials to employ, they must study past work, not to imitate it, but to see how the early rude forms employed, were made into agreeable, striking, or beautiful forms—in fact, to learn how to invent; for as each age differs in cultivation and taste, so must the architecture, if it is to move the age. You all know Sir Joshua Reynolds’s dictum, that we learn to invent by studying the inventions of others, so the architects must also invent some new forms of beauty and new methods of exciting emotions, for old methods reproduced scarcely excite them.

Fortunately for us, we are enabled to trace the method employed by the Greeks in effecting this transformation, and the Greeks were the most artistic race the world has seen. We have not got their earliest huts nor their improved cottages, but we have their temples, which were but glorified cottages, carried to the greatest perfection they could attain, for the purpose of pleasing the divinities—divinities who had aided them in that glorious struggle for liberty they carried on against the Persians, and in which they won a victory that still seems miraculous to us.

By studying the paintings on the Greek vases, we can find out the methods employed to turn the rudest work into that which has been the admiration of mankind ever since. We see the thick cap on the tree trunk that supported the lintel in the original cottage, chamfered or splayed towards the trunk, then made round, and finally invested with the form of the sea-urchin’s shell, the echinus. We also see how a still thicker cap was first rounded at the bottom edges, just as a carpenter would do it now, then gradually formed into a rough volute, and finally finished off into some lovely shell spiral. It is, of course, a long way from the first rude attempts to the perfection attained at the culminating point of Greek art; but in the earliest remaining temples we see all the motives which were finally brought to such exquisite perfection.

It is impossible to find out the cause that impelled them to choose those forms which now charm us,—we call it native taste or genius; and it is of no consequence, as the knowledge would not enable us to do likewise; but it is important that we should observe by what devices the effect we admire was attained. We see that those parts in compression were marked by lines vertical, or nearly so, viz., by flutes in the columns and triglyphs, though the reason for these vertical lines was probably æsthetic. It is also necessary for us to observe where they accentuated parts, and where they introduced ornament. It seems to me that they accentuated those parts that had duties to perform that were different from those of the contiguous parts—the capital and base for example—the business of the first being to concentrate and of the latter to diffuse weight;

for enrichment with the highest ornament, man and animals, they mainly chose those parts that were not structural, but mere filling-in,—the metopes and the pediments. Whether we consider these Greek temples as studies of line, or of light and shade, we shall be equally charmed; and we shall be equally surprised at their subtlety. The long horizontal lines of the steps, and of the architrave and cornice, are contrasted by the vertical flutes of the columns, whose lines also contrast with the horizontal lines of the abacus and the curved ones of the echinus and fillets. The crescent light on the echinus is not only beautiful in shape, and makes a bright space in the midst of shade and shadow, but it is set off by the graduated shade below and the sharp shadow of the abacus. The shade and shadow of the annulets, and the sinking-in of the necking, not only repeat the curves of the echinus, but again contrast with the vertical flutes. Again, how admirably the stiff vertical flutes of the triglyphs enhance the curved surfaces and flowing lines of the sculptured metopes, besides acting as foils to the horizontal lines of the architrave and cornice.

The profound study the Greek architects bestowed on the sunshine of Athens, and its effects on shapes, is surprising; as is also their accurate working of that superb material, marble. You can see the brilliant effect of some of the fine sinkings at the Propyleum, that even now look like the last deep touches an artist gives to his picture to make it brilliant: and that come out now as finely as they did two thousand years ago.

Of square forms they were lavish, but of curved ones they were chary; but to relieve the monotony of square, flat surfaces, they inserted angular ones, like the soffits of the mutules, and by means of the guttae they got not only brilliance, but scale. I sometimes fancy that their persistence in simplicity, and their constant perfecting of forms, but not radically altering them, was greatly due to their familiarity with the nude human figure. The Greek architects must have noticed the young clothed men under training, and seen how the whole muscular system was gradually perfected.

I think it is Vitruvius who says that the names of some musical tones were absent in the Roman language, which were found in Greek; and from this we may infer that Roman ears were too dull to distinguish them, and this is probably the case with the moderns as regards all the senses. Wilkins discovered what Vitruvius meant by the curves in architecture, set out by the “scamilli impares” or ordanates that the Greeks introduced, but frankly confesses that he never observed these curves in the works of the ancients; yet once discovered some of them can be made palpable to any one.

Doubtless it is from these and other refinements that we never get tired of looking at the Parthenon. Eight similar columns, apparently set at equal distances, suggest to us monotony, but from slight but measured irregularity the form becomes like one of nature’s fine works, and does not pall upon us.

I must dwell long on Greek work, not only on account of its beauty and its simplicity, but because it is the original type from which all successive Western architecture was evolved. We probably should not have had St. Wulfran at Abbeville, if, let us say, the Parthenon, as the type of Greek architecture, had never existed.

There are one or two other points I must call your attention to, namely, the base and necking of the Ionic, and the sort of pedestal that was used to the Ionic columns of the Temple of Diana at Ephesus, circular on plan and carved with figures in high relief. These drums may be seen at the British Museum. The severe simplicity of the Doric column and its great spread at the bottom rendered a base superfluous, but the base added to the Ionic was necessary, from the smaller increase of the shaft at the bottom. This base is always cylindrical, and it makes an echo to the more ornate cap. The originality and beauty of these base-mouldings are well worth attention, as what piece of Greek art is not? You recollect Horace’s lines:—

“Do you, my friends, from Greece your models draw,
And day and night to con them be your law.”
Horace, “De Arte Poetica,” l. 268.

The choice of the necking for ornament was curious; it was partly a survival and was partly ornamented to prevent too striking a contrast between a plain surface and the rich volute. The reason for the carved pedestals at the Temple of the Ephesian Diana is obviously a sculptor’s device to let his work be seen.

You all know the charming story Vitruvius tells about the invention of the Corinthian capital by

Callimachus, who is supposed to have lived before 395 B.C., about forty years before the birth of Alexander the Great. Professor Cockerell found a Corinthian capital at the Temple of “Apollo the Helper” at Bassæ; Dr. Dorpfield believes there were two, one at each angle of the Ionic peristyle in front of the statue. This temple is said to have been designed by Ictinus, one of the architects of the Parthenon; the Parthenon was built about 422 B.C., and Ictinus was the architect of the temple at Bassæ, and the Corinthian capital Professor Cockerell found on the spot belonged to the temple; it takes the merit of the invention from Callimachus.

The Corinthian was a very showy capital, and had the foliage most elegantly arranged in the monument of Lysicrates, but as its supposed origin suggests, the foliage was wholly parasitic. It is clearly a sculptor’s, but as its architect’s invention, for it has a very unstable appearance, and contrasts unfavourably with the constructional capitals of the Doric and Ionic; still, we cannot afford to despise it, because it was not only the mother of the Roman Corinthian, but of all Western capitals with foliage.

You must not think that the admiration of Greek art I express, is a personal peculiarity, or purely due to the praises of antique authors. I give an extract from the impressions made on a French man of letters, when he saw the Acropolis in 1865:—

“The impression that Athens made on me is much the strongest that I have ever felt. There is one place where perfection exists; there are not two: it is Athens. I had never imagined anything equal to it. It was the ideal crystallised in Penticlic marble which showed itself to me. Up to that time, I had believed that perfection was not of this world; one single revelation appeared to me to compare with the absolute. . . . A thing which has only once existed, which was never seen before, and will never be seen again, but the effect of which will endure for ever. I mean a type of eternal beauty, without a local or a national blemish. I well knew, before my voyage, that Greece had created science, art, philosophy, civilisation; but I wanted the scale. When I saw the Acropolis, I had a divine revelation, as I had the first time I felt that the Gospel was alive, in seeing the valley of Jordan from the heights Casyoun. Then the whole world appeared barbarous to me. The East shocked me by its pomp, its ostentation, and its impostures. The Romans were only rude soldiers; the dignified appearance of the finest Roman, of an Augustus, of a Trajan, seemed to me to be only posturing, after the ease, the simple nobility of these lordly and tranquil citizens. Celts, Germans, Slavs appeared to me like a sort of conscientious Scythians, but laboriously civilised. I found our ‘Middle Ages’ without elegance or shape, sullied with pride and with pedantry. Charlemagne appeared like a big German groom; our Knights seemed to me lumberly, at whom Themistocles and Alcibiades would have laughed. There had been a nation of aristocrats, a public wholly composed of connoisseurs, a democracy that had seized on shades of art so slight that the refined ones of our people could hardly perceive them. There had been a public to understand that which causes the beauty of the Propyleum, and the superiority of the sculptures of the Parthenon. This revelation of true and simple grandeur touched me to the centre of my being. All that I had known up to that time seemed to me the clumsy effort of a Jesuitical art, a rococo made up of silly pomp, of quackery, and of caricature. . . .”

The Romans took Greek art bodily, not the perfect art of the days of Pericles, but the art debased by the supremacy of the Macedonian barbarians, and probably made but little alteration in it, for as yet the complete sequence of Greek and Roman architecture has not been established. Fergusson believed that the missing link had either been destroyed or not yet found. The Romans made their mouldings coarse, and generally made architecture submit to absolutely fixed rules, having found the supreme utility of an invariable rule in military operations; but being a constructive as well as an imperial race, they only made the useful subservient to taste in sacred buildings. They found the arch too useful and too cheap to be sacrificed, and even in sacred buildings I think the architraves were sometimes flat arches; almost as wretched an expedient for getting a straight line as our flat window arches.

In the Baths, the Romans found the columns, with a slice of entablature, useful to carry the groined vaults, but swept away the rest of the horizontal entablature, because it interfered with

* Being the Fourth Royal Academy Lecture on Architecture this Session. Delivered on Thursday evening, February 2, 1893.

the lighting. As regards the arch, the Romans did little with it as an æsthetic feature; they merely moulded its face like the architrave of a door. At the archway of the gate at Perugia however, there is a wide archivolt made of two rings of stone with a moulding round it, said to be Roman work, which is very effective. The Romans, or the Greek architects they mostly employed, were possibly the inventors of the modillion, and they certainly tried many æsthetic experiments; the Greek shaft appears to have been mostly plain, or fluted, unless you include the sculptured drums at Ephesus; the Romans adorned the shafts with leaves, with patterns, and with bas-reliefs,—the latter may be seen in Trajan's Column; and they occasionally covered square piers or pilasters with sculpture in the shape of trailing plants. It is said, but with what truth I know not, that the thin shafts at the doorway of Siena Cathedral, which are carved all over, were either Roman or copied from Roman work. When I said the Greeks kept their shafts plain or fluted, I spoke of those of the Golden Age; in the early ages the shaft was not so treated. We all know the chevroned shaft of the Treasury of Atreus, shown upside down in Stuart and Revett's book. The Roman adoption of the Greek post and lintel architecture was not an outcome of their own methods of construction, but was simply adopted and adapted as a sort of tub thrown to the whale of fashion; but the things the Romans did care for were dignity and magnificence. One can fancy the great Agrippa or Vespasian saying to the Greek slave who was his architect, "I do not want any of your philosophy, and I am perfectly indifferent to what mouldings or curves you use; but I want something in the fashion: rich, handsome, and dignified, and, if you don't give it me, I shall have you crucified."

Just before the Romans established Christianity as the State religion, and Rome emigrated to Constantinople, Diocletian's arch had started arches direct from the capitals of Corinthian columns, and had begun to use corbelled arcades as an ornamental feature.

As soon as Justinian's days are reached, there are no more signs of anything but arcades on columns; what remains of the cornices goes above the spandrels of the arcades; the capitals are treated after the manner of the silver capitals Constantine had put to the sanctuary columns of the Holy Sepulchre. These Byzantine columns mostly have a thick abacus, to concentrate the weight of the wide piers above on to the columns. The archivols are very narrow, and appear to be part of the veneering, mostly executed in flat carved work or in inlaid marble, and returned round over the abacus. The main arches supporting the dome are hidden by the mosaic; but the arches are marked by coloured mosaic bands; though in the galleries there are some very wide ornamental archivols, possibly as wide as the brick arches they cover. In some of the later works, such as St. Theodore (Theotokos) and the "Monastery in the Fields" (*Μονή τῆς χώρας*), there are beautiful ornamental archivols of marble, carved with pierced acanthus leaves, with the tops of the leaves turning over. This structural alteration, however, was made in the Byzantine shafts; the fillet below the apophage was made into a wide band, to prevent its splitting with the weight, and at the necking the fillet was treated in the same way.

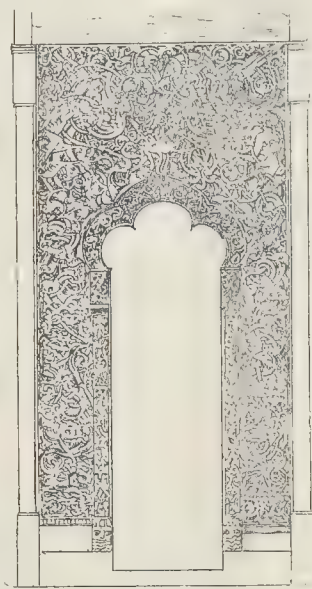
When the savages who overran the Roman Empire began to settle down and to build, they probably used what men of skill they could find, who copied, as well as they could, the Roman and Byzantine buildings at hand; and I believe kept to their old places the accentuation and ornamentation of the parts; but in the twelfth century hosts of the Westerns had made a tour through the greater part of the Roman Empire, on account of the Crusades, and had seen most of the masterpieces of architecture of all periods, including the Saracen. It is believed they then saw the deserted cities of the Hauran, which we have only lately known through the Marquis de Vogüé's publication. The Crusades lasted from the end of the eleventh to nearly the end of the thirteenth century, for Acre was lost in 1291.

The Cathedral of Durham is said to have been founded in 1093, but where the Normans got the chevrons and spirals from, with which they decorated the magnificent piers, I know not. It may be said that they invented them, but so little is invented, that it might be said they did not. Some one did invent something at some time, but it is only after it has been developed for centuries that it is likely to be admired. Those chevroned columns of the Treasury of Atreus, are supposed to be of 1200 or 1300 B.C.

The principal invention of the Romanesque architects was the new proportioning of the column by lengthening the shaft; they saw that the column had been used to carry an entablature, an arch, or a groined vault, and so put the capitals under the external cornices of churches to support them, and left the bases at or near the ground. Sometimes the column went to the top of the building and supported nothing; inside it often supported a truss of the nave. The vigour and independence of mind of some of the savage hordes that had over-run the West made them despise precedent, and made them use in a new way features that pleased them. I explained the structural reasons for stepping arches; in doorways the Romanesque architects put a column under each step of the arch, and that gave rise to one of the most striking features of Gothic, the recessed porch. Those barbarians that had capacities for civilisation, like the Goths and Norsemen, must have felt themselves greatly superior to the worn-out people they had overcome, and that feeling possibly made them desire an architecture different from the old. The Norsemen are said to have impressed all nations with their superiority, even when they were not the masters of it, and if we think of their discovery of Iceland, Greenland, and North America, and the confidence the Roman Emperors of Constantinople had in their military skill and integrity, we need not necessarily be surprised at their taste for the fine arts.

In the reign of the Byzantine Emperor Michael IV., 1040 A.D., Harold Hadrada was sent to quell a rebellion at Athens, and when he had quelled it he had the achievement engraved in Runic on the lion of the Pireus, now at the arsenal at Venice. Hadrada fell at the battle of Stamford Bridge a few days before the Norman Conquest.

There is a very remarkable instance of the intercourse of the Norsemen with the East in the church of Wang, near Meåso, in Norway. There



Church at Wang: Inner Doorway, South Porch.

was a doorway to this church the internal archway of which is a trefol, and perfectly Saracenic in character and in the disposition of the ornament; but on close inspection the ornament is seen to be Scandinavian or Byzantine; antiquaries are not certain whether this doorway was of the tenth or of the thirteenth century, though they incline to believe it was of the later date, on account of the workmanship. It was carved by a Norwegian named Einard. The church was pulled down, but the materials were bought by King William the Fourth of Prussia, and put up at Bruckenberg in Prussia in 1844.

The Norsemen, who were pirates, which in those days was an honourable calling, made settlements on most of the coasts, and had kingdoms in Sicily and in France; in almost all the countries they ravaged while they were pagans, they saw and generally destroyed the churches, which were of

a much higher type and better execution than the temples, palaces, and houses they had at home.

Every architect, and most others, know some of the characteristic Norman ornaments, the zig-zag, the chevron, the cable, the patera, the lozenge, the dog-tooth, the billet, and the meander. One class of ornament is probably native, the imitation of the heads of birds and beasts of prey, that were probably nailed round their own doorways. One very pretty ornament is, too, occasionally found, semi-circles laid over a roll moulding; these, with barbarous copies of Roman and Byzantine ornament, mostly made up the tale; but I think it is evident that they loved figure sculpture, as capitals, corbels, fonts, &c., are mostly covered with it. The figures of man and animals are of a rudeness surpassing antique Greek work. They appear to have loved ornament as well, and used it lavishly when they could afford it and could get it done. You see some of their buildings covered with blank arcades, with triangles, with squares, with intersecting circles, or semi-circles, and with scale work. The intersecting arches of the arcades gave plenty of examples of the broken arch, which we call the "pointed," and which subsequently made such a figure in Gothic, and which is supposed to have been got from the Saracens.

About 717 A.D. the Saracens crossed the Indus and took Multan. Before 833 Mohamed Ben Musa published the solution of quadratic equations that had been got by the Saracens from India, and the Saracens were then becoming deeply versed in geometry. We may be sure that such enlightened monarchs as the successors of Abd-el-Rahman, who were of the Ommeyad race, were sure to attract learned and scientific men to Spain. The Christian abbots had been teaching the arts and sciences during such times as they were at peace, so that there must have been some small knots of more or less learned men in Europe, ready to improve their knowledge and learning when and where they could. The architects had been trying to vault the naves of churches to prevent the total destruction of the edifices by fire. The doming of St. Mark's at Venice and St. Front at Périgueux in the eleventh century had shown the Westerns that this feat could be performed.

Besides the travels of the first Crusaders, a Christian kingdom had been started at Jerusalem in the very last year of the eleventh century that lasted for nearly a hundred years, which together with Antioch and other settlements, must have greatly increased the intercourse of the West with the East, and about the same time Abelard's philosophy (1079-1142 A.D.) had greatly influenced men's minds, and with the exception of the Crusades, the various savage tribes had settled down to permanent habitations. All these circumstances must have greatly enriched all the countries of the West, and have given time for study and for improvement, besides the joyousness and thankfulness of Christendom, after finding that the opening of the eleventh century did not bring in the destruction of the world.

Viollet-le-Duc attributes the domical form of the early vaulting to the ease of making the diagonal ribs semi-circles; but M. Corroyer, in his books on Romanesque and Gothic, attributes the domical vault to the imitation of the domes of St. Front and its neighbourhood—to its being cheaper to form a thin dome on ribs than to have a regular dome; and he also considers the square bay of the nave, corresponding to the two bays of each aisle, to be due to the same cause, viz., to the survival of the square for the dome. The French plan of laying the filling on the back of the ribs is, he says, "one of the marks of Gothic"; it may be a sign of it in France, but here the architects generally rabbetted the ribs, so that ribs and panels were all one mass.

When the church whose nave was so vaulted had aisles, all sorts of devices were used to abut these large vaults, either by half-barrel vaults to the triforium, or by vaulting the triforium and omitting the clearstory, or by what were practically flying buttresses under the roofs of the aisles; but as these schemes gave no proper clearstory, the flying buttresses were at last shown above the aisle roofs, as at the Cathedral of Soissons, built in the latter part of the twelfth century, and in the thirteenth century the buttresses and piers of the flying buttresses were mostly pinnacled, and thus gave that strikingly characteristic appearance to Gothic churches.

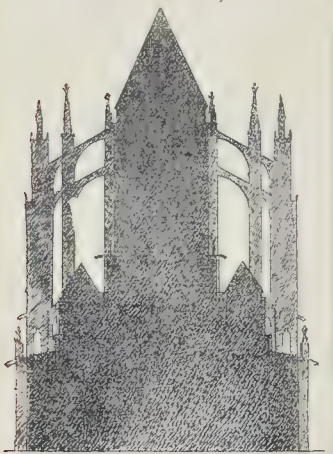
The concentration of weight and thrust at one point enabled all the wall between the piers to be cut away and turned into a picture gallery of stained glass. The narrow coupled windows with a piercing in the spandrel were grouped together so as

to fill the space between the buttresses, and the solid parts of the window-heads were cut away and formed into tracery. The logic, however, which concentrated everything outside, and swept away what carried nothing, took a different direction inside; here the weights were theoretically separated, and each part was carried by a separate member; the cross rib of the nave vault had its shaft carried down to the pavement in front of the main pier, the first arches of the nave arcades had also their shafts carried down at each side of the main pier, and the cross rib of the aisle vault also had its shaft at the back of the main pier, while the shafts from the diagonal and wall ribs of the nave vaulting ended on the capitals of the main piers. Eventually each diagonal rib of the nave and aisle vaults, and the second line of arches of the nave arcade, had their shafts brought to the ground. When the small shafts were of harder and different coloured stone and detached—for instance, at the angle piers of the transepts, they gave the pier the appearance of a gigantic still, as at Salisbury, and were as destitute of beauty as they were of use. At a very early date the architects had the larger shafts worked on the stones of the piers, as at Amiens and elsewhere; the strings of the stories mostly went round these shafts from the nave vaulting, and so bound them aesthetically to the other work.

It is very difficult to give the exact date of the first appearance of any feature, but I think there is small doubt that the cusp was borrowed from the Saracens. It is said the bicusped form was taken by them from the sepulchres made in the rocks of Persia, the whole foil being for the head, and the half ones for the shoulders of the deceased. The cusp was probably got from India; there are cusped openings at Martand and Pandratten in Cashmere, said to have been built before our era. Cusped forms are to be found in Abd-el-Rahman's Mosque at Cordova, begun to be built before 787 A.D.

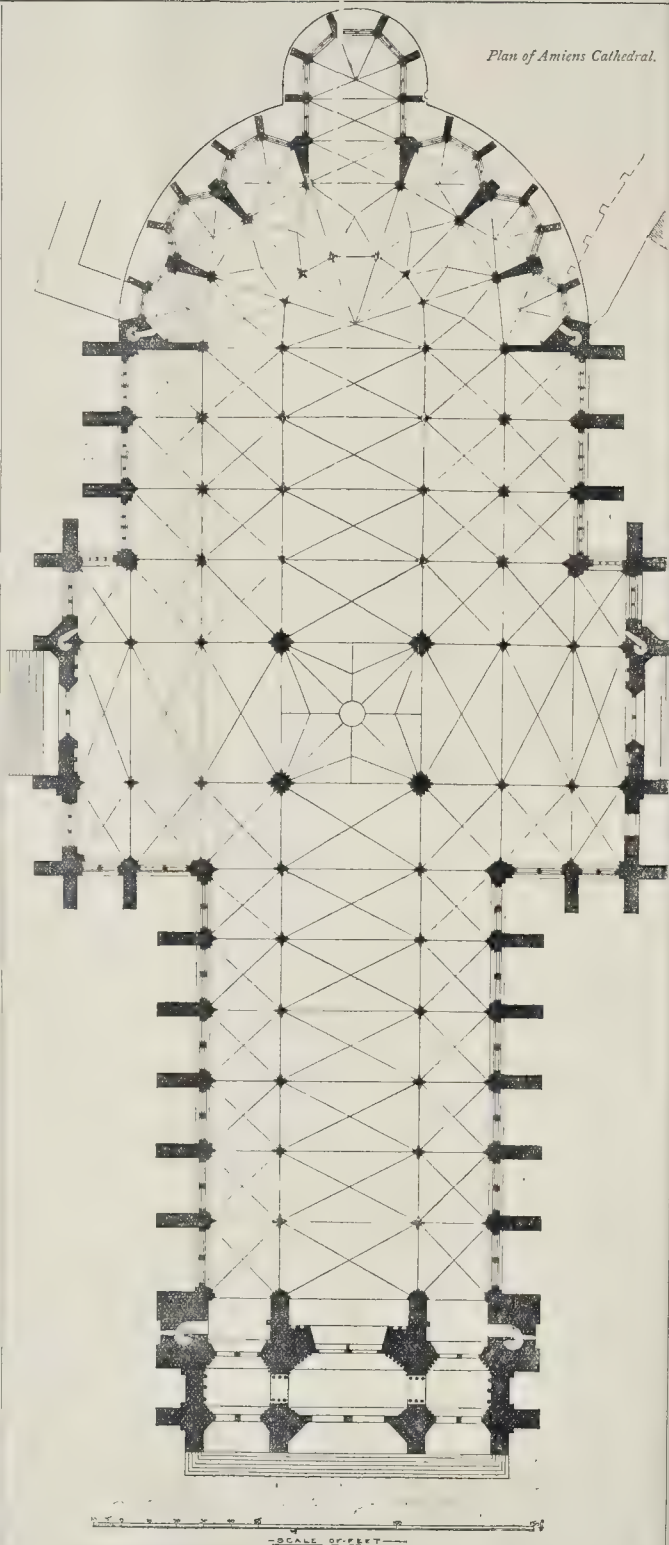
In Gothic the parts were ornamented as far as position went in the old way, and at the end of the Romanesque period, just as the architects were animated with new vigour, Romanesque ornament became very vigorous and almost beautiful, as may be seen at the north gateway of the west front of Rouen Cathedral, and the porches at Chartres. The sculptors, however, were not content with this; they first took to conventionalising nature in their own barbarous way, as may be seen in the sprawling ornament on the string at Amiens, and over here in the early English capitals, but they eventually took to copying nature.

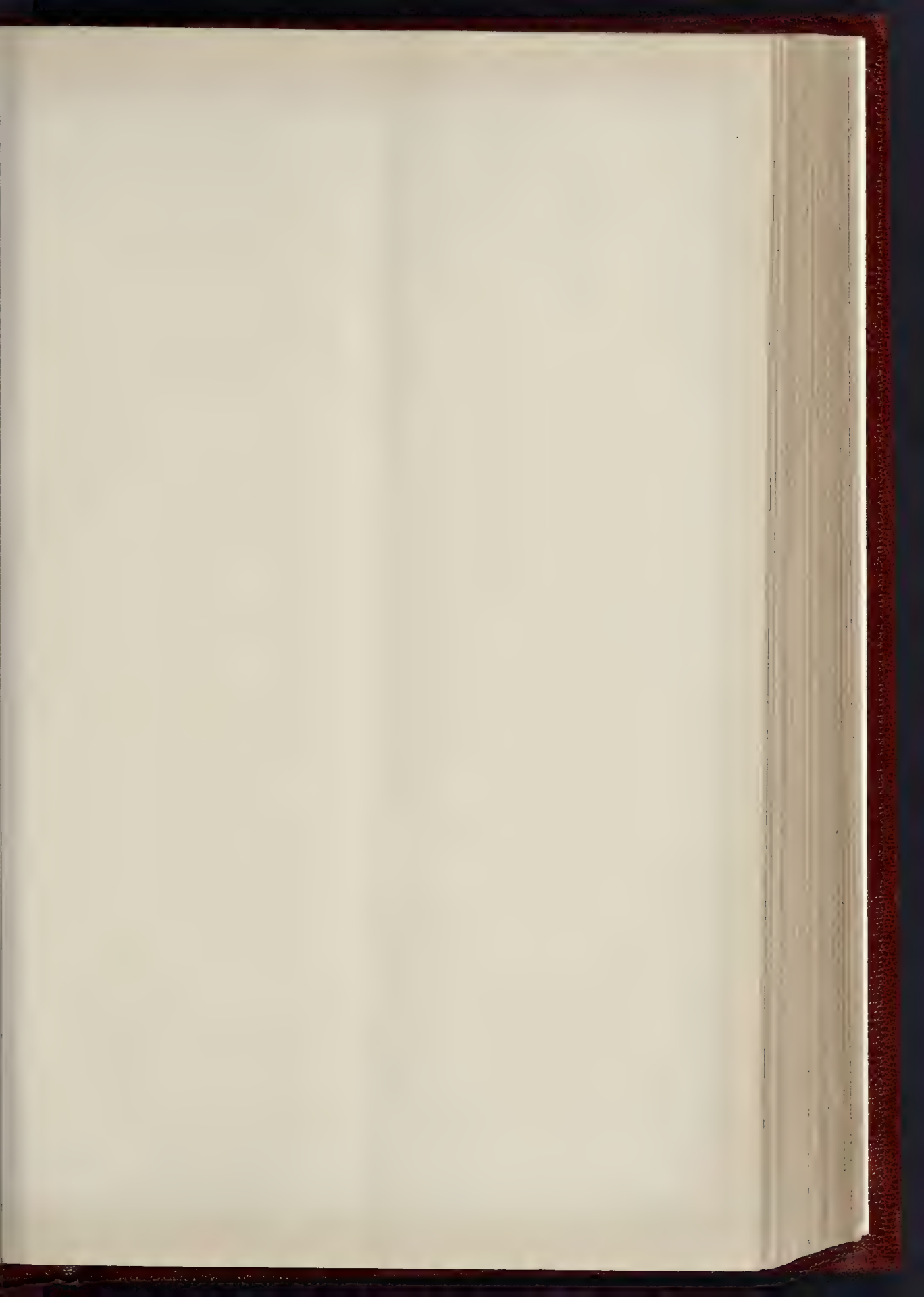
The fifteenth century Gothic architects had found out that, as a rule, all ornament looks best in shadow, and used various devices to get their ornament in shade; a favourite method was to project the balustrading of the triforium and put a member on the soffit, ornamented with pierced foliage. It is to be observed that the panathenaeon frieze of the Parthenon was always in shadow.



The whole exterior of a Gothic cathedral, except the west end and the ends of the transept, was dependent on the work it had to do for the inside; it was an elaborate shoring of the nave and aisles, by means of piers, buttresses, and

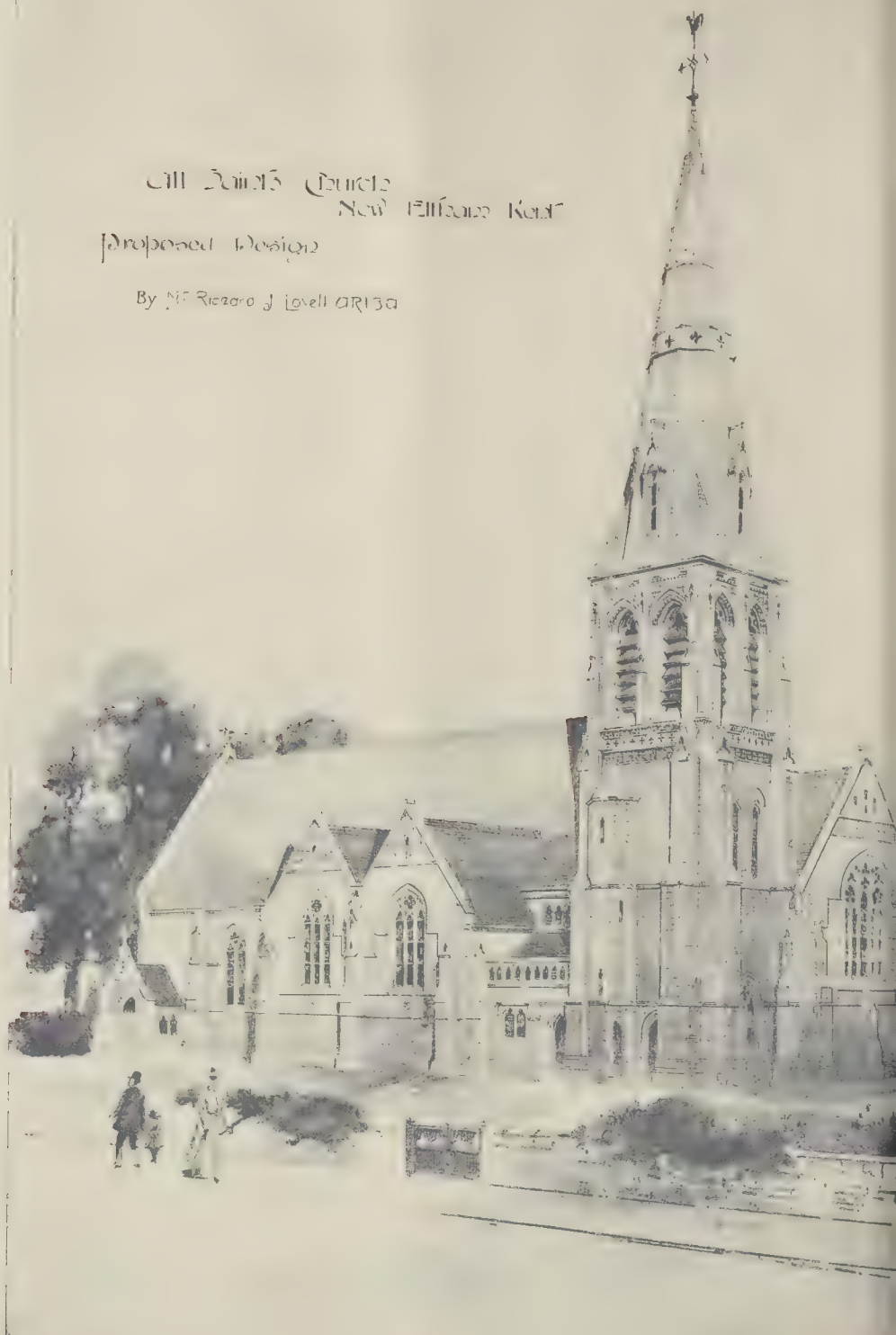
Plan of Amiens Cathedral.





St. John's Church
New Fitzroy Road
Proposed Design

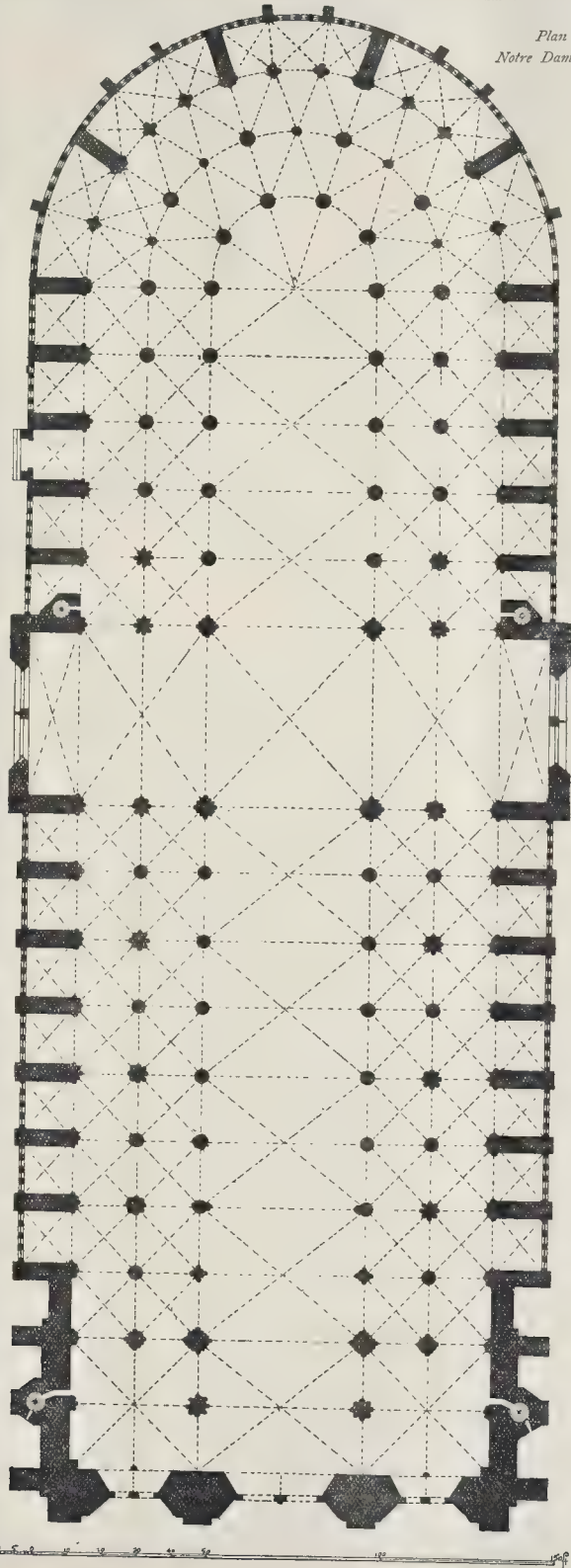
By Mr. Ricardo J. Lovell ARIBA





Interior View
Looking East

Plan of
Notre Dame, Paris.



flying buttresses; the walls in their ultimate development were windows with a few stone colonettes or moulded bars held up by irons, with arches thrown across from buttress to buttress to carry the roofs and balustrades. Do what they would to ornament these necessary forms, the forms themselves were practically the same; at dusk the outline of Beauvais looks like one of those Indian banyan forests of one original trunk with the branches taking root, and making other trees that Milton describes in "Paradise Lost" (lib. 9, lines 1102 to 1107):—

"But such as at this day to Indians known
In Malabar or Decan spreads her arms
Branching so broad and long, that in the ground
The bended twigs take root, and daughters grow
About the mother tree, a pillard shade
High overarch't, and echoing walks between;"

But with the west and the transept ends of cathedrals the architects had a free hand, and could do what they liked. In most cases the west fronts were flanked by two towers, had three doorways, and a window was wanted to throw a flood of light into the nave, and this was mostly a rose window. We see how, up to the very last, the original motive of three doorways and a window for the nave was worked up. At the west end of Chartres the two towers made no integral part of the composition; the centre part had three doorways slightly recessed, three windows over them, and the upper part of the nave was made into a square panel, with a rose window. The panel was crowned with a cornice, and had an arcade above to join the two towers and screen the gable.

At Soissons the centre doorway was much larger than the side doorways, and the side ones came through the towers; the rose window was inserted into a pointed arch, which left an awkward shaped piece between the circle and the point of the arch, while the crowning arcade ran across the towers, to make the west front one composition. Laon was much the same composition, only the deep doorways projected as a porch, like those to the transepts at Chartres, and the rose window was set in a round arch. At Notre Dame at Paris a new motive was introduced. A massive arcade, with flat trefoiled arches, ran right across the front, just over the heads of the doors, and this arcade was filled with sculptured effigies of kings, binding the whole composition together as with an iron band. The rose window has a circular arch, though the side couplets are contained in pointed ones, and the slender upper arcade runs round the towers. At Amiens the arcade of kings is kept higher, running over the low window arcade above the doors. Both these arcades are rendered weak by the archivolts being too highly enriched, and though the rose window is in a round frame, its bottom edge is cut off from sight by the arcade of kings. The depth of the doorways or porches is effective, though somewhat weakened by a fringed edge to the arches. Reims, though it has an artistic charm that disarms criticism, has portals that are hardly so effective as those of Amiens, while the west fronts of both Amiens and Reims are, in my opinion, inferior to the power, restrained force, and masterly composition of Notre Dame. The transept ends of Reims are, however, unique. The lines of figures under the balustrades before the gable ends have the dignified proportions of a range of Greek caryatides. Curiously enough, the architect, though making a triple arcade of semi-circles below the rose window, was led by the prevailing taste into putting his rose window within a broken arch. It is impossible that any architect possessed of the taste and mastery exhibited here could have done this from a sense of propriety; he did it because it was then fashionable, and has spoiled what otherwise might have been the great triumph of Medieval architecture. Never sacrifice your convictions to gain contemporary applause.

At Soissons and Chartres there are no gables over the doors of the west end, but at Paris there is the suggestion of one over the north door. At Amiens they exist, and also at the north and south porches of Chartres. At Reims these gables are not only much higher, but the centre gable runs as high as the middle of the rose window, and all the gables have their tympanums filled with sculpture. There are canopies over the figures of the centre one; those on the sharp rakes of the gable edges look like the icicle work of the Saracens. As the cathedrals and churches have their west ends later and later in date, so do these gables take greater prominence; at Rouen, the apex is above the top of the rose window, and at the little church of St. Mary de l'Épine, near Chalons-sur-Marne, built like a miniature cathedral, this gable of the doorway runs up to the bottom of the battlements. Thus in Gothic, as

in nature, features were gradually developed and ornamented.

As the architects, masons, and carpenters became more skilled in geometry and the art of stonecutting, and learned to what slightness they could cut stone to make it last their day, they took to making forms interpenetrate, and eventually got to love fine canopy work, and to use it as one of the principal motives of decoration. They began to find every plain space unbearable, and everything solid a sign of want of skill, and to suppose that every invention requiring knowledge and great skill must be proper. All expression of the functions of the parts was left out. An interpenetrating base was decided on showing where each part of this intellectual subdivision of the parts of the structure was carried down, and these parts were then carried up the nave and aisle walls, branching out for the arcades, running across the nave and aisles, as the cross rib of each, while parts of it branched off as diagonal ribs. Take a bunch of straight and lissom saplings, fit to the inward bulk a base of clay, and also fit a separate and different base to each external sapling, and squeeze the whole together, so that the salient parts of the bases alone remain on the outside. Let some of the saplings run up and be bent across for the cross rib, some diagonally for the diagonal ribs, and some sideways to make the arch mouldings of the arcades, and you have this sort of architecture, with no distinction between the parts that thrust and the parts that bear downright pressure, and no mark to show where one function ends and another begins, except at the base.

The following device was also adopted. The whole work was supposed to be completed, *i.e.*, the arches, piers, and vaults, and then plain cylinders, larger than the original piers, were supposed to have come down from Heaven, and pierced through it all, the arch mouldings dying on the face of the cylinders. At last every bit of plain surface was covered with thin arcading, or with wry tracery and skeleton gables pushed through strings and balustrades, the lean tops of these gables looking like the lath compasses of the mason, left there by mistake. Open tracery, so thin that it looks like those dissected leaves that are kept under glass cases, stand up in the air, or at least what is left of it.

The north spire of Strassburg looks like a huge ugly wire bird-cage for doodies or rocs, and has less resemblance to a work of fine art, than a pierced ivory Chinese ball has to a Greek gem.

It is perhaps unfortunate, but it is not surprising, that the Renaissance men who had just become acquainted with the literary and sculptured masterpieces of the ancient world, and who were at last free from moral and intellectual thralldom, should not only hate the architectural memorials of their bondage, but that their improved taste should revolt against these fretted surfaces, where there was not a blank space to rest the eye on, and should adore the grandeur and dignity of the Roman ruins.

The heads of that church that had thriven on the old system, of which the Gothic cathedrals and churches were the magnificent record, were in their hearts, in their thoughts, and in their tastes, pagans; and just then there was no idea to be represented, but earthly pomp, or liberty, that mostly took the form of the slave's saturnalia. So the Gothic architect, with all his skill and all his subsidiary workers, was, like Milton's—

"Headlong set,
With his industrious crew to build a hell."

Since then there has been no progress of the whole art; how could men, who in materials and construction did not know "a hawk from a handsaw," improve it? Even had they known what Roman construction was, which they did not, how could petty Italian states vie in funds with the mistress of the world?

Gwilt, in his ratio of voids to solids, gives us an epitome of the skill of the Renaissance constructors. Diocletian's Baths are 167, Notre Dame at Paris 140 (probably a greater ratio than Amiens), while St. Peter's is 261, *i.e.*, the Renaissance architects had about half the constructive skill of those of Notre Dame. The Renaissance Italians could not put themselves really into the place of the ancient Romans, but from architecture mostly falling into the hands of sculptors, they did a great deal to make the proportions of buildings much more graceful and subtle, and they improved outlines.

I think Baldassare Longhena's Church of St. Maria della Salute at Venice has been oftener painted than any other building in the world, and the Palazzo Pesaro by the same architect, in spite of its somewhat rococo details, strikes everyone,

architects included, as a much grander and more magnificent building than any of the Byzantine or Gothic palaces of Venice. Of course, I say nothing of the floral and figure sculpture; that is sculptor's work, but its immense superiority must be evident to everyone; the best Renaissance tombs and other comparatively small constructions are for shape, proportion, and ornamentation, simply divine. Only here, again, the mixed figure and floral work was not done because it really appealed to the people, but because the Romans were supposed to have liked it.

ARCHITECTURAL SOCIETIES.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—A well-attended meeting of this Association was held on Tuesday last, Mr. W. Hale, F.R.I.B.A., in the chair, when a paper was read by Mr. E. Lloyd Edwards, of Ruabon, on "Terra-cotta: Its Manufacture and Use." The author gave a detailed description of the various processes employed in the manufacture of terra-cotta, showing how the constituent parts of the clay are affected by the firing and manipulation, and how, to secure a good final result, careful thought as to jointing and due allowance for shrinkage during firing are as necessary as the skilful handling of the work in the various stages of manufacture. The author, in dealing with the quality of clay necessary to produce a good terra-cotta, said that the Ruabon clay contained of silica 63 parts, of alumina 20 parts, of oxide of iron 6½ parts, of water 5 parts, and other constituents 5½ parts, and pointed out that to be strong enough to resist the heat of the kilns sufficiently to become thoroughly hard and non-porous, a clay must contain a large proportion of silica, and that an ideal clay for the purpose must be strong enough, but without any excess of strength, which would cause it to twist in the burning. Having given some practical advice as to distinguishing the differences between good and bad clay and terra-cotta, and having shown how best to avoid delay in its manufacture, the author passed on to point out the most suitable lines upon which to base designs for terra-cotta work, and finally claimed for terra-cotta that in its comparative cost, capability of resisting the action of the atmosphere, beauty of colour and facility of manipulation it was superior to stone, especially for buildings in large cities with smoky and acid-laden atmospheres. Mr. C. E. Bateman proposed a hearty vote of thanks to Mr. Edwards for his paper. Mr. W. Henman seconded the vote of thanks, which was supported by Messrs. McConal, Peacock, Harrison, and Dove, and carried. Mr. Edwards replied to several points raised in the course of the discussion.


LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—A meeting of the Leeds and Yorkshire Architectural Society was held on Monday at the Law Institute, Albion-place, Leeds, when a lecture was delivered by Mr. H. V. Lanchester, A.R.I.B.A., entitled "Some Remarks on Colour Decoration." Mr. G. B. Bulmer presided. The lecturer gave a brief historical review of the principles of colouring observed in the decorative art of Egypt, Assyria, Greece, Rome, and of the later Venetian and Florentine schools; and then proceeded to deal with the decorative work of our own times, pleading for the adoption of a system of crafts rather than of trades, and so obtaining a more intimate association between the work of the architect and of the craftsman. A feature of English decoration, he said, was that it produced a "closed-in" effect, whilst the Italians, with their love of outdoor life, had always avoided such a sensation in their decorative work. The lecturer having discussed under different heads the various means adopted in this country to produce our decorative effects, their history and their possibilities, he proceeded to comment on the various materials employed in decorative work, and on their colour and characteristics. At the close a hearty vote of thanks was accorded to Mr. Lanchester.

SANITARY INSPECTORS' ASSOCIATION (MANCHESTER CENTRE).—The fourth annual dinner of the members of this Association was held on Saturday evening last at the Grand Hotel, Manchester, Mr. James Maguire, Chairman of the Council, occupying the Chair. Representatives were present from Manchester, Salford, Liverpool, Sheffield, Swinton, Stalybridge, Aston-under-Lyne, Stockport, Ramsbottom, and other towns.

THE GOUPIE GALLERIES.—Messrs. Bousod, Valadon, & Co., have removed to larger galleries situate at No. 5, Regent-street, S.W., and No. 10, Charles-street, St. James's.

Illustrations.

THE PORCH, ADEL CHURCH.

 THE Church of Adel, near Leeds, is fairly well-known, and may be considered a typical example of small Norman church. It was founded about 1140 A.D., shortly before the neighbouring Abbey of Kirkstall, and has stood from that time to the present day with very little alteration. In plan it is very simple, consisting only of nave and chancel, with a small modern vestry on the north side of the chancel, and the porch here illustrated on the south of the nave. There is a very fine Norman chancel arch and a curious old font formed of a piscina of early Norman date on a modern base. Around the eaves runs a corbel table of grotesquely carved heads, a portion of which is shown in the illustration.

The church was carefully restored in 1877 by George Edmund Street, when the roof was raised to a steeper pitch, the vestry rebuilt, and new oak seating put in.

The church is close to the site of an old Roman station (Burgodunum) the outlines of which may still be traced, and from time to time fragments of urns, flint implements, querns, coins, stone coffins, &c., have been found, many of which are still preserved and in the care of the vicar. It is supposed that a church existed in the village previous to the Norman one, and some curious stones have been discovered in the foundations of the present building which may have belonged to the Saxon church. PERCY ROBINSON.

THE NEW FINNISH HOUSE OF PARLIAMENT.

THE question of a separate House of Parliament for the Finnish Estates has been before the National Assembly since 1863, but it was not until 1888 that the latter adopted the plans for the building which are illustrated in the present number. A competition for designs was invited, with the result that those of Herr Gustav Nyström, Helsingfors, a prominent Finnish architect and teacher at the Polytechnic Institute of Finland, were adopted.

The building was completed in the course of 1891, and has cost 50,000*l.*, to which must be added the cost of the site, viz., 20,000*l.*

The building contains on the ground floor muniment rooms and library, chamber for warming and ventilation, kitchen and domestic offices. On the first floor are the vestibule, committee room, shorthand office, and restaurant. On the second floor is the assembly chambers for the three Estates and offices connected therewith. On the third floor is the public gallery. The House of Parliament faces the new premises of the Bank of Finland, built by Herr Bohnstedt, architect, of Götah.

The great assembly-rooms contain seats for seventy-two representatives, and the smaller ones seats for fifty-two, whilst in the gallery there is accommodation for some 600 persons. The building is heated with steam and ventilated by an exhaust process. It is built of granite and brick, the exterior walls being stuccoed. The floors are of cement mosaic with marble, and the roof of galvanised iron and glass.

The style is sufficiently shown in the elevations, as far as regards the exterior. The interior is profusely ornamented with frescos.

Herr Nyström was also the architect for building the Finnish State Archives adjoining the House of Parliament.

Nos. 64 to 68, SOUTH AUDLEY-STREET, W.

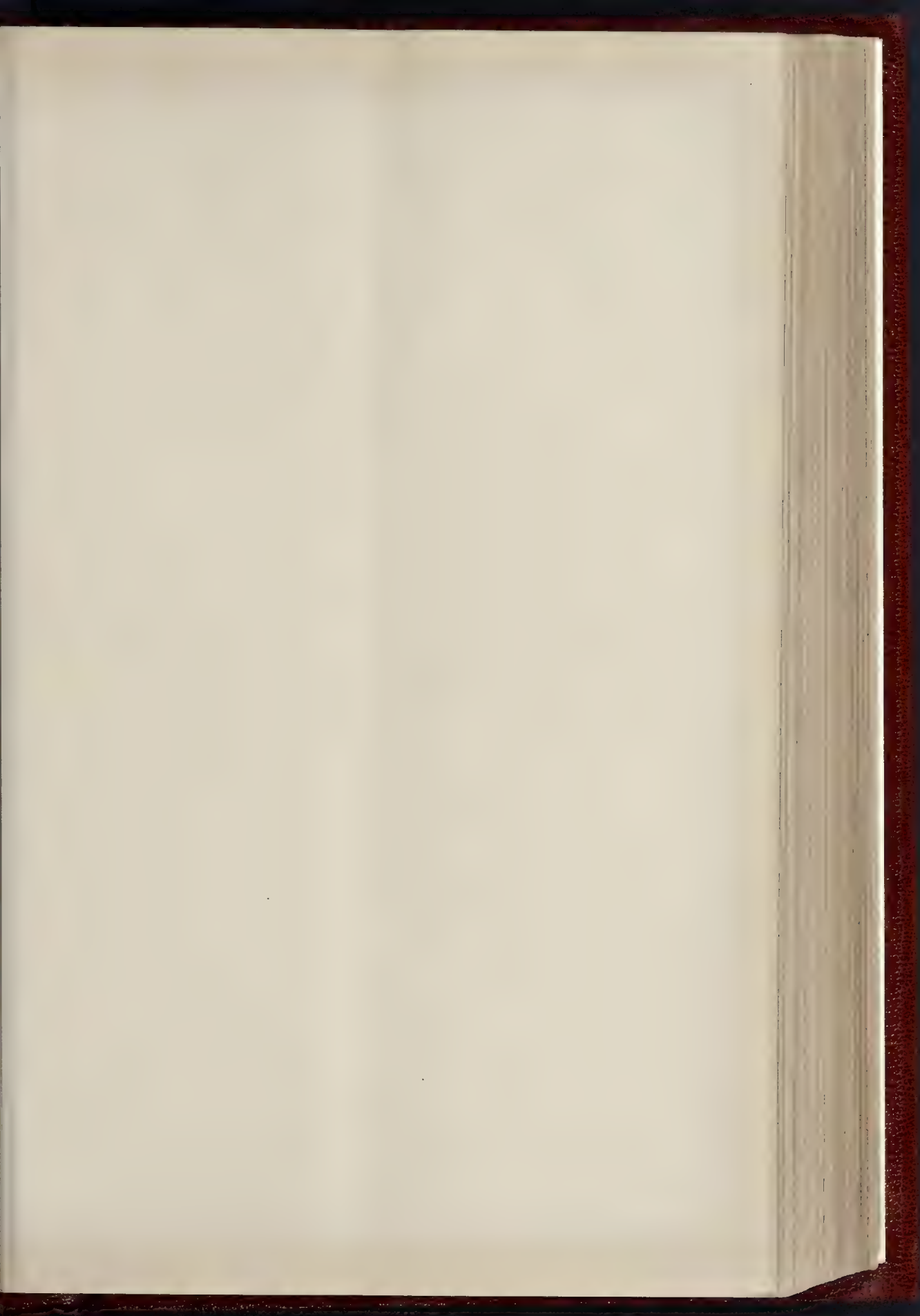
THESE buildings are situated on the west side of South Audley-street, Grosvenor-square, and will, when completed, extend from Aldford-street on the north to South-street on the south.

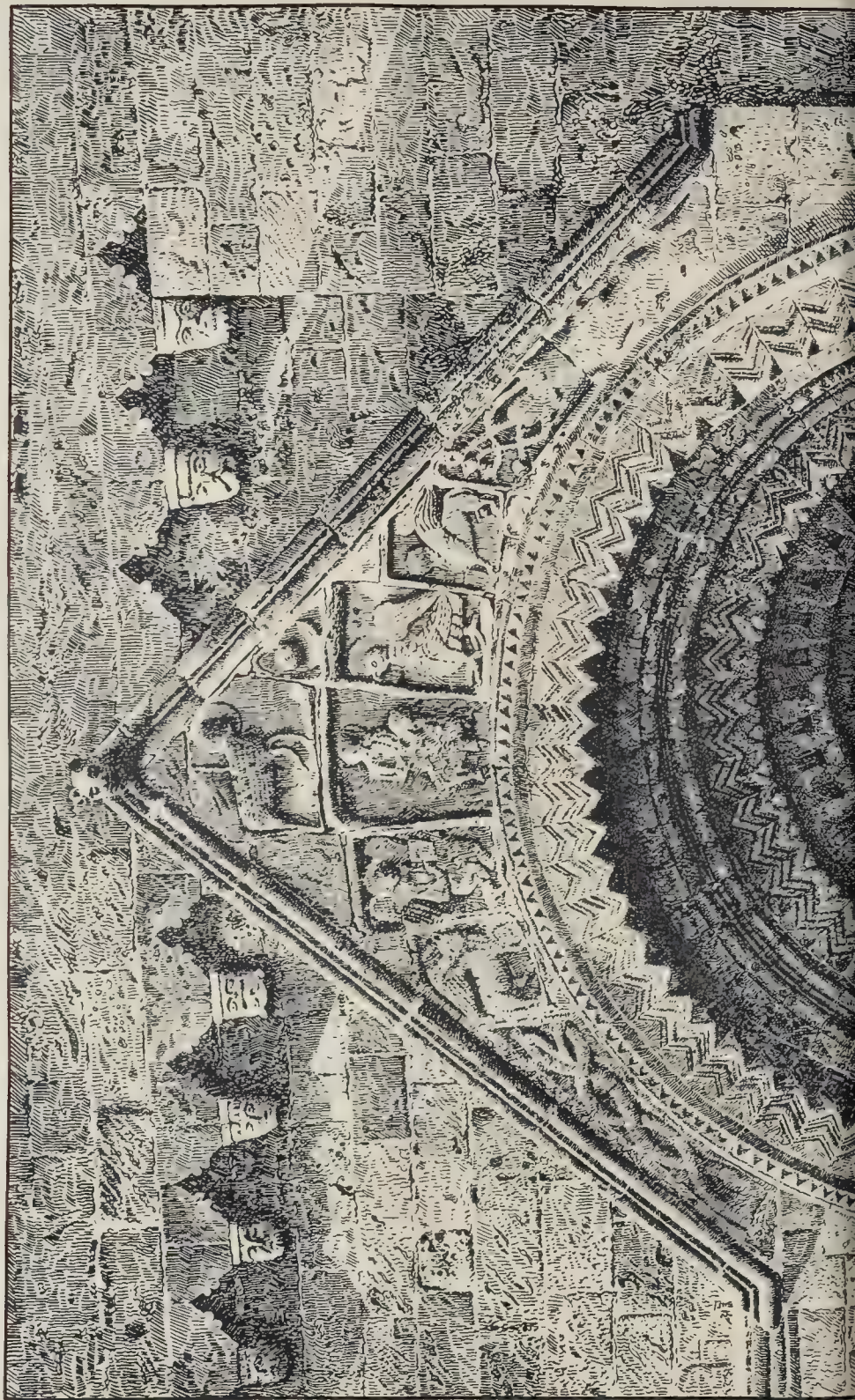
They form part of the re-building on the Duke of Westminster's property, and both return frontages have been set back, thus contributing to widen the approaches to Hyde Park from the centre of Mayfair.

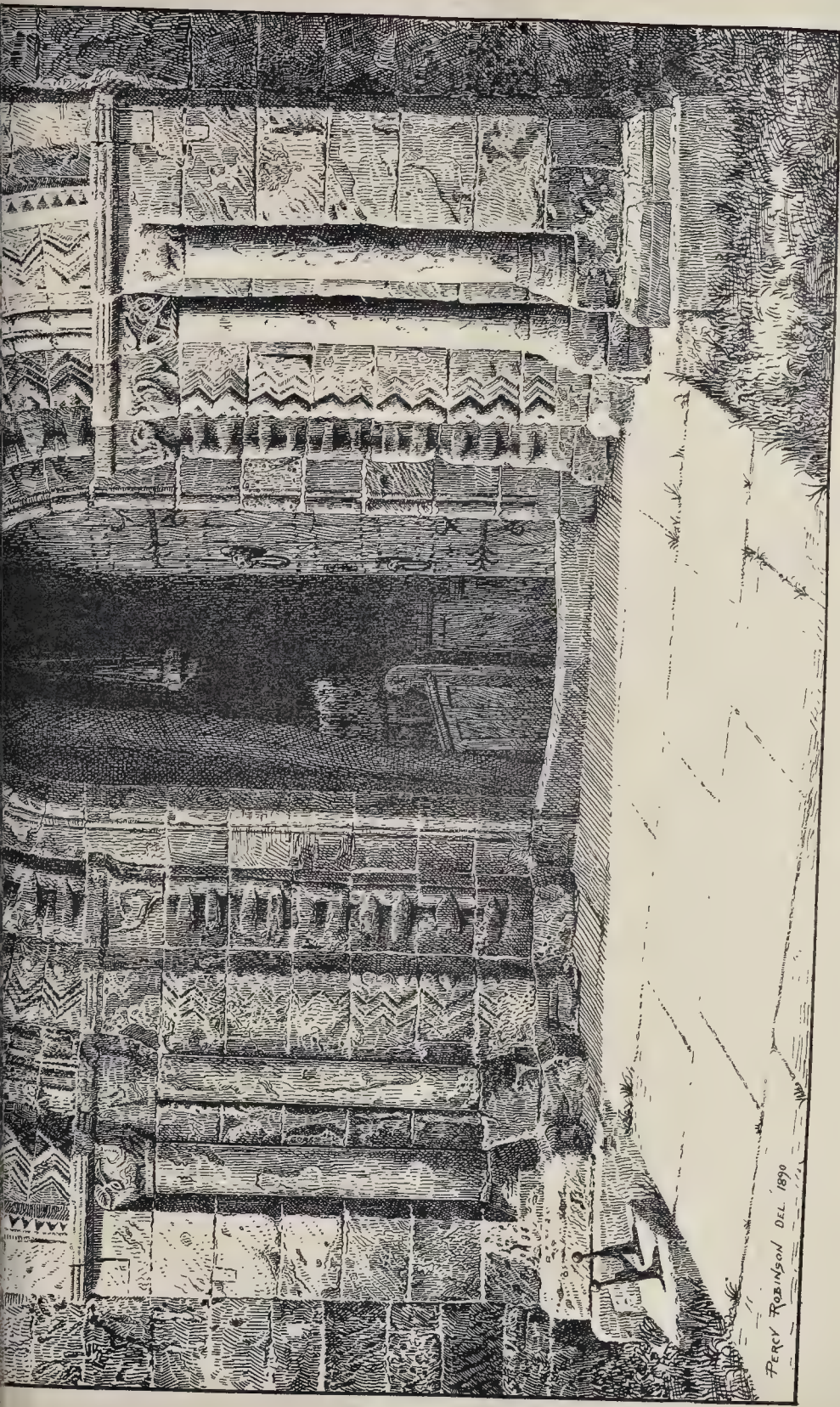
The premises have been erected by three different lessees for the purposes of their businesses on the ground floors and basements, and are designed with residential flats above on the first, second, third, and fourth floors.

No. 65, however, contains two maisonnettes only, occupying two floors to each house, with an internal staircase between the same.

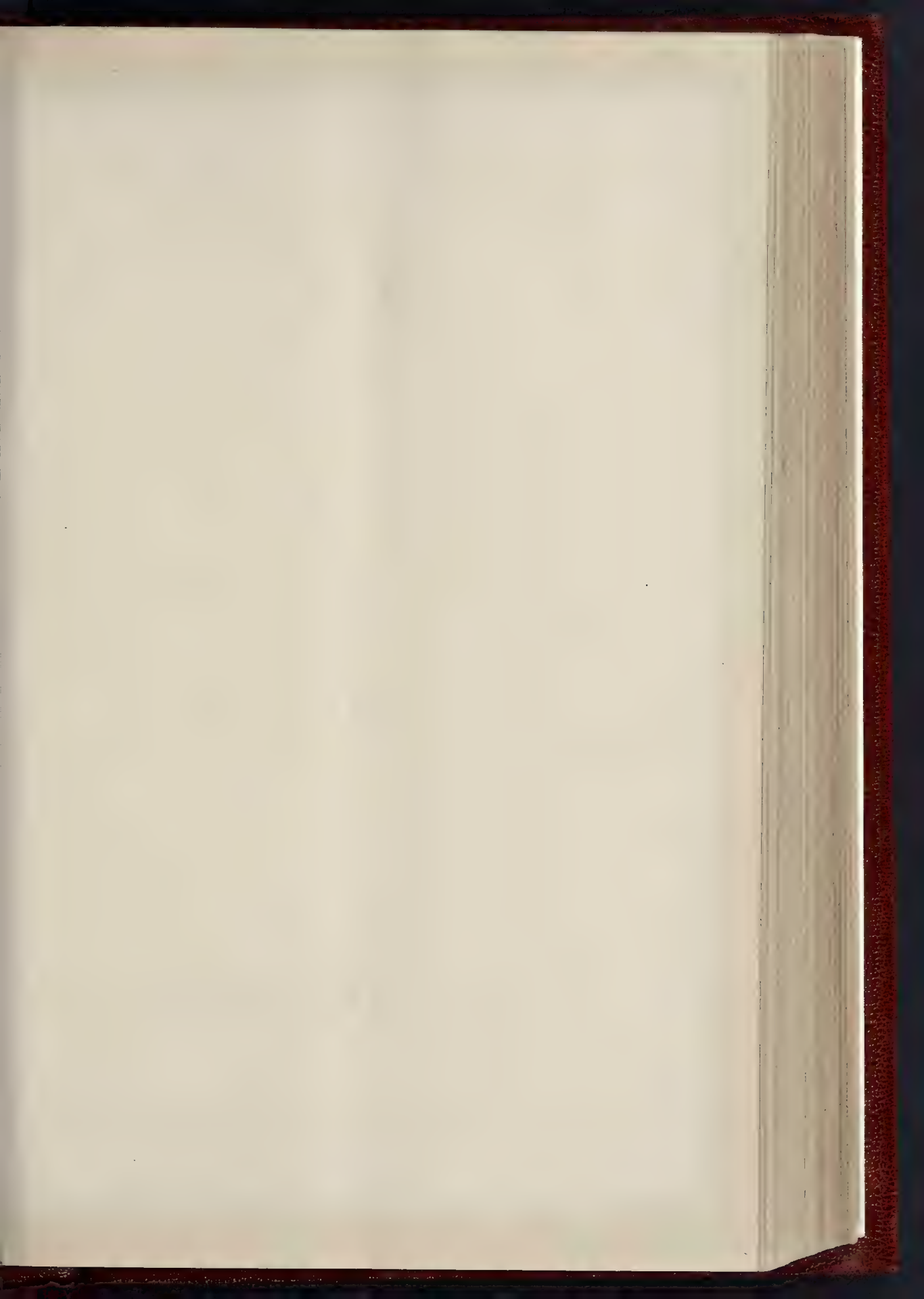
The buildings have been constructed with







PORCH, ADEL CHURCH.—DRAWN BY MR PERCY ROBINSON.

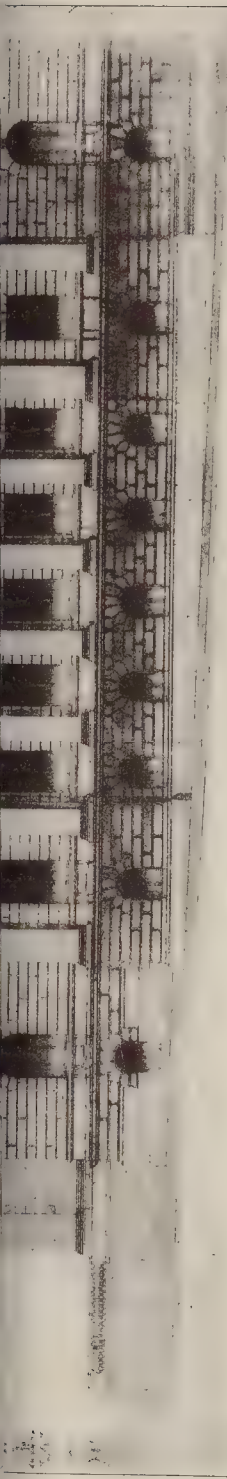


THE BUILDER, FEBRUARY 25, 1893.

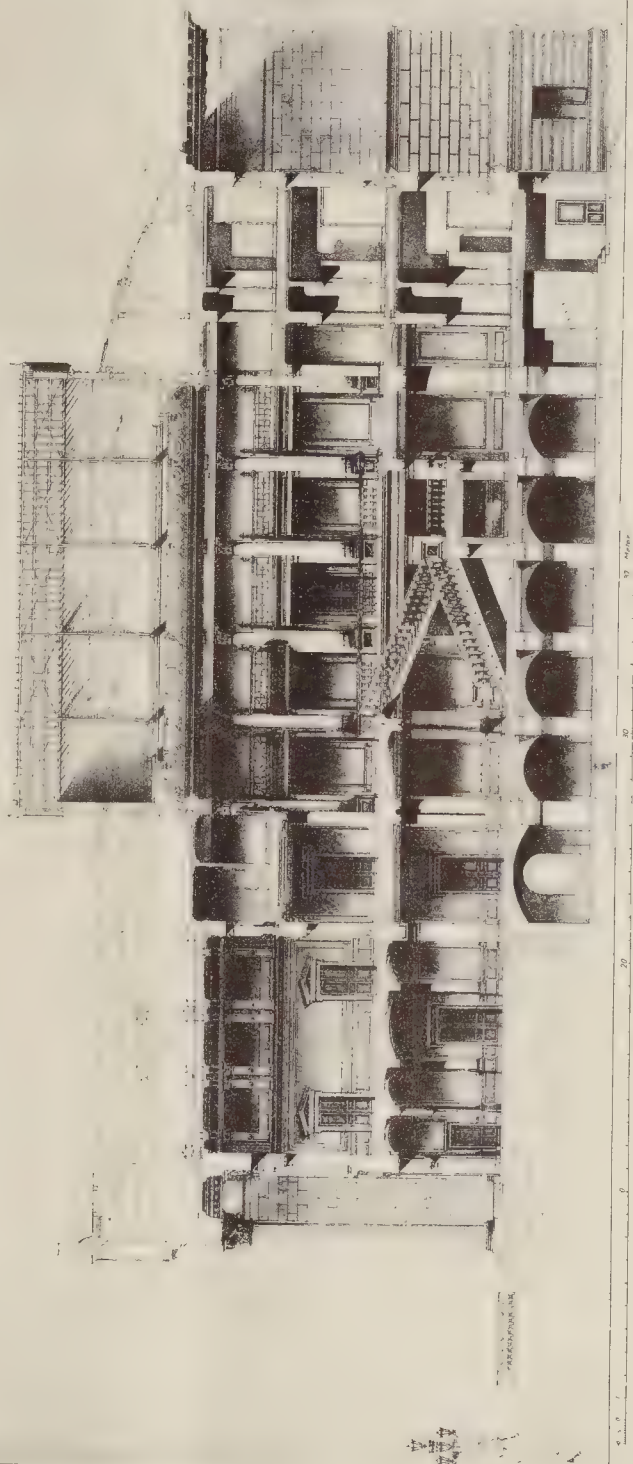


FRONT ELEVATION.





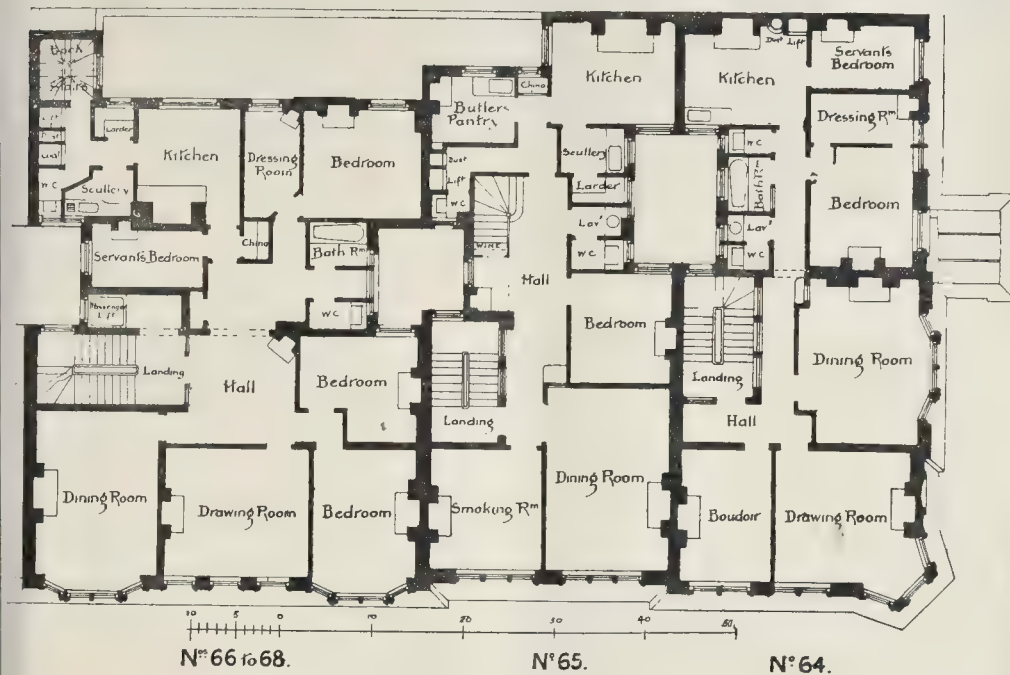
SIDE ELEVATION.



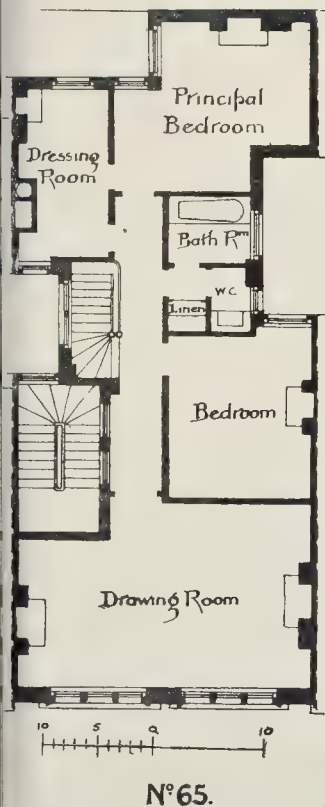
SECTION.

THE NEW HOUSE OF PARLIAMENT, FINLAND.—PROFESSOR GUSTAF NYSTRÖM, ARCHITECT

THE PHOTOGRAPH BY A. C. & S. EAST, HARDING STREET, FETTER LANE, E.C.



New Buildings, South Audley-street.—First Floor Plan.



N° 65.

New Buildings, South Audley-street.
Plan of one of the Upper Floors.

Portland stone to the top of the ground floor, with red bricks and pink terra-cotta above. They are provided with fireproof floors throughout, with stone staircases, built partly with ornamental tiling and marble.

The whole of the areas are built with white glazed bricks, the same materials being extensively used in the basements.

The flats have been fitted up with all modern improvements, and those in No. 68 are approached by an electric passenger lift.

The buildings are lighted throughout by electric light.

Messrs. Ashby Bros. have erected the premises from the designs and under the superintendence of Messrs. T. Chatfield Clarke & Son, architects, of London.

Mr. P. J. King has been the clerk of works.

DESIGN FOR ALL SAINT'S CHURCH, NEW ELTHAM, KENT.

This church is designed to seat 570 persons in a wide nave and transepts, at a cost of 8,000*l.*, including tower and spire.

The original drawing was in last year's Royal Academy exhibition.

The design was submitted in a limited competition by Mr. Richard J. Lovell, of London.

THE ROYAL COMMISSION ON METRO- POLITAN WATER SUPPLY.

The efficacy of sand filtration as carried out by the companies who draw supplies from the rivers will apparently be a very important factor in determining whether the river supplies shall continue to be used in the future, and also whether we shall draw upon them still more largely by storage in reservoirs if sites can be found. Much of the evidence at the later sittings* has borne upon this point, and especially that of Professor Ray Lankester, Dr. Klein, Dr. Percy Frankland, Professor William Crookes, and Dr. W. Odling. At the last sitting, however, Dr. Edward Frankland was examined upon a further statement which he had promised when he was examined at

an earlier stage of the inquiry. In this later statement he brings down the record of the experiments in which he was engaged to the end of January last; and he gives a kind of *résumé* of the question as introductory to the modified conclusions based upon the results of the latest investigations.

The importance of filtration, the witness pointed out, was first insisted upon in 1828; the first filter was used by the Chelsea Company in 1829; and an Act of 1852 required that water for domestic use, unless it were pumped from wells into covered reservoirs, should be "efficiently filtered." What was no doubt meant at that time was that the water should be "clear and transparent to the eye." In 1867 he reported to the Registrar-General that it was much to be regretted that the London waters were not more effectively filtered. The definition of efficient filtration which was thought to be sufficiently stringent in 1852, when the bacteriological effect of the process was entirely unknown, has now become obsolete, and ought (he says) to be amended. We now know that the possibly noxious matters in river water are not the mineral, or even organic, as distinguished from "organised" materials, but they are living microbes, and that the only efficient filtration, from a sanitary point of view, is that which removes the whole, or nearly the whole, of these microbes from the water. "The whole subject of the filtration and examination of potable water has been completely metamorphosed by the recent investigations in bacteriology," and especially the method of gelatine plate culture devised by Dr. Koch. London water has been submitted to this process since January, 1891, but up to May, 1892, the samples were drawn from the mains. From May last they had been obtained from water as it left the filters before entering the mains. This is obviously the most important moment in the history of the water, for the smaller the number of microbes found there, the less is the probability of the presence of pathogenic organisms. The non-pathogenic may multiply afterwards, but this is of no consequence if the pathogenic are not present initially.

Samples collected at standpipes in 1892 contained from twelve up to 2,088 microbes per cubic centimetre—numbers in most cases largely in excess of those in the samples taken as the water left the filters. The differences between these numbers and the numbers of microbes found in the water taken at the filters (set out in returns)

* For previous reports of the evidence given before this Commission, see the last two volumes of the *Builder*, as per references given in footnote on page 518 of the number for December 31, 1892; see also current volume, pp. 93, 131, ante.

show how considerable is the multiplication in the companies' service reservoirs and mains. Since May, 1892, Dr. Frankland has submitted to bacterial examination samples of raw unfiltered water, and of filtered water taken at the same times. He has also examined occasionally the water, pumped by the Southwark Company from the gravel flanking the Thames (as already described in the course of the inquiry). He has undertaken this heavy additional work for one year at the request and expense of the associated companies, who have unreservedly placed their plant at his disposal for the purpose, and have afforded him every facility for carrying on the inquiry.

A table gives, for the months May to January, the temperature of the waters, and the numbers of microbes per cubic centimetre, with a column showing the mean of these numbers. The following is the "mean" column:—

THAMES.	Microbes per c.c.
Unfiltered water	3,497
Chelsea	9
West Middlesex	16
Southwark	180
" gravel water	82
Grand Junction	53
Lambeth	70
LEA.	
Unfiltered, New River Cut	4,602
New River	28
Unfiltered, East London intake	10,557
East London	31
DEEP WELLS.	
Kent	5

These observations have not been continued long enough to permit of any safe conclusions being drawn from them. As far as they go they indicate:—

1. That the water in the gravel flanking the Thames is, bacterially, of enormously better quality than that of the adjacent river. Thus, bacterially as well as chemically, filtration or percolation through gravel is immensely more efficient for the purification of water than mere flow for scores of miles in a river.

2. That it is possible, by careful filtration, so to arrest microbes and their spores as to transform the raw Thames and Lea waters into a beverage which, bacterially, is but little inferior to that from deep wells and the chalk.

3. That the number of microbes in the raw river waters is inversely proportional to the temperature; the number increasing enormously when the freezing-point is reached. The Thames water at Hampton contained 2,421 per c.c. in August, and 8,210 in January last. The East London intake contained 1,316 in August, and 56,150 in January.

4. That the number of microbes in the filtered water is, on the average, inversely proportional to the length of time during which the raw river water has been stored. The Chelsea Company, with a storage capacity of 14½ days' supply, delivered into its mains water containing on the average only 7 microbes per c.c.; the Southwark, with 1½ days' storage, supplied water containing 125 per c.c., or, omitting one abnormal sample, 70 per c.c. The East London, with 13½ days' storage, 27 per c.c., or, omitting one abnormal sample, 12 per c.c.

5. Other things being equal, those companies which employ the thickest stratum of sand in their filters also appear to deliver to their pumps water containing fewest microbes. Thus the Chelsea Company delivered better water than the East London Company. The following shows the storage and filtration of the companies:—

		Thickness of sand in filters.	
		Days' storage.	Maximum. Minimum.
		ft. in.	ft. in.
Chelsea	14½	4 6	3 6
West Middlesex	7½	3 3	2 6
Southwark	1½	3 0	1 6
Grand Junction	3½	2 0	1 3
Lambeth	6½	3 0	2 6
New River	5½	2 3	1 5
East London	13½	2 0	1 4

6. Of all the conditions affecting bacterial, quality rate of filtration might be expected to be the most important; but it appears that slowness of filtration will not compensate for deficient storage capacity. The Southwark Company filters more slowly than the Chelsea; yet the microbes in its filtered water are ten times more numerous. The Grand Junction Company filters at nearly twice the rate of the Southwark Company, but the former have about twice the storage capacity, and their filters deliver water containing less than half as many microbes. These figures in the above return are furnished

by the companies, and it may be a question how far they can be trusted for such a comparison.

7. The following table is given to illustrate the effect of the cleaning of the filters. The first column shows the area of filter-beds cleaned annually for each million gallons filtered daily; the second the average number of microbes per c.c.; and the third the average chemical purity during 1892, as shown by the proportional amount of organic elements:—

	Acres.	Microbes.	Organic Elements.
Chelsea	2.8	9	3.2
West Middlesex	6.2	16	3.5
Southwark	5.3	180	3.4
Grand Junction	6.0	63	3.5
Lambeth	4.5	70	3.5
New River	6.0	28	2.0
East London	5.8	31	3.0

According to this table, of the companies drawing from the Thames, the Chelsea, which cleans its filters less frequently, delivers the best water, both as regards bacteria and chemical purity; but it has by far the largest storage capacity, and uses by far the thickest stratum of sand. The average bacterial purity of the West Middlesex water is four times as great as that of the Grand Junction Company; but the latter's rate of filtration is 80 per cent. greater. The Southwark surpasses all but the Chelsea in chemical purity, but its bacterial purity is far less. The chemical purity of the Lambeth supply was exactly the same as that of the West Middlesex and Grand Junction, but its average bacterial purity was less, although it was more than twice as great as that of the Southwark Company. All these companies, except the Southwark, delivered throughout the year efficiently filtered water—water which appeared to the eye perfectly bright and clear. On one occasion the Southwark sent out water which was slightly turbid. The microbes in this water averaged 94 per cubic centimetre about the same time, and were very much fewer than at other times when the water was perfectly clear and transparent.

8. The transport of pathogenic microbes renders efficient filtration of the river waters supplied to the metropolis of the very greatest importance from a bacteriological point of view—a statement which has been enforced by every visitation of cholera. The importance of filtration as a safeguard against cholera is further emphasised by the statistics of the Hamburg outbreak last autumn. Dr. Koch wrote to witness that the behaviour of the cholera in Hamburg, supplied with unfiltered Elbe water, and in Altona, which had the river water filtered, proved the value of filtration. So important has filtration become in the light of recent bacteriological research that, in using for domestic purposes the water of rivers which receive either sewage or sewage effluents, he would recommend double filtration as a second line of defence against the invasion of pathogenic microbes. Experience shows that the best filtration plant may at times, especially in winter, pass an objectionable number of microbes. When filters were new or were not working satisfactorily, the second filtration would be desirable, to keep down the number of microbes. That double filtration is not impracticable is proved by the fact that the Grand Junction Company have already begun to carry it out on a very extensive scale. Of course gravel water would not need double filtration.

9. Examinations have not been continued long enough to suggest a standard of bacterial purity, but the Chelsea and West Middlesex Companies do not appear to have much difficulty in keeping below 50 microbes per cubic centimetre.

10. His investigations have not led to any completely decisive results as to the comparative efficiency of old and new filters.

The water from the gravel flanking the Thames, unless the neighbourhood of the pumping stations became populated, might be regarded as a practically permanent source of supply. "Filtration through 100 ft. of gravel is much more efficient in the purifying of water, both chemically and bacterially, than a flow of 100 miles in a river." After some observations on the power of oxygen to burn up or destroy organic matter, Dr. Frankland reports upon the resources of the Thames basin for the future water supply of London. He says there is no river basin in Great Britain in which there exists such an abundant supply of excellent water. It is in the Chalk, the Oolite, and the Lower Greensand, which are the best water-bearing strata in the kingdom.

The statement and evidence of Professor Ray Lankester bore directly upon subsidence by

storage. Professor Lankester had made experiments to discover the effect of the subsidence of mud and clay on the number of bacteria in suspension.

Experiments were made with three samples of one litre each of Oxford tap water. To two samples were added sterilised kaolin—25 grains in one case and 12 in the other—and the third sample was left untouched. In 15 hours there were found in suspension, in a cubic centimetre of water—(1) 1,200 colonies, (2) 2,790 colonies, (3) 7,040 colonies. Repetitions of the experiments yielded similar results, and showed that ½ of the bacteria present were carried down by the subsiding kaolin. Then river mud sterilised by heat was substituted for kaolin. In 20 hours were found 15,400 colonies, compared with 55,000 in a sample to which no such addition had been made. The addition of lime to river-water (Thames, Oxford,) produced a reduction to 280 compared with 5,000 colonies. The addition of alum gave none as against 15,130, and 8 as against 2,380.

A series of experiments were made on the multiplication of bacteria in water after removal from a natural source and after standing in a collecting bottle or laboratory jar. All statements as to the absolute number of bacteria present in water, says Professor Lankester, whether of one species or another, are liable to a most extraordinary source of fallacy, first pointed out by Mead Bolton. Unless the gelatine cultures are made instantaneously with the water as removed from its source, the number of bacteria present will be greatly over-estimated, since bacteria multiply in a sample removed from river or reservoir at an enormous rate. Hence the great variability in numbers of colonies detected in the same water on different occasions. Two samples were taken at the Ditton reservoirs of the Lambeth Company and examined at different periods up to twenty-eight days. One was a sample of water filtered by the company and the other a sample of unfiltered water; and the numbers of colonies per cubic centimetre found in each were as follows:—

	Filtered.	Unfiltered.
At the moment of removal	73	2,900
After twenty-four hours ...	690	3,304
" 2 days	Over a mill.	2,010
" 3 "	490,000	14,950
" 4 "	48,600	12,000
" 5 "	36,720	10,800
" 6 "	27,500	20,160
" 7 "	17,000	12,168
" 9 "	14,320	9,720
" 11 "	9,600	7,720
" 18 "	8,500	3,280
" 23 "	5,900	4,750
" 28 "	8,670	1,500
" 30 "	8,670	3,000

Corresponding experiments were made with samples of Oxford water, two of tap water and two of river water, with the following results:—

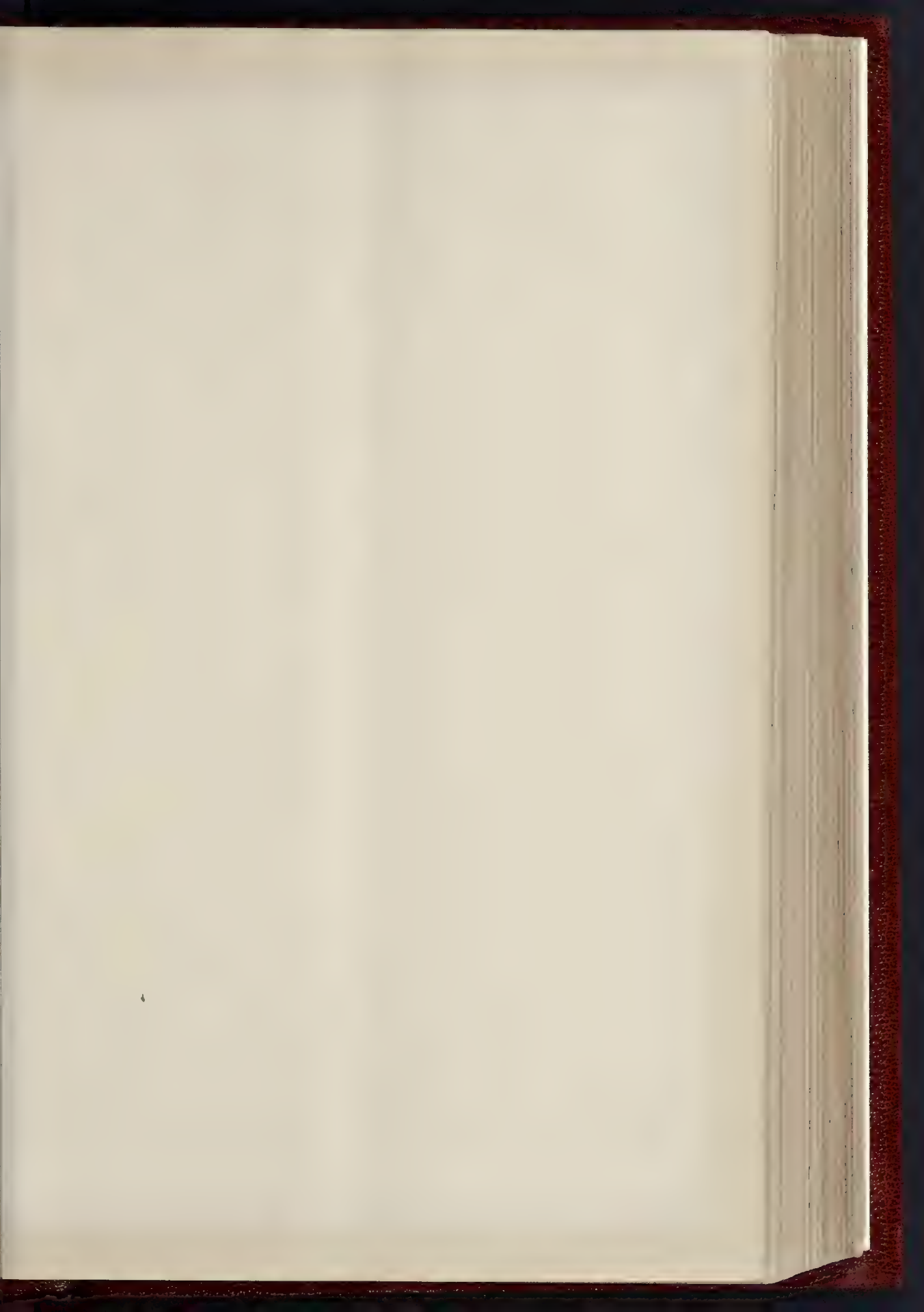
	At the moment	2,395	2,320	3,044	29,950
After 1 day ...	20,000	2,585	20,000	67,680	
" 2 days ...	Over a mill.	16,150	7,560	12,240	
" 3 "	"	27,040	6,720	17,000	
" 4 "	"	24,440	5,816	4,200	
" 6 "	72,900	60,620	—	4,860	
" 7 "	—	—	—	—	
" 8 "	15,360	—	—	9,900	
" 9 "	—	—	—	9,680	

These results show that there is a more rapid increase of bacteria in a comparatively pure filtered sample of water than in a sample already largely charged with bacteria. They also indicate that there is a maximum reached and subsequently a diminution in the number of bacteria in suspension. They tend to throw grave doubt on the value of all statements as to the actual number of colonies obtained by gelatine plate culture from samples of water.

Examinations were made of the Oxford sewage, as pumped on to the sewage farm, of the effluent, and of the river immediately above and below the effluent.

There were never found in the sewage-farm effluent species which belong characteristically to sewage, but only fluvial species. The typhoid bacillus was not detected in the sewage. There had been no cases of typhoid in the Oxford district from which the sewage was derived. The effluent contains neither more bacteria nor other kinds of bacteria than are to be found in other ditch streams which drain into the Thames. The following are the numbers of colonies per cubic centimetre found in the samples:—

	Sewage.	Effluent.	Above.	Below
12,000,000 ...	20,500	4,700	11,000	
1,688,000 ...	60,000	14,300	24,900	
1,688,000 ...	60,500	24,300	21,900	
528,000 ...	27,000	1,800	9,072	
2,486,000 ...	60,000	2,000	14,580	
1,080,000 ...	156,000	16,490	—	







Professor Lankester has made numerous experiments with typhoid evacuations and river water, for the purpose of ascertaining the behaviour of typhoid bacillus in water under varying conditions. He has succeeded in recognising, isolating and cultivating the typhoid bacillus, when a pure culture of it on agar: agar was diluted by water a thousand million fold. The defects of one individual passing into the Thames at Oxford would be immensely more diluted before reaching Hampton. But we have as yet no experiments which show the limit of dilution (if any) at which the typhoid bacillus becomes harmless. The typhoid bacillus has not been found, even in samples of the concentrated deposit removed from the filters at Ditton during last summer. It has been found that *B anthracis* is attacked and destroyed by other bacteria when cultivated with them in pure cultures. It is possible—indeed, not improbable—that one or more species may be discovered which are injurious to, or destructive of, *bacillus typhosus*.

Experiments are being made with typhoid bacillus placed in a large volume of water, kept in constant flow by a pump, so as to imitate as far as possible the conditions of the flowing river.

COMPETITIONS.

COUNTY OFFICES, WAKEFIELD.—On the 15th inst., twenty-eight sets of designs were received at the offices of the West Riding County Council at Wakefield for the buildings proposed to be erected in that city for the use of the Council. The designs, says the *Leeds Mercury*, "include almost every style of architecture, and several of them are very elaborate and beautiful. It is apparent at a glance that the numerous plans have entailed a vast amount of time and care, and the work of selecting the most suitable will not be an easy task. Probably the final decision will not be known until the meeting of the Council in April."

LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday afternoon at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

Markets.—The greater part of the sitting of the Council was taken up by the consideration of a report of the Public Control Committee on Markets. It appeared that on December 22, 1891, the Council referred to the Committee the consideration of all questions and the conduct of all inquiries relating to markets in London, and subsequently from time to time made other special references bearing upon the general question. Having considered these references the Committee submitted a long and interesting report on the question, concluding with a number of recommendations, which were as follows:—

1. **Market Authority.**—That it is desirable that a market authority for the County of London should be created, and that the London County Council should be such market authority.

2. **Powers of Market Authority.**—That to the Council, as that market authority, should be given the sole right to establish additional markets in the county, subject to any existing market rights which are fully established and properly exercised.

3. **City Markets.**—That it appears undesirable to include in our recommendations existing markets owned and controlled by the Corporation of the City of London, as these markets are excluded from the Council's statutory inquiry, and as they will inevitably form part of the larger question of the united government of London.

4. **Other Existing Markets.**—That the Council, as the market authority for London, should be empowered to compulsorily acquire other existing markets in the county as well as market property and market rights, where it is considered desirable in the public interest to do so.

5. **Compensation.**—That the value of market right cannot properly be separated from the amount realised by the proper and lawful exercise of these rights, nor from the property of the market in respect of which such right exists; and that any Bill dealing with the subject should therefore provide that, falling agreement, questions of compensation should be settled by arbitrators instructed to value the property, the rights and the profits, as forming inseparable parts of the market, and as therefore having one value only. That the arbitrators should also be instructed in valuing the market profits to exclude all tolls or other receipts which were *ultra vires* to the market rights, and which could not therefore have been enforced.

6. **Removal of Markets.**—That although experience has proved that successful markets must grow, and cannot be made, we believe it practicable under adequate powers to remove an existing market to a more convenient site, as was done in the case of the old Cattle Market at Smithfield.

7. **Market Improvements.**—That the Council should be given either to remove existing markets, or to enlarge and improve them and their approaches, with power to acquire property compulsorily and carry out necessary works.

8. **Retail Markets.**—That almost the only retail markets in London are those unauthorised markets which are held in the streets chiefly by costermongers; that in many cases these street markets obstruct traffic and are nuisances; that they entail inconvenience and hardship on seller and buyer; and that the question of making proper provision for them is becoming daily more urgent.

9. That the method of providing for existing street markets which gives the surest promise of success is by the construction of suitable market buildings on the sites of the existing markets, and, where thought desirable, in conjunction with local street improvements or the erection of artisans' dwellings in the manner described in this report.

10. That it is desirable at first only to construct one or two of such retail markets experimentally, and that the necessary general powers for compulsorily acquiring property and for constructing and maintaining new markets should be sought by the Council.

11. That the market authority be empowered to prohibit or regulate street stalls and to require the holders of such stalls to be registered or licensed.

12. **Parliamentary Powers.**—That it be referred to the Parliamentary Committee to consider and report on the means for giving effect to such of those recommendations as may be approved by the Council.

Mr. Fardell moved, and Mr. Westcott seconded, the following amendment to the first recommendation:—

"That it be an instruction to the Committee to communicate with the Corporation of the City of London, inviting them to appoint representatives to confer with the Public Control Committee of the Council upon the subject of markets with a view to the adoption of some joint action thereon, and that in the meanwhile the consideration of the report be postponed."

In the course of the discussion, it was announced that the Government had decided to appoint a small Royal Commission to consider the means of amalgamating the Corporation of London and the County Council, so as to unify the administration of London. The amendment was defeated on a division by 78 against 31. Recommendations 1 to 7 were then agreed to. Recommendation 8 was under discussion when the debate was adjourned.

Waterloo Bridge.—The Bridges Committee in their report stated that the road and footways of Waterloo Bridge were in an unsatisfactory condition, and should be raised. The carriage-way and footway surfaces could be raised six inches without increasing the dead load on the foundations of the piers and abutments to any appreciable extent. They suggested that that should be effected by taking up the existing granite sets, covering the surface of the existing concrete with seven inches of new concrete, and laying upon that wood-paving six inches deep. They proposed that the existing cast-iron channel should be taken up and relaid, and that the present granite footway paving and granite kerb should be removed and a new kerb and 3-in. Yorkshire footway paving laid. The estimated cost of the work was 7,000*l.*, and it would take about three months to complete, if the bridge were kept open for traffic. The Committee submitted a recommendation in favour of the proposed plans being carried out.

Mr. Roberts adversely criticised the proposals of the Committee, and an amendment he moved, declaring it to be inexpedient to endorse the recommendation, was carried by a large majority. After transacting other business, the Council adjourned.

Books.

Les Artistes Célèbres: Greuze, par CH. NORMAND; Les Van der Velde, par EMILE MICHEL; Charlet, par F. LHOMME; Raffet, par F. LHOMME, Paris: Allison et Cie.; 1892.

THESE form four more of the interesting series of short but largely illustrated biographies of artists, of which we have noticed a good many of the preceding volumes from time to time. M. Normand's volume on the Van der Velde, which is of no larger proportions than the others (each volume runs from about 120 to 130 pages), is necessarily much more condensed in proportion to the amount of subject than those which only deal with the life and work of one artist, while in treating of the Van der Velde family, the author had to consider the works of several painters in the same space allotted to his coadjutors for treating of one, and it may be added that the works of Wilhelm Van der Velde at least will hardly bear illustration in black and white on a small scale so well as those of artists who have dealt mainly with figures. Some of the slight studies for shipping scenes, however, reproduce very satisfactorily, and a conscientious attempt has been made to convey in the illustrations something of the largeness and breadth of effect of the famous painter of calm seas and stately ships; while the summary in one volume of the main facts about a large and important family of painters is a convenience for readers who wish to gain a general

* Mr. Roberts also incidentally strongly but very justly criticised a proposal appearing on the agenda in the name of Mr. Rhodes, for widening the bridge by carrying the footpaths on cantilevers. This proposal was, however, dropped.

knowledge of the works going under the name of the various Van der Velde, and to distinguish and compare them. Adrien Van der Velde's pastoral scenes and cattle naturally produce more satisfactorily as small illustrations than the works of his brother. Among them a reproduction from an original etching of a cow lying down foreshortened, with head to the spectator, is a notable example of forcible drawing; and it is interesting to see among the illustrations an example of an essay in sculpture by the artist; a figure of a cow couched on a pedestal, modelled with great power, and reproduced here from a photograph.

M. Normand defines Greuze as not the painter of the people, but of the "petite bourgeoisie," of which class he was himself by birth a member. His portrait, however, an etching after a painting by himself, has a certain air of distinction and refinement, to which perhaps the dress of the period and its associations contribute something. M. Normand seems to wish to connect Greuze with the social theory of which Rousseau and Diderot were the leaders, which regarded man as naturally good in disposition and only corrupted by social convention, and which therefore looked for all the best qualities in the lower classes of the people, who were supposed to be uncorrupted by false social pretence and fashion. M. Normand considers that Greuze exactly fell in with this philosophy of life; that he was the painter who created in France the "peinture morale." This is certainly not the light in which he is regarded in England, where he is best known by that class of pretty but not elevated female heads, in which it has even been remarked that he succeeded in showing that it was possible to give immodest expression and sentiment to figures clothed with perfect propriety of costume. But those who hold this notion of Greuze will find sufficient evidence in M. Normand's pages and the illustrations with which they are accompanied to convince them that this is a very one-sided view of him. He was largely engaged in painting pictures of family life, more German in sentiment (and even in the rather heavy style of the figures) than French. In fact there might be said to be two Greuzes, one the painter of humble life and the other the painter of pretty boudoir pictures. In both styles he is, to our thinking, tinged with an undeniable vulgarity of style and sentiment. That he could rise above this is evident from such a pretty ideal of a peasant girl as he has given us in "La Cruche Cassée," from the air of distinction which characterises his portrait of the "Marquise de Chauvelin," and from one or two nude studies reproduced in this volume, and which show incontestably his power of drawing. M. Normand's memoir is charmingly written, and well worth reading in a literary sense alone.

M. Lhomme has been congenially occupied with the memoirs of two military painters. About Charlet we do not care very much; a painter of undoubted powers, he verged far too much towards the style of a caricaturist, and his caricature is often unpleasantly coarse and ferocious, though many of his sketches are no doubt most remarkable of their kind. Raffet, his pupil, stands in a different category. In this country he is little known, and even in France, as his biographer remarks, he has never had a reputation equal to his merits, of which he was indeed only half aware himself. An exhibition of his works a year or two ago in Paris, however, duly noticed by our Paris correspondent, excited great enthusiasm, which will be understood and shared by every one who makes acquaintance with M. Lhomme's memoir and the numerous reproductions of Raffet's sketches which it contains. The son of a soldier, born in 1804, and passing his childhood amid military surroundings, Raffet seems to have imbibed into his very blood the military passion of the period, and the sense of the picturesque and striking in military parade, dress, and action. Though of course he never attained to anything like the position of Meissonier as an executant, it appears to us that in the spirit and realism of his battle scenes he is even beyond Meissonier in power.

In his various sketches of incidents in the career of Napoleon, whose figure must have been drawn from the memory of his observations in childhood, there is a wonderful power and dramatic force, with sometimes just an undercurrent of satire. We see the former in the extraordinary sketch, "L'Œil du Maître," of Napoleon looking with a lowering eye after the body of cavalry who are just charging; the whole of Napoleon's military genius and despotic character seem expressed in the figure. And we see

unquestionably the semi-satirical turn in the remarkable drawing called "L'Inspection," where the short unmistakable figure of the Emperor, hands behind his back and with his back to the spectator, walks solemnly along in front of the long line of the tall soldiers of the "Old Guard," drawn up for his inspection; a picture which also gives a whole summary of one aspect of Napoleon's character and position. And what a light is flashed on some of the pleasant realities of war in the picture of the unfortunate company standing in a morass in a storm of rain, over their ankles in water, with the command of the old sergeant, "Il est défendu de fumer, mais vous pouvez vous assoir." These are only specimens out of scores to be found among the illustrations (a large number of which are direct reproductions of original studies) of Raffet's extraordinary genius and vigour in illustrations of war subjects; and we counsel all readers who do not know his work to procure M. Lhomme's memoir of this remarkable artist, and make the acquaintance of a new genius, or one who is new to most English readers.

Correspondence.

To the Editor of THE BUILDER.

PITCH-PAPER FOR ROOFS.

SIR,—Does any reader know whether pitch-paper is now being used for flat or nearly flat roofs, the paper being laid in separate sheets, layer over layer, each layer being covered with tar or black varnish before the succeeding layer is pressed down upon it, a sufficient number of sheets being used to give the requisite thickness for a perfectly waterproof roof? Some fifteen or more years ago there was an article in a now defunct serial called the *Practical Magazine* in which, if my memory serves me, it was stated that such pitch-paper roofs had been tried for twenty years in Germany with perfect success.

FRANK SPENCE.

PASSAGE OF AIR.

SIR,—I do not know that there is any formula published for working the anemometer, but I trust that "Constant Reader" will find no difficulty with the following:—

Let V = the velocity in cubic ft. per minute, as read by the anemometer, and corrected.

A = the area of pipe or opening, in feet. Then $V \times A$ = cubic ft. per minute.

There will be a slight error on account of the compressibility of air, but for ventilating purposes this need not enter into the calculation.

For circular pipe $A = \frac{D^2}{4} \times \pi$
 $= D^2 \times 0.785$

D being diameter of pipe in feet.
 Then, for a 3-in. pipe (3 in. = 0.25 foot),
 $Q = V \times 0.25^2 \times 0.785$

When Q = quantity of air in cubic feet per minute, say, with a velocity of 120 ft. per minute as read (and corrected) by the anemometer.

Then $Q = 30 \times 0.25^2 \times 0.785$

Say = 1.5 cubic ft. per minute

= 1.5 \times 60 = 90 cubic ft. per hour.

For a 9-in. square shaft the working would be a little more simple; the fraction 0.785 would be left out of account.

It would then be

$Q = V \times 9'' \times 9'' = \text{cubic ft.}$

$= \frac{12 \times 12}{12 \times 12}$

$= V \times 0.75^2$

and taking V at 30 ft. as before

$Q = 30 \times 0.75 \times 0.75$

= 17 nearly.

Glasgow, ISAAC LOW, JUNR.

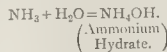
AMERICAN PRODUCTION OF BESSEMER STEEL IN 1892.—We learn from the *Bulletin* of the American Iron and Steel Association that the output of Bessemer steel ingots in the United States last year was the largest ever reported. The statistics published show that the production in 1892 was 4,160,072 tons, against 3,688,871 tons in 1890 (the largest output previously recorded), and 3,247,417 tons in 1891. Compared with 1890, the increase in the American production of Bessemer steel ingots last year was 472,101 tons, or 13 per cent.; but compared with 1891, it was 912,655 tons, or 28 per cent. The total production of Bessemer steel rails last year was 1,458,743 tons, against 1,239,393 tons in 1891, and 1,797,489 tons in 1890. While the American output of Bessemer steel rails in 1892 was thus 219,350 tons, or 17½ per cent. greater than in 1891, it was 338,746 tons, or 18½ per cent. less than in 1890.

The Student's Column.

CHEMISTRY VIII.

Ammonia NH₃.

AMMONIA is a chemical compound produced by the combination of the elements hydrogen and nitrogen. It is a colourless gas which is very soluble in water. The liquor ammoniac of commerce is a strong solution of the gas in water, usually possessing a specific gravity of .880 (water = 1.0), and containing about 36 per cent. of NH₃. This solution is known to chemists as ammonium hydrate. It is supposed to form a true chemical compound thus—



Ammonia is said to have derived its name from the fact that a compound of it was prepared in ancient times near the temple of Jupiter Ammon by heating camel's dung.

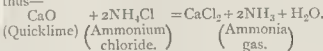
Ammonia was obtained by the ancient alchemists by the distillation of stags' horns, and is, therefore, referred to by them under the name of "spirits of hartshorn."

Guano, which is the dried dung of certain sea-fowl found chiefly on the coasts and islands of South America, owes its great manual value principally to the amount of ammonia it contains.

Ammonia and its compounds are now mostly prepared from the ammoniacal liquors (obtained by the distillation of coal) which form a by-product of gas manufacture.

On an experimental scale, ammonia is usually prepared by heating a mixture of ammonium chloride (sal ammoniac) and quicklime (calcium oxide).

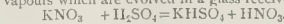
The reaction which takes place is expressed thus—



Ammonia possesses a characteristic odour, immediately turns red litmus paper to a blue colour, and is a powerful alkali, neutralising all acids to form ammonium salts.

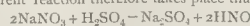
Nitric Acid. HNO₃.

On a small scale, nitric acid is most conveniently prepared by heating potassium or sodium nitrate with strong sulphuric acid in a hard glass retort, and condensing the nitric acid vapours which are evolved in a glass receiver.



(Potassium nitrate.)

On a large scale sodium nitrate, which is cheaper than potassium nitrate (nitre or saltpetre) is treated with sulphuric acid and heated to a higher temperature than is used when preparing the acid on a very small scale, and a slightly different reaction therefore takes place thus—



When pure, nitric acid is a colourless fuming liquid. It is a powerful oxidising agent, and the dilute acid rapidly dissolves many of the common metals. It combines with many metallic oxides, forming nitrates. When dropped upon the skin it stains it yellow. Nitrate of potash or nitre is largely used for the manufacture of gunpowder. Nitrate of soda, although cheaper, cannot be used for this purpose because it is deliquescent, i.e., it absorbs moisture from the air and becomes liquid. Large quantities of nitric acid are used for the manufacture of sulphuric acid, gun-cotton, nitroglycerine and other commercial products.

The following is the test usually applied for the detection of a nitrate in a solution.

A small quantity of the liquid to be tested is placed in a test tube, and an equal volume of strong sulphuric acid is cautiously added drop by drop and well mixed with it. The mixture, which will have become hot, is cooled and a little freshly prepared saturated solution of ferrous sulphate is carefully poured down the side of the test-tube. If any nitrate was present in the solution, a dark brown ring will be formed at the junction of the two liquids.

Experiments. Group 5.

1. Preparation of nitrogen: Place a small piece of phosphorus in a small porcelain crucible, float the crucible in a shallow basin of water (if necessary, support the crucible on a flat piece of cork), ignite the phosphorus, and immediately place over it an inverted wide glass jar. When the phosphorus has become extinguished and the contents of the jar quite cool, note that the water

risks and occupies about one-fifth of the content of the jar. The remaining four-fifths will be colourless nitrogen gas. Prove that nitrogen is not a supporter of combustion by plunging a lighted taper into it and noting that it is immediately extinguished. Note that the gas has no action upon test-paper, nor upon clear litmus water.

2. Preparation of the two most important compounds of nitrogen (a) ammonia, (b) nitric acid.

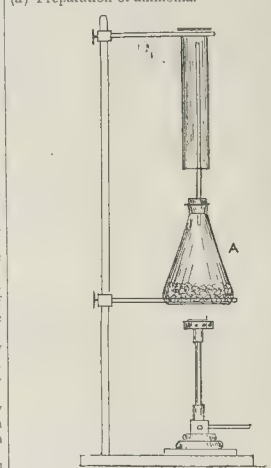


FIG. 9

Ammonia gas is lighter than air and is soluble in water. It is, therefore, collected shown in Fig. 9. Mix about equal weights powdered ammonium chloride and quicklime, place the mixture in flask A. Connect the flask with a cork and tube as shown in the figure, invert over the tube a dry gas jar. Heat the mixture very cautiously in order not to crack the flask. When the air has been expelled, ammonia gas will be driven into the gas jar, being lighter than air will be retained in it, and the jar is filled. In this manner as many jars as required may be filled.

When the first jar is filled, remove it from the stand, place the palm of the hand over its mouth and immerse the mouth of the inverted jar in a basin of water. Remove the hand and note that the water so rapidly absorbs the ammonia that a vacuum is produced and the water rises as to almost fill the jar. Observe also the peculiar odour of ammonia and its action on test-paper. Hold a glass rod which has been dipped in strong hydrochloric acid over a jar of the gas; notice the white fumes of ammonium chloride as at once formed.

(b) Preparation of nitric acid.

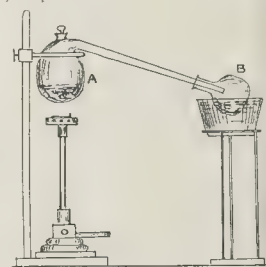


FIG. 10

In a small stoppered retort A (Fig. 10) place some powdered potassium nitrate (nitre or saltpetre) and add about an equal weight strong sulphuric acid, pouring it into the retort by means of a glass funnel. Remove the stopper, place the stopper in position, let the neck of the retort pass into a clean flask or receiver kept cool by immersion in a vessel of cold water as shown in the figure.

Gently heat the retort. At first, red fumes

(lower oxides of nitrogen) will pass over, but soon a liquid (probably colored yellow by the red gases) will be seen to condense in the neck of the retort and trickle down into the receiver. This liquid is nitric acid. Observe its acid properties and its action on blue litmus test-paper. Also its action upon copper, bronze coins, and other metals.

Symbol C. Carbon. Atomic Weight 12.
Carbon is a solid element which occurs in three distinct forms—

Example.	Specific Gravity.
1. Diamond	Crystalline 3/3 to 3/5
2. Graphite or Plumbago	Graphoidal 2/5 to 2/3
3. Charcoal	Amorphous 1/6 to 2/5

Each of these modifications of carbon, when burnt in excess of air or oxygen, produce carbon dioxide (CO₂).

The Diamond is the purest and densest form of carbon found. When burnt it leaves only a mere trace of ash. Attempts have been made to manufacture it artificially, but with the exception of forming a small quantity of dust resembling diamond dust, have been unsuccessful. Of late years, the diamond has been much used in drills for boring through all kinds of hard rock.

Graphite, Plumbago, or Black-Lead, occurs in beds in Cumberland and other districts, and is mined like other minerals. It is of a steel-grey colour and possesses a metallic lustre. It does not, of course, contain lead, but, like lead, leaves a grey streak when drawn across paper.

It is largely used for the manufacture of the so-called lead pencils, and also for polishing iron-work to prevent the iron from rusting.

Anthracite coal consists chiefly of carbon, and may be regarded as a natural form of amorphous carbon.

Charcoal is obtained from various substances containing considerable proportions of carbon, by calcining them in retorts from which air is excluded.

Animal charcoal is prepared by heating bones in this manner. It is found that charcoal possesses the property of destroying organic colouring matter, and also of deodorising putrefying vegetable and organic matter, and that for these purposes animal charcoal is superior to all other charcoals. Enormous quantities of animal charcoal are used for decolorising and purifying the brown, raw sugar solution.

Wood charcoal, when prepared from oak and beech, is used principally for fuel, whilst that obtained from willow and alder woods is mostly employed for the manufacture of gunpowder.

Wood charcoal possesses a greater power of absorbing gases than other charcoals. It will absorb 90 times its own volume of gaseous ammonia, 55 of sulphuretted hydrogen, and 35 of carbon dioxide.

It is probably on account of this absorbent power that charcoal, and especially wood charcoal, when freshly burnt, is such an excellent material for oxidising putrid gases, and thus rendering them harmless.

Lampblack is an amorphous form of carbon obtained by burning crude oils, turpentine, resin, &c., with a limited air supply, and subliming the smoke in chambers, the walls of which are covered with canvas. Lampblack is sometimes used as a pigment for paint.

Ivory black is obtained by carbonising waste ivory. It is employed in the preparation of ink for engraving, and occasionally as a pigment.

Gas carbon is the hard, dense deposit of carbon that cakes round the sides of the retort during the carbonisation of coal. It is formed in largest quantity when the heat and pressure in the retort is greatest. Owing to its density, gas carbon is much used for electrical purposes.

The most important commercial form of carbon is **coke**, the residual obtained by the distillation or carbonisation of coal.

OBITUARY.

MR. JOHN PETTIE, R.A.—We regret to announce that Mr. John Pettie, R.A., who had been ill for but a month, died at St. Leonards on Tuesday 14. He was born in Edinburgh in 1839, and early showed considerable artistic talent. He exhibited at the Royal Scottish Academy, and, going to London when twenty-two years old, speedily made a name, and was elected an R.A. when twenty-one. On the death of Sir Edwin Landseer in 1873, Mr. Pettie was elected to the vacant seat in the Academy, being, then, thirty-four years of age. Mr. Pettie's pictures were chiefly of a military character, or portraits.

LOCK, CATERICK CHURCH.—A new turret clock, showing the time on an external dial 5 ft. in diameter, has been put up at Caterick Church in Yorkshire, by Messrs. Potts & Sons, of Leeds.

GENERAL BUILDING NEWS.

ST. FRIDSWIDE'S MISSION-HOUSE, POPLAR.—This building has been erected at the cost of Miss Catherine Mary Phillimore, and fitted up in a very complete manner, for the accommodation of Clewer Sisters working in connection with the Christ Church (Oxford) Mission. The dwelling for the Sisterhood occupies three floors; the kitchen department and refectory being on the ground story, and the community room and oratory on the one-pair story. There are seven dormitories on the one-pair story, and five on the two-pair. A club-room and guild-room for women and girls are placed at the east-end of the buildings with internal communication, and an external entrance in Duff's Fields. There is a large waiting-room and soup-kitchen on the basement. Messrs. Smith & Sons, builders, of Norwood Junction, have carried out the superstructure. The architects are Messrs. John and S. Flint Clarkson, London. Mrs. Gladstone performed the ceremony of formally opening the building on the 11th inst.

NEW PARISH CHURCH FOR BALLYMACARRETT, BELFAST.—The rebuilding of Ballymacarrett Parish Church, which is dedicated to St. Patrick, is nearly completed, and the new church will shortly be opened. The building comprises arched nave and clerestory, aisles, transept, choir, organ-chamber, vestry, tower, and porches. The nave, when completed, will be 100 ft. long by 28 ft. wide, having north and south aisles, the width across the transepts being 98 ft. The chancel is 35 ft. long by 24 ft. wide, a portion of which is devoted to the choir, and beyond—eastward—rise the altar steps and holy table. An effort has been made to make the church also suitable for large congregations, and with this end in view galleries have been introduced into the transepts. The total accommodation, when the church is completed, will be for about 1,500 persons. The style of architecture adopted is Perpendicular. The internal woodwork generally is pitch-pine, the choir-stalls and chancel fittings being of oak. The church is heated by hot water. The architect is Mr. Samuel P. Close, of Belfast, and the work is being carried out by Messrs. Dixon & Campbell, also of Belfast.

RESTORATION OF ST. GERMAN'S CHURCH (CORNWALL).—According to the *Western Morning News* the restoration of the church of St. Germans is again to the front. About two years ago the towers and the fabric were put in thorough repair under Mr. Piers St. Aubyn, architect, at a cost of £2,000. The intention is to restore the whole church according to a uniform plan, doing it piece by piece as funds are forthcoming. Plans have been prepared by Mr. St. Aubyn for a roof, panelled throughout, and Mr. Lang, of Liskeard, has had the work entrusted to his care, at the cost of 1,700l. Norman clerestory windows have been discovered in the church during the last three months.

NEW CHURCH, BARKING.—The first portion of the new Church of St. Paul, Barking, has been completed, and on the 11th inst. it was consecrated by the Bishop of St. Albans. The new church has been built on a site in the Ripple-road. The designs were prepared by Sir A. Blomfield, and the style of the church is Early English. The exterior walls are of flint with red brick dressings. When the designs are completed the church will seat about 900 persons, and the total cost will reach over 6,000l. The portion completed comprises only the chancel and two bays of the nave, the cost being about 4,500l. The foundation stone was laid in June last by the Marchioness of Waterford. The builders were Messrs. Parmenter, of Baintree.

CHURCH ROOM, LITTLE IRCHESTER, NORTHAMPTON.—A church-room, comprising mission-hall, ante-room, and porch, has just been opened at Little Irchester. The walls are faced with Leicestershire pressed bricks, relieved with Bath-stone dressings. The roofs are covered with vitrified Broseley tiles, and surmounted by an octagonal bell-turret. Ventilation is provided by four fresh air inlets and ventilators in the ceiling. The room is lighted by two windows in each gable, and smaller ones on either side, the ante-room being lighted by a four-light circular-headed window. The walls are match-boarded, with moulded capping, to a height of 4 ft. 6 in. from the floor, and above this they are distempered in a pale green tint. The windows are all glazed with tinted muffled glass, and the floor is formed with wood blocks. The seating accommodation is for 60 persons. The plumber's work has been done by Mr. Ward, of Irchester, and the contractors are Messrs. T. & C. Berrill, of Irchester, who have carried out the work under the superintendence and from the designs of the architect, Mr. H. H. Packer.

BOARD SCHOOL, WILLINGTON QUAY, NORTH-UMBERLAND.—The new school which has been erected at Willington Quay for the Wallsend School Board was opened on the 20th inst. The Stephenson Memorial School, of which the new building is to constitute the junior department, was erected in 1859, and has been enlarged from time to time by the addition of class-rooms and an infants' school. The building just completed is to accommodate the scholars of the first and second standards, the Stephenson Memorial School retaining only the senior scholars. Accommodation is provided by the three departments, senior, junior, and infants, for considerably over 1,500 school places. The new

building consists of one large room with accommodation for 180 children, three class-rooms for 60 children each, and one for 40; it is built of brick, with stone dressings. The interior is bright and cheerful.

The large rooms are sub-divided by partitions, and the walls are lined with glazed brick bufs to a height of 4 ft. above the floor, which are covered with pitch-pine blocks laid on concrete by Messrs. Roger Lowe & Co., of Farnworth. The heating and ventilating arrangements, on the automatic system, have been carried out by Messrs. Ashwell & Nesbit, of Newcastle. Warmed fresh air is admitted into the building at various points. The foul air is extracted by an underground trunk, which communicates with an extraction shaft. This shaft is enclosed by a tower rising to a height of 50 ft. The caretaker's house is so placed as to command the playground; as does also the oriel window of the teachers' room, which is situated over one of the cloak-rooms. The plans and specifications, prepared by Mr. Wm. Hope, architect, North Shields, have been carried out by Mr. W. T. Weir, contractor, Howdon.

THE PROPOSED INFECTIOUS DISEASES HOSPITAL FOR LEITH.—Sketch plans of the infectious diseases hospital proposed to be erected for the burgh of Leith at East Pilton, Queensferry-road, having been approved by the sub-committee of the Town Council, have just been exhibited in the Council Chamber. In preparing the plans, says the *Scottishman*, the architect, Mr. Simpson, has kept in view the plans of cottage hospitals shown to the committee by the Board of Supervision, the South-Eastern Hospital, London, and the hospitals at Leamington and Newcastle-on-Tyne; and the floor, cubic space for each patient, and other details are stated to be carried out after due consideration of the recommendations of representatives of the Local Government Board, the Board of Supervision, and other gentlemen. In all there were sixteen plans exhibited, including those of the following buildings:—The ward blocks, disinfecting house, mortuary, discharging block, store for patients' clothing after it has been disinfected and washed, administrative block, washing-house and laundry, and gatekeeper's lodge and house. The plans show five wards, one of which, occupying a central position, is a probationary ward, placed a distance of fully 80 ft. from the others. Each ward is devised to give 12 ft. horizontal of wall space to each patient on both sides, and will be 26 ft. wide inside, with a height of ceiling of 13 ft. Each of the four wards is planned to contain 18 beds, and the probationary ward is designed for 10 beds. A duty room for the nurses is designed to overlook each of the wards, and it is proposed to heat the wards partly by open fireplaces and partly by low-pressure hot-water pipes, the furnace and boiler for the latter to be worked from the outside. As to the disinfecting house, it is to be an isolated building with a close partition in the centre, while the administrative block has been designed to provide for a medical officer, nurses, maids, and general servants. It is proposed to light the wards and apartments with gas, but should it be deemed advisable to have an installation of electric lighting, it could be done, it is reported, at little extra cost. The total estimated cost of the construction of the hospital is 24,693l. 11s. 4d. This estimate is exclusive of the cost of a main sewer and laying out the grounds.

NEW CHANCEL AT ST. ANNE'S CHURCH, BIRKENHEAD.—The Bishop of Chester (Dr. Jayne) consecrated, on the 11th inst., the additions to St. Anne's Church, Birkenhead, of a new chancel and organ loft, an altar, and a memorial window. The chancel has been increased in length by 20 ft., and on the south side of it an organ loft, 21 ft. by 19 ft., has been built. A new window has been constructed in place of the old one formerly existing. In the south wall of the sacrum a moulded and carved stone sedilia and credence table have been built. There is also a new altar of iron and copper, with moulded oak handrail. Two new oak clergy stalls have been provided. The improvements have been carried out to the plans and under the direction of Mr. Charles Aldridge, architect, Liverpool.

SANITARY AND ENGINEERING NEWS.

THE WATER SUPPLY OF PRESTON.—Colonel J. Ord Hasted, R.E., one of the Local Government Board inspectors, held an inquiry at the Preston Town Hall on the 10th inst. respecting an application made by the Preston Corporation under the Public Health Act for permission to borrow 95,000l. for new waterworks. The inspector, says the *Manchester Courier*, was informed by the Borough Treasurer that the expenditure of 95,000l. would in no way increase the price of water, as the Corporation were in the position of having a sufficient surplus to cover any extra expenses. The last loan on waterworks account was the sum of 40,000l. in 1875, and they now sought to borrow another 95,000l. for a much-needed improvement in the supply of water to the town. The Borough Engineer (Mr. H. Reah) submitted plans, and entered into the details of the proposed scheme. It was pointed out that the population of Preston was put at 109,038, but that the water supply of the town included a portion of Walton. At present the Corporation have three

reservoirs in the gathering ground of the Langden and Harenden Fells, just beyond Longridge, which have a total capacity of 253,000,000 gallons—the Spade Mill reservoir 110,000,000, the Alston reservoir 84,000,000, and the Grimsargh reservoir 59,000,000. For some time past there have been grave complaints by the ratepayers as to the inadequate pressure from the mains, which varies considerably. Under the Local Improvement Act of 1866 the Corporation have been restricted in respect of the Alston reservoir to the appropriation of half the gross volume of the water coming from the Langden and Harenden brooks, or not more than 6,500,000 gallons in 24 hours, and the daily consumption of the town is given at 3,250,000 gallons. The chief difficulty has been the lack of accommodation for storage purposes, and the inspector's attention was called to the fact that on wet and stormy days vast quantities of water coursing down the hill sides were allowed to pass away as waste. It is to remedy this evil and to increase the dimensions of the outlet pipes, that at Alston, which feeds the town, at present being only 10 in.—that the Corporation are now seeking powers to lay down a 30 in. main from the Grimsargh and Alston reservoirs to Acreage-lane, Preston, and the erection of a straining chamber at a total cost of 35,500 l.; and the construction of a new reservoir in the immediate neighbourhood of that at Alston, which will hold another 275,000,000 gallons, or more than double the reserve. This latter part of the work, with the diversion of the present Loud conduit and other minor operations is to cost the remaining 60,000 l. of the 95,500 l. proposed to be borrowed. The reason assigned for the laying of a 36 in. main is that the present main, which was laid in 1856, is only 26 in. in diameter, and is utterly inadequate to meet the requirements of a steadily growing population. At the present moment there is storage for two months' supply, and it is proposed to make it four months.

WATER SUPPLY, ABERCERNE.—At the meeting of the Abercarn Local Board of Health last week, Mr. J. W. B. Rooke, the Surveyor to the Board, presented a special report, dealing in detail with proposed improvements of the waterworks. The chief items were, the construction of a covered reservoir to hold 6,000,000 gallons, and laying new, 12 in., 9 in., and 6 in. mains over the whole area of the district, which includes Crumlin, Newbridge, Abercarn, and Cwmarn, together with the enlargement of the Crumlin covered reservoir, at a total cost of 12,000 l. The report was adopted, and the clerk was instructed to apply to the Local Government Board for borrowing powers. The report further included the construction of a lattice and steel girder bridge (105 ft. span) over the River Ebbw, at a cost of 1,175 l. 15s.; this was also adopted.

MONMOUTH DRAINAGE SCHEME.—The Town Clerk of Monmouth has just received from the Local Government Board an answer to the recent inquiry held by Mr. R. Walton, with reference to the application of the Town Council for sanction to borrow 8,500 l. for work of sewerage. They say they are unable to approve of the discharge of the sewage into the River Wye without it having been subjected to purification, and request that the scheme may be reconsidered with a view of purification, such system to include treatment on an adequate area of suitable land; also that the sewers be extended to Wyesham; also that the slaughter-houses, of which complaints have been made to the Board, are on an unsuitable site, and the Board ask that immediate action be taken with the view to closing the buildings and the provision of better accommodation on a more suitable site. This will necessitate an additional outlay of something like 5,000 l.

SEWERAGE, CRAVEN ARMS.—A Local Government Board inquiry was held at Craven Arms on the 9th inst., as to an application of the Rural Sanitary Authority for sanction to a loan of 1,865 l. for sewerage and sewage disposal. The village has at present about 1,000 inhabitants. The population is rapidly increasing, and the want of a proper system of sewerage is much felt. It is intended to purify the sewage on suitable land a mile from the village. Mr. W. Wyatt, of Shrewsbury, is the engineer.

CLACTON-ON-SEA SEWERAGE.—The Local Board of Clacton-on-Sea have accepted a tender from Messrs. B. Cooke & Co., of Battersea, London, S.W., for the construction of sewers and sewage outfalls for the district of Great Clacton. The accepted tender is 10,374 l. The works are to proceed immediately. Mr. W. H. Radford, C.E., of Nottingham, is the engineer to the scheme.

STAINED GLASS AND DECORATION.

WINDOW, WALKLEY CHURCH, YORKSHIRE.—On the 5th inst., a new stained glass window, placed in the large east window of St. Mary's Church, Walkley, by Mr. W. Turner, in memory of his wife and only son, was dedicated. The window, which consists of four lights, with ornamental tracery, has been filled in with four pictures. The first light represents the Nativity; the Crucifixion is the second subject; the risen Saviour is in the third light; and Mary, Peter, and John occupy prominent positions in the fourth light, the other disciples standing. A canopy surmounts the whole, and the

base is in keeping with the architecture of the church. In the top tracery is seen "Christ in Majesty," and immediately under it the descending dove. The remaining pieces of tracery contain angels with various musical instruments. The window is the work of Messrs. Kayll & Co., of Leeds.

MEMORIAL WINDOW, CONGREGATIONAL CHURCH, EXETER.—A window has just been erected in the Congregational Church, Exeter, in memory of the late Mr. R. Williams. It consists of a design of Gothic ornament in richly-coloured stained glass, there being in the centre of the four compartments medallions containing scrolls bearing Scripture texts. The window was designed and executed by Mr. F. Drake, of Exeter.

EAST WINDOW, SCROOBY CHURCH, NOTTINGHAMSHIRE.—The east window of Scrooby Church, Nottingham, has been filled with stained-glass by Mr. F. E. Williams, of Scrooby, in memory of his father. The window contains subjects in illustration of the Beatitudes. The work has been executed by Messrs. Powell Brothers, of Leeds.

CONSERVATIVE CLUB, HAMPSTEAD-ROAD.—A window has just been placed in this Club in commemoration of Mr. H. R. Graham's return to the last election, being the only supervening gain in the Metropolis. It was designed and painted by Mr. Ernest Harrison, and presented by him conjointly with Mr. C. A. Russell, of Wells-street, W. It is in Renaissance ornament interlaced with symbolical floral work, with a life-sized portrait of the member in the centre.

FOREIGN AND COLONIAL.

FRANCE.—In conformity with the decision of the Senate in regard to the rebuilding of the Opéra Comique, the Budget Committee of the Chamber of Deputies has resolved to apply towards this work the indemnity of 1,070,000 francs paid to the State by the insurance companies after the burning of the theatre. Architects desirous to take part in the competition will have to accompany their design with a statement that it can be carried out for not more than 3,500,000 francs.—The jury in the Boucicaut Hospital competition have declined to award the first premium. Second premiums have been awarded to MM. Alph and Legros and Michelin, and third premiums to Messrs. Courtois-Suffit, Planco, and Calinaud. The final adoption of any design is postponed.—The new cavalry barracks at Vincennes, near the Polygone de l'Artillerie, are shortly to be opened. These barracks, in the construction of which the greatest care has been given to sanitary conditions, have been built from the plans of an engineer officer, Captain Barillot, who has shown much talent in carrying out the work.—The Gobelin establishment will be represented at Chicago by five important tapestries representing "Les Arts, Les Sciences, et les Lettres," "L'Antiquité," "le Manuscrit," and "l'Imprimerie," after the cartoons of Elzoum, and "Homère défini," after Ingès.—The "Union Artistique des Ardennes" is organising its fourth Fine Art exhibition, which will open on June 11, at Charleville, and will close on July 4.—In conformity with the last wishes of Elie Delaunay the painter, the Administration of Fine Arts has distributed a considerable number of drawings between the museums of the Louvre and Luxembourg, the library of the Ecole des Beaux-Arts, and the provincial museums of Lille, Amiens, Dijon, Angers, Grenoble, Montpellier, and Nantes.—The department of Public Works intends to undertake shortly some important operations for the improvement of the port of Quistrehem (Calvados) and of the canal from Caen to the sea.—The works are soon to be commenced for a railway from Toulon to Hyères along the Mediterranean shore with a "gare maritime" at the port of Rhode.—M. Bourg has been chosen as the sculptor for the statue to Dr. Guépin, the celebrated Breton oculist, which is to be erected at Nantes.—We hear of the death of M. Edouard Félix Poudroux, architect, and member of the Société Centrale. M. Poudroux, who was 58 years old, had been a pupil of M. Louslache and his assistant in many of his works.—M. Achille Hermant, the architect, has been commissioned to go to New York, Boston, and Chicago, to study the architecture and organisation of school establishments in the States.—A new art exhibition is announced to be held in the Durand Rue galleries, organised by a group of artists who have taken the title of "Société des Parisiens de Paris."—Various important street improvements are to be commenced this year in Paris, for which a sum of 120 million francs has been reserved from the last loan raised by the municipality. These works, which will be undertaken on both banks of the river, will include particularly the formation of the Rue Reaumur, which will be a prolongation of the Rue du 4 Septembre between the Place de la Bourse and the Rue du Temple. This operation will cost 50 million francs. There is also a proposal to prolong the Rue de Rennes as far as the Quai Malaquais, and to open a Rue Megador between the opera and Rue St. Lazare, opposite the church of la Trinité.

BUILDING WORK IN QUEENSLAND.—The buildings of the year can hardly be considered either as

numerous or imposing, and Brisbane itself can boast of very few additions to its architectural beauties. From a commercial point of view, several important erections have either been begun or completed, among the latter may be mentioned the large freezing works at Eagle Farm, Brisbane, and Tel Aviv. From these great results are expected, an outlet for the overstocked cattle properties, and establishment for a frozen meat trade which should be able to compete with the world. The C. Sugar Company has also decided to erect a refinery near Brisbane, and has purchased land, wharf frontage to the Brisbane River. Among other buildings either commenced or coming during the year might be mentioned:—Deal Dumb Asylum, Brisbane, J. J. Lough, architect; Municipal Chambers, South Brisbane, John H. Son, architects; Banking premises, Rockhampton, R. Gailey, architect; Presbyterian Church, Rockhampton, Voller & Graham, architects; A. M. P. Buildings, Normanston, G. H. M. J. son, architect; Convent, Warwick, Simkins, Ibler, architects; R. C. Schools, Brisbane, Simkins & Ibler, architects; R. C. Church, Sandgate, V. Caldwell, architect; Memorial Church, Thang Island, J. H. Buckenridge, architect; Metropole Hotel, Thursday Island, McCredie Brothers, architects; Fire Brigade Station, Brisbane, Nicholson & Wright, architects; C. Chambers Cooperaroh, H. W. Atkinson, architect; All Souls' Church, Toowoong, Hunter & Co., architects; Q. N. Bank premises, Blackall, F. B. A., architects; Bank of New South Wales premises, Blackall, R. Gailey, architect; addition to the above, several large residences—erected, including Mr. J. Clark's at Hel G. H. M. Addison, architect; Mr. Maines Toowoong, R. Gailey, architect; Mr. Bolton Indooroopilly, Charles McLeay, architect; Armour's at New Farm, C. W. Chambers, architect. It was the year it was decided by the Government to call for competitive designs in all public works exceeding 5,000 l., but this has been an offer which resulted in little benefit to the profession, as public buildings have been required at this figure.

Australian Building and Engineering Journal

MISCELLANEOUS.

"A MANCHESTER FIRM'S ADVERTISING SHEET."—A correspondent who sends us a copy of one issued by architects who are both members of the Institute of Architects, will find our opinion very plainly expressed in a "Note" in the *Builder* for October 15 last, page 297. The architect who issue it were simple enough to send in a letter to the Editor of this Journal some time since. We regret to find that they are still continuing this reprehensible and undignified practice.

THE SURVEYORS' AND AUCTIONEERS' CLERK'S PROVIDENT ASSOCIATION.—The Committee Management of this institution, in their report for the year 1892, state that the number of members of the respective divisions of the Association is as follows:—Sick allowance fund, 60 against 43 last year; assurance fund, 31 against 28; superannuation fund, 10 against 8; benevolent fund, 6 against 4. This increase is encouraging, and the Committee have reason to believe that the publicity recently attained by the Association is likely to be productive of further additions to an important enlargement of the operations of the Association has taken during the year. The amount to be assured, the life assurance division has been increased to 10 and four members have been accepted for the amount after careful examination by the society's medical officer. The premiums are calculated to produce the necessary funds, but the committee have considered it desirable to place to the credit of the assurance fund a sum of 150 l. from the surplus superannuation fund; and 100 l. from surplus benevolent fund as a special reserve. A sick allowance for the year has been about average of previous years owing to the prevalence of influenza. No claim has been upon the life assurance fund up to the present time. A further sum of 257 l. 5s. has been in on capital account. The reserve investment amounts to 2,718 l. 11s. 3d. The Committee, under their special consideration the raising of funds for the benefit of a city firm, who is incapacitated work. The annual general meeting of the members and subscribers will be held at the Albert Mart on Wednesday, March 1 next, at 7 p.m.

COMPETITION FOR A MODEL SCHOOL.—The Municipal Council of Vienna are offering three prizes of 1,000 florins, 500 florins, and 250 florins, for the best designs for a model school. The prizes will be awarded according to the vote of a committee specially appointed to consider the subject. The designs are to be sent in by July 1893. Full particulars of the competition will be furnished by the Hochbau Abtheilung, Stadtbauamt, Vienna.

THE HEALTH OF FLORENCE.—The Commission of Hygiene has presented the Symphonie with its report on the health condition of the city within the last year. The deaths amount to 4,096, giving a diminution of 69 in comparison with those of 1891, which numbered 5,065.

ucting from these the deaths of those persons not belonging to the commune, there is a total diminution, as compared with last year, of 147; and this, in spite of the fact that in the month of January the mortality, due mainly to influenza, rose to 947. For this the succeeding months marked a notable decrease in the deaths, which maintained till the end of November, notwithstanding the heavy mortality of January, showed on the whole year the total diminution above indicated. The population of the commune being 184,521 on December 31, 1891, the total of deaths amongst those belonging to the commune during last year was 22.64 per cent. of the inhabitants. The deaths from infectious diseases were 121 less, being 240, as compared with 361 of the year preceding—a percentage of 4.80 on the total, instead of 7.52, which was the percentage in 1891. Very remarkable was the diminution of the death-rate from typhoid fever, which caused only 88 deaths in place of the 286 registered in 1891. This rate constitutes the minimum of deaths from typhoid fever for a period of more than twenty-five years. The year 1893 (concludes the report) coincides with the best auspices, and every hygienic indication serves to show that Florence, already one of the healthiest cities of Europe, and on this account a place of sojourn for visitors from both hemispheres, continues to progress in salubrity whilst concurrently improving her sanitary regulations.—*Lancet*.

ADJUSTABLE SAUCER-STAND FOR INDIAN INK. This is a small invention for which a patent has been applied for by Mr. McGinnis, A.M. Inst. C.E., which will be found very convenient in architects' offices. It is a saucer adjusted on a base so that it can either be kept level or tilted at the angle required for getting a sufficient depth of ink. The ink will hold any ordinary saucer.

DINNER OF BUILDERS AT SUNDERLAND.—On Friday night the members of the Sunderland Building Trades Association had their annual dinner at the Empress Hotel. The Mayor, D. Ranken, presided, and in proposing the toast of the evening, "The Sunderland and District Building Trades Association," referred at some length to the strength possessed by trades that were associated, and made liberal reference to the organisation of the men that they employed. He did not object to the men making themselves together, because the masters would do so with some recognised head, whereas, if the men had no association, they would have no responsible person to negotiate with in the case of disputes. The men were bound together not only for their purposes, but also to provide some assistance to themselves should they be overtaken by illness or misfortune. This being the case, they would be likely to allow their money to be squandered to the detriment of the family. He was of opinion that employers had done a wise thing in associating themselves for their own protection. He admitted that there were times when the men were right, but there were also times when they were wrong. They often gave too short notice when they considered they were entitled to an advance in wages, and thus landed employers into severe losses by contracts into which they had entered. In consequence of this they should be able to resist the demands and meet the men on equal terms. "The Building and Allied Trades" was proposed by Mr. Green, and responded to by Mr. Eirick and Mr. Ranken; and that of "The Architects," given by Mr. Robt. Hudson, was acknowledged by Messrs. R. Henderson, and Rounthwaite.

THE HOME IRON TRADE.—No signs of amelioration are yet visible in the English iron market, and there is generally shown a weakening tendency. Business in crude and finished iron is very quiet, plates, however, continue to display more activity; but the steel trade remains in a depressed condition. Shipbuilders and engineers are dull. The coal trade manifests no improvement.—*Iron*.

LEGAL.

ARCHITECTS' CHARGES: BURR V. RIDOUT.

In this action, tried in the Queen's Bench Division last week before Lord Chief Justice Coleridge, and a trial jury, the plaintiff was an architect, who sought to recover 430*l.*, as his charges for preparing plans, drawings, &c., for certain buildings, for which tenders were obtained on those plans, but which were thrown up as too expensive. The defendant, it appeared (we quote from the *Chief* report), was an estate agent, and had an agreement with Lord Cadogan, under which he was to build two houses on the Cadogan Estate at a cost of 4,000*l.*, the buildings being shops below, and "flats" above as residences. His intention was to erect the buildings at a cost of 4,000*l.*, and appeared that he was told that it would be possible to erect such buildings at that cost, but of plainest possible character. It was agreed that the defendant was informed of this, but it was not until he had agreed to plans more expensive. He began by employing the defendant to survey the land and take the levels, &c.; and for this there was a charge of 15*l.*, not disputed, and, indeed, paid by Court. The defendant then, in August, 1891, asked the architect to inform him what would be

his charges, in a lump sum, for preparing the plans and working drawings and specifications, and taking out the quantities, superintending, and other works incidental, as well as arranging for the mortgages, &c. The plaintiff replied that his fees for preparing drawings and specifications and superintending the work would be according to the scale of charges sanctioned by the Royal Institute of British Architects. The rules include the following:—(8) "If the employer, after having agreed to a design and had the contract drawing prepared, should have material alterations made, an extra charge should be made, unless such alterations are rendered necessary by an unreasonable excess in the builder's tender beyond the architect's approximate estimate"; (9) "If the architect should have drawn out the approved design, complete with plans, elevations, sections, and specifications, the charge is half the commission upon the estimated cost; if he should, in addition, have procured tenders in accordance with the instruction of his employer the charge is one-half per cent. extra." The latter rules were the only ones relied upon as applying where the scheme is thrown up before the building is begun.

According to the case for the plaintiff, these terms were agreed to and he was directed to prepare plans and drawings. In the meantime, the defendant desired to raise 2,000*l.* by mortgage on each house, which would amount to 4,000*l.*, and his case was that the cost was not to exceed that amount; and it appeared that perfectly plain buildings might be erected for that sum, but that the drawings, &c., represented buildings of a far more costly character. When the tenders were received the lowest was over 7,000*l.* But this was according to the designs prepared by the plaintiff, according to which the work was to be executed in the modern style, with terra-cotta fronts and every adornment inside and out, with all the latest improvements, electric lights, &c., and, as counsel observed, "everything that could render the buildings handsome, elegant, and expensive." And the case for the plaintiff was that the defendant had from time to time seen the plans and drawings and approved of them. For the work as thus designed it was found on the lowest tender that the cost would be 7,000*l.*, and, indeed, the lowest tender was above 7,000*l.* The defendant then said this was above his means, and he abandoned the enterprise. Upon this the plaintiff set in his claim, which was disputed, and this action was brought to recover the amount.

The defence was that the arrangement was only conditional upon the cost not exceeding 4,000*l.*, and that the plaintiff's plans had rendered the expense so much in excess as to be impracticable, and the work was of no use; but he paid into court 110*l.* as a reasonable amount if anything was due at all. The plaintiff denied any instruction that the cost of the houses was not to exceed 4,000*l.*, and alleged that his charges were reasonable under the rules. In the meantime the defendant had employed another architect, who had been paid 110*l.*, and under whom the buildings had been erected for 3,500*l.*

Mr. Witt, Q.C., and Mr. Duke were for the plaintiff; Mr. Kemp, Q.C., and Mr. Brodick for the defendant.

The plaintiff's counsel, in opening the case, said the terms, as fixed by the Royal Institute of British Architects, in cases where the work was broken off, would be 25 per cent. on the estimated cost, and if the work went on to the receiving tenders the charge would be 1 per cent. further on the lowest tender.

Lord Coleridge said he would not allow the Institute to dictate to juries what sum was to be paid for work not done.

Mr. Witt said his case was that these terms had been agreed upon, the defendant having been informed that the rules of the Institute would apply.

Lord Coleridge.—Unless there is clear proof that they were part of the contract I shall treat the rules of the Institute as mere waste paper.

The plaintiff was then called, and he stated that at an interview with the defendant he handed to him the rules of the Institute, and the defendant employed him on those terms. In September he prepared "sketch drawings," upon seeing which the defendant, he said, desired some alterations which would increase the expense. The defendant went through the plans and conferred with the surveyor about the expense, and wanted the cubic contents to be taken out, with a view to an approximate estimate of the expense. The plaintiff's clerk took out the cubic contents at 116,870 cubic feet, and at 6d. per foot the expense would be 4,000*l.* But at 6d. per foot the building would be of the plainest possible nature, and the defendant himself said that for a building such as was intended he should think the expense would be 9d. or 10d. per cubic foot, on which the plaintiff said he told the defendant that meant an expense of between 6,000*l.* and 7,000*l.* On December 2 the defendant wrote that the plans had been approved by the earl for the estate. Then, in January last year, tenders were advertised for, and defendant wrote for the quantities. Then the tenders came in, and the lowest tender was 7,067*l.* The defendant said that was more than he could undertake, and he threw it up and asked plaintiff to send in his account, the main item of which were—for preparing drawings and specifications, &c., 3 per cent. on 7,067*l.* (212*l.*), and for preparing a

bill of quantities 2 per cent. on lowest tender (142*l.*). Then there was a charge of nearly 50*l.* for lithographing quantities, &c., 21*l.* for preparing specification of alterations, 10*l.* for surveying site, and some lesser items brought the amount to 450*l.*

In cross-examination, he said he knew the defendant was a "speculative builder," but he did not tell him that the expense must not exceed 4,000*l.*

Mr. Kemp, for the defendant, pointed out that the rules of the Institute of Architects did not contain one which was in terms applicable to the case which had occurred—that of the work being thrown up before it was begun. The question, therefore, would be what was reasonable in such a case. Now, the defence was based upon this—that the defendant, who was described as a "speculative builder," and to whom therefore the cost would be vital, had contemplated only an expense of 4,000*l.*, and that the plaintiff knew this, and was employed to prepare plans and drawings for such an expense; whereas he had prepared such as would involve an expense of over 7,000*l.*, which the defendant could not afford, and so the plans were useless to him.

The defendant was called as a witness, and gave evidence in support of this defence; and, according to his evidence, the cost of 4,000*l.* was fixed from the first, and he had fixed the cost at per cubic foot at 8d., which would come to 4,030*l.* In November he sent the plaintiff his building agreement with Lord Cadogan, which was to erect two houses and expend 4,000*l.* When the tenders were opened the plaintiff said, "We must cut down tremendously." "But I," said the defendant, "declared it was not a case for cutting down." There was a difference of thousands of pounds, and he had to employ another architect, because the plaintiff's plans were far beyond the limit of 4,000*l.*, and the plaintiff, it was contended, ought to reimburse the defendant for the expenses thus incurred. The defendant added that he had employed another architect, to whom he had paid 110*l.*, and who had carried out the building for 3,500*l.*

Lord Coleridge, in summing up the case to the jury, said the defence rested on this—that the expense of the building was not to exceed 4,000*l.* The defendant was bound by his agreement with Lord Cadogan to expend 4,000*l.*, and that was all he was bound to spend on the building. And it was not likely that he would expend 8,000*l.*, but the probability was that he would as nearly as he could keep to that sum. Now, undoubtedly, architects did not strictly keep within their employers' limit of expenditure, and, on the other hand, the employer was easily induced to countenance an increase of expense here and there, upon such pleas as architects knew how to urge—"It will not cost much." "It is a pity to spoil the house for the sake of a few pounds." This was human nature on both sides. But here, when the tenders came in, the expense, it was found, was near 8,000*l.*, and the defendant's letters did not look like a total repudiation. He wrote: "The price I look for in my mind was 4,500*l.*, including architect's fees, so that a great reduction must be made." Could the defendant, then, entirely repudiate the employment of the plaintiff? If not, then it became a question what was reasonable, and that was for the jury to consider, and they would judge as to the various items of the claim. It was said that the Institute of Architects had settled certain charges, and percentages were charged on the estimated amount of expenditure. But a commission upon expenditure incurred was open to the gravest possible objection. A gentleman wished to build a house and was willing to pay 50,000*l.* upon it, and asked an architect to prepare plans for such an expenditure. His architect prepared plans for a house which would cost 150,000*l.*, and said, "Well, you may or may not build it, but you must pay me, whether you do so or not, commission upon 150,000*l.* for the Institute of British Architects say so." He confessed his legal soul fired at it, and he hoped that no British jury would ever yield to it, for it was a most unjustifiable attempt by a body of men for their own advantage and to increase their own emolument. The defendant was not liable to pay the percentages claimed unless he had agreed to do so. Had he so agreed?

The jury found for the plaintiff for 200*l.*, including the sum paid into court—that is, for 90*l.* beyond the 110*l.* paid into court—for which Lord Coleridge gave judgment.

REPAIRS AND REBUILDING UNDER THE BUILDING ACT.

At the North London Police Court, before Mr. Bros, on the 8th inst., Mr. Samuel Lissner, builder, was summoned by the District Surveyor of East Hackney South for non-payment of District Surveyor's fees, 21 3s. 9d., for rebuilding a two-story bay window at 77, Lauriston-road.

The defendant had given notice of the work, which had been duly surveyed, but maintained that he was not bound to give notice, and relying on the case of *Fletcher v. Briant* in the Queen's Bench, refused to pay any fees.

The District Surveyor contended that the present case, in which the whole external wall of a two-story window, 20 ft. high, had been rebuilt to the foundations, was quite different to the case quoted, and

CONTRACTS—Continued.

Those marked with an Asterisk () are advertised in this number. Competition, p. iv. Contracts, pp. iv., vi., viii. and ix, Public Appointments, pp. xx. a*

was held on Tuesday at the Anglo Hotel, 1, Alderman David Jones in the chair. The meeting was convened to consider a communication from the Operative Stonemasons in reference to the strike in the Cardiff building trade, and also letters from Operative Bricklayers and Plasterers, who, in sympathy with the masons, had threatened to join the strike. The question of negotiating the points having again been fully discussed, it was decided to reply to the Operative Stonemasons' Association that the Masters' Association strictly adhered to its policy, &c., as offered by its representative committee, and that it was not prepared to accept by the "stonemasons' society" on March 1 next all negotiations would cease. To bricklayers a similar reply was sent as to the question of negotiations, and it was further decided that a reply, couched in similar terms, be sent to the Operative Plasterers' Association. The effect of the decision on the part of the Operative Stonemasons' Association, says the *Western Mail*, shall rules will stand as they were before the commencement of the dispute, except that relating to the question of the *piece* of work, which will in future be *bad*, and that the *piece* of work will be *bad*, and that the *piece* of work will be *bad*. The operatives have again

retention of the old rule, that no worked stone should be brought into the town except landers, Yorkshire square steps, and paving stones. The masters at their last meeting proposed that the rule should in future read as follows:—"That no worked stone be brought into the town for the purpose of being used on contract work, except landers, steps, copings, and Yorkshire paving, and also granite and marble." It is a significant fact, remarks the same authority, that of the forty employers present at the meeting only two are now in need of men.

MEETINGS.

FRIDAY, FEBRUARY 24.

Architectural Association.—Mr. A. E. Street on "Individuality and Originality in Art." 7.30 p.m.
Institution of Civil Engineers (Students' Meeting).—Mr. R. Hansford Worth on "The Methods usually adopted in Devon and Cornwall for Dressing Clay and Limestone." 7.30 p.m.
Royal Institution.—Dr. Edward Hopkinson on "Electrical Railways." 9 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Wright Clarke on "Details of Plumbers' Work." 8 p.m.

SATURDAY, FEBRUARY 25.

Architectural Association.—Visit to the Institute of Chartered Accountants, Coleman-street, Buildings, Moor-gate-street, by permission of the architect, Mr. John Belcher.
Edinburgh Architectural Association.—Visit to S. S. C. Library.
Royal Institution of British Architects.—Messrs. E. Ingress Bell, Leonard Stokes, and S. H. Leach on "Terra Cotta." 8 p.m.
Royal Academy of Arts.—Professor J. H. Middleton, M.A., on "Michelangelo." 8 p.m.
Royal Academy of Arts.—Mr. Herbert Rimmer on "Renaissance Architecture of Spain." 7.30 p.m.

SUNDAY, FEBRUARY 26.

Institution of Civil Engineers.—Reopened discussion on Dr. Edward Hopkinson's paper on "Electrical Railways." (a) time permitting Mr. Walter Pitt on "Plant for Harbour and Sea-works." 8 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Mr. Charles Mason on "Scavenging, Disposal of Home Refuse." 8 p.m.
Builders' Clerks' Benevolent Institution.—Annual General Meeting. 7.30 p.m.
Glasgow Architectural Association.—Annual Supper, Exhibition of Drawings, &c.

MONDAY, FEBRUARY 27.

British Archaeological Association.—(a) Mr. Cann Hughes on "Pemberton's Parlour Tower, Chester"; (b) Rev. J. Cave Browne, M.A., on "Leeds Priory, Kent." 8 p.m.
Carpenters' Hall, London Wall.—Professor Sylvanus Thompson on "Electric Lighting from a Popular Point of View." 8 p.m. (Admission Free.)
Royal Academy of Arts.—(a) Mr. E. Green, F.S.A., on "Some Local Chap Books"; (b) Mr. Mill Stephenson, F.S.A., on "A Look from Beddington Park." 4.30 p.m.

TUESDAY, FEBRUARY 28.

Institution of Civil Engineers.—Students' Visit to the Houses of Parliament, to inspect the Clock-Tower and the Ventilating and Lighting Arrangements. 4 p.m.
Society of Arts.—Mr. Thomas R. Dallmeier on "The Photography." 8 p.m.
Institution of Civil Engineers of Ireland (Dublin).—Meeting in the New Hall, 35, Dawson-street.

WEDNESDAY, MARCH 1.

Society of Antiquaries.—8.30 p.m.
Royal Academy of Arts.—Professor J. H. Middleton, M.A., on "Michelangelo." 8 p.m.
Royal Institution.—Mr. George Simonds on "Sculpture considered apart from Archaeology." 8 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Professor A. Wynter Blyth on "Diseases of Animals in relation to Meat Supply; Characteristics of Vegetables, Fish, &c., unfit for Food." 8 p.m.

THURSDAY, MARCH 2.

Society of Antiquaries.—8.30 p.m.
Royal Academy of Arts.—Professor J. H. Middleton, M.A., on "Michelangelo." 8 p.m.
Royal Institution.—Mr. George Simonds on "Sculpture considered apart from Archaeology." 8 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Professor A. Wynter Blyth on "Diseases of Animals in relation to Meat Supply; Characteristics of Vegetables, Fish, &c., unfit for Food." 8 p.m.

FRIDAY, MARCH 3.

Royal Academy of Arts.—Professor J. H. Middleton, M.A., on "Michelangelo." 8 p.m.
Royal Institution.—Mr. George Simonds on "Sculpture considered apart from Archaeology." 8 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Professor A. Wynter Blyth on "Diseases of Animals in relation to Meat Supply; Characteristics of Vegetables, Fish, &c., unfit for Food." 8 p.m.

SATURDAY, MARCH 4.

Royal Academy of Arts.—Professor J. H. Middleton, M.A., on "Michelangelo." 8 p.m.
Royal Institution.—Mr. George Simonds on "Sculpture considered apart from Archaeology." 8 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Professor A. Wynter Blyth on "Diseases of Animals in relation to Meat Supply; Characteristics of Vegetables, Fish, &c., unfit for Food." 8 p.m.

SUNDAY, MARCH 5.

Royal Academy of Arts.—Professor J. H. Middleton, M.A., on "Michelangelo." 8 p.m.
Royal Institution.—Mr. George Simonds on "Sculpture considered apart from Archaeology." 8 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Professor A. Wynter Blyth on "Diseases of Animals in relation to Meat Supply; Characteristics of Vegetables, Fish, &c., unfit for Food." 8 p.m.

MONDAY, MARCH 6.

Royal Academy of Arts.—Professor J. H. Middleton, M.A., on "Michelangelo." 8 p.m.
Royal Institution.—Mr. George Simonds on "Sculpture considered apart from Archaeology." 8 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Professor A. Wynter Blyth on "Diseases of Animals in relation to Meat Supply; Characteristics of Vegetables, Fish, &c., unfit for Food." 8 p.m.

TUESDAY, MARCH 7.

Royal Academy of Arts.—Professor J. H. Middleton, M.A., on "Michelangelo." 8 p.m.
Royal Institution.—Mr. George Simonds on "Sculpture considered apart from Archaeology." 8 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Professor A. Wynter Blyth on "Diseases of Animals in relation to Meat Supply; Characteristics of Vegetables, Fish, &c., unfit for Food." 8 p.m.

WEDNESDAY, MARCH 8.

Royal Academy of Arts.—Professor J. H. Middleton, M.A., on "Michelangelo." 8 p.m.
Royal Institution.—Mr. George Simonds on "Sculpture considered apart from Archaeology." 8 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Professor A. Wynter Blyth on "Diseases of Animals in relation to Meat Supply; Characteristics of Vegetables, Fish, &c., unfit for Food." 8 p.m.

prises improvements in their forms, and improved means for laying or connecting them. The improved brick is formed with holes, extending through the thickness of the brick, and intended for the reception of uniting bolts of clay, wood, tube, or angle-iron, and also with partial holes or channels on the sides, these channels forming, when the bricks are laid in their proper position, complete holes or passages. The holes are made by pressing the bricks in a suitable mould, or by the cutting or pressing out of the material. The partial holes remaining open are particularly useful for the reception of gas or water pipes, smoking-tubes, &c. In using the improved bricks they should be placed in such a manner that the holes always cover the respective partial holes or channels, so that by being laid over and next to each other hollow cylinders are formed, which are filled in by means of the above mentioned bolts or ties.

21,614.—CONCRETE MIXING: E. L. Ransome.—This patent relates to a machine for mixing the materials employed in making concrete. It consists of a series of chambers containing the materials, and having adjustable gates through which the material is proportionately delivered upon a moving conveyor, which in turn delivers it to a mixing mill.

71,318.—VENTILATORS: J. V. Eves and M. M. Greaves.—This invention relates to ventilators for insertion in the chimney-breast, and similar situations, of rooms for extracting and carrying off the vitiated air of the room into the flue. As at present constructed, in these ventilators there is always the liability of a return draught carrying smoke from the chimney into the room, and it is to obviate this that the present invention is designed. It consists essentially in constructing the ventilators with a double set of valves or flaps, so that should any return draught arise and pass the first flap it will be deflected in a direction straight into the second flap, and so prevent any possibility of passing through into the room.

NEW APPLICATIONS FOR LETTERS PATENT.
 February 6.—3,646, M. Becker, Process for Producing a Fundamental Mass from which Varnish and Similar Coatings may be made.

February 7.—3,650, C. Porter, jun., Slide-hinge.—3,651, Roofing-Strips and Mouldings for making same.—3,652, J. Smith, Sawing or Cutting Stone.—3,653, A. Burrow, Distemper, Whitewash, and other Brushes.—3,654, J. Mohrberg, Bricks.—3,655, J. Van Nes, Preventing the Frosting of Windows.—3,656, E. Naylor, J. Crabbe, 3,658, W. Franklin, Grease, Silt, and Gully Traps.

February 8.—3,654, P. Robinson, Girders and other like articles.—3,655, J. B. Turner, Screw-drivers.—3,656, E. Naylor, J. Crabbe, 3,658, W. Franklin, Grease, Silt, and Gully Traps.

February 9.—3,658, C. Penney and J. Thackrah, Water-closets.—3,659, C. Thompson, Sheet Metal Roofing.—3,660, A. Smith, Feed Mechanism for Planing Machines, &c.

February 10.—3,661, H. Thomas, Painters' Brushes.—3,662, W. Bate, Syphon Discharge Pipes.—3,663, J. Dick, Metallic Roofing.—3,664, J. Kessiter, Grooved Brick.—3,665, D. Taylor, Ranges and Grates.—3,666, H. MacCormack and J. Buckley, Ladder Grip or Fastener.—3,667, H. MacCormack and J. Buckley, Ladder Grip or Fastener.—3,668, H. MacCormack and J. Buckley, Ladder Grip or Fastener.—3,669, H. MacCormack and J. Buckley, Ladder Grip or Fastener.—3,670, H. MacCormack and J. Buckley, Ladder Grip or Fastener.—3,671, H. MacCormack and J. Buckley, Ladder Grip or Fastener.—3,672, H. MacCormack and J. Buckley, Ladder Grip or Fastener.—3,673, H. MacCormack and J. Buckley, Ladder Grip or Fastener.—3,674, H. MacCormack and J. Buckley, Ladder Grip or Fastener.—3,675, H. MacCormack and J. Buckley, Ladder Grip or Fastener.—3,676, H. MacCormack and J. Buckley, Ladder Grip or Fastener.—3,677, H. MacCormack and J. Buckley, Ladder Grip or Fastener.—3,678, H. MacCormack and J. 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LEYTONSTONE (Essex).—For the erection of a block of temporary infirmary buildings and nurses' quarters, at the Workhouse, Leytonstone, Essex, for the Guardians of the West Ham Union. Mr. F. J. Sturdy, architect. Quantities by Messrs. R. L. Curtis & Sons.

Spencer & Co. £4,056 W. Downes £3,723
Reed & Son 3,769 J. Holland 3,193
C. Cox, jun. 3,669 W. Langley 3,193
Calverton Iron Company 3,450 Heasle & Farrow 3,440
J. J. Hosking 3,340 Greig 3,340

LONDON.—Accepted for alterations to framework of roof at London Bridge Station, for the London, Brighton, and South Coast Railway Company. Mr. F. D. Banister, engineer. Quantities by—

Mr. C. H. Gough £1,030 0 0
J. O. Richardson, Albert Works, Peckham, S.E. £1,030 0 0

LONDON.—For erecting "The Rose of Denmark" beer house, 1 Ambeth Walk, S.E., and house adjoining, for Messrs. Truman, Hambury, Buxton, & Co., Limited. Mr. Alfred Wright, architect. Quantities by—

G. D. Sarjeant £2,797 W. Johnson & Co. £1,784
Peacock & Sons 1,784 Whitehead & Co. 1,784
Samuel Salt 1,065 Edwards & Medway 1,111

J. T. J. 448 0 0

LYNDHURST.—For road-making, kerbing, and channelling at Lyndhurst Gardens, Northwood, Lyndhurst, New Forest. Plans, for Mr. Kerrell, Falmouth. Mr. William Burrough Hill, surveyor, Southampton.

F. Rocks 448 0 0
J. Clarke & Son 448 0 0
W. Bickley 448 0 0

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MAIDSTONE.—For the erection of 300 yards of ragstone walls and piers, and 10 yards of chertspur stile fencing, for the Rural Board. Messrs. Tootel & Sons, surveyors, 13 King-street, Maidstone.

H. J. Smith £2,415 0 0
J. H. P. 2,415 0 0
W. J. 2,415 0 0

Wood & Sons 2,415 0 0
J. H. Verrall 2,415 0 0
T. J. 2,415 0 0

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The Builder.

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MARCH 4, 1893.

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Plan of Chester Cathedral.—Measured and Drawn by Mr. R. W. Paul.....	Extra Large Photo-Litho.
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Design for Window, Jesse Haworth Memorial Church, Walsham.—By Mr. W. Pape.....	Double-Page Ink-Photo.

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Norman Monuments of Palermo.



S Mr. Dehli observes at the commencement of his historic sketch of Palermo,* "the Norman conquests in Southern Italy are nearly contemporaneous with the Norman conquest of England."

But how different the architectural associations suggested by the mention of the two events. In conquering England the Normans, fortunately for us, brought their own architecture with them, to a great extent at all events. It may be said that they based their work here to some extent on the starting point afforded them by existing Saxon architecture; it is still a moot point (the late Mr. Freeman thought it was not) whether the nave of Waltham represents the pre-conquest church or not; but even if it does, and if other early work sometimes called Norman dates in reality before the coming of William, the influence of Norman bishops had previously been so strong that we may practically say that English architecture was becoming Norman some time before the year 1066. But in invading England the Normans were coming into an island which had no architectural past of any consequence to hamper them, and which had previously been far away from the influence of the architecture and art of civilised countries. But Sicily was in the very centre of antique art and civilisation. On its soil are found some of the earliest and most notable monuments of Doric architecture. Subsequent to the Christian era it had been successively under Byzantine and under Arab possession, though it seems to have been always in a too unsettled state to allow of the elaboration or preservation of any

important architectural monuments. The strong hand of the Norman established for some time at least a more settled state of things, and, as in England, so in Sicily, the Norman conquerors soon began to exercise their racial passion for building. But while in England the Norman was the superior artist, in Sicily he was in the presence of races more gifted in this respect than himself, and of mingled Byzantine and Saracenic traditions which were too strong to be obliterated before him. As Pope (with rather doubtful discernment) said of England—

"We conquered France, but felt our captive's charms,"

so the Norman conqueror of Sicily was artistically conquered on that ground, and instead of leaving in the country anything like the ponderous and sturdy but somewhat savage type of architecture with which he covered England, he summoned the artists of various races whom he found upon Sicilian soil to build and decorate for him.

The result is a most significant example of the proverbial reflection in ancient architecture of the political and social circumstances of the time. Here, in an island which had been a successive object of warfare and struggle among Romans, Byzantine Greeks, Arabs, and Norman French, might we precisely expect to find a style which seems to belong completely to none of these races, but to contain elements contributed by all, unless we except the Normans, who were, indeed, the inciting cause of the work being done, and either paid the bill or compelled some one else to pay it, but have left little recognisable outward mark of the characteristics which belong to their architecture elsewhere. It is only in the plan that we find any similarity with northern Norman work; in the Cathedral of Monreale for instance, with its three apses at the end of the three aisles, and the east and west piers of its crossing lengthened out in the direction of nave and choir, as at Tewkesbury; only here, instead of finding mere plain masses of walling, we have them cut up into recesses after the hereditary fashion of Italy. But

otherwise the architectural detail is a delicate and highly refined mingling of Italian, Byzantine, and Saracenic feeling, in a result which has its precise counterpart no where else in the world. We may quote the paragraph in which the position is very well summed up by the author. After remarking that the Byzantine tradition had probably more or less spread throughout Italy previous to the period we are now speaking of, he continues—

"The powerful races which in the meanwhile had built up a civilisation on the other side of the Alps gradually worked their way into Italy—the great object of their conquests—but their architecture, in the new climate and under the new conditions generally, assumed new forms. We perceive their own Transalpine elements and the influence of Byzantine art, which they probably superseded, throughout—even in Pisa, in Florence, in the work of the Cosmati in Rome, and throughout Southern Italy. The fondness for mosaics must be regarded as a Byzantine feature, and especially so marble mosaics in geometrical patterns (*mosaici di pietri duri*), and the practice of inlaid mosaics on marble. We recognize two schools,—Roman and Byzantine—and remember in this connexion the magnificent mosaics in Pompeii which easily account for the origin of the former; in fact I remember being struck by the apparent identity of certain predominant shades of colour in Pompeii and in the Baptistery of Ravenna, which suggested to me an unbroken tradition in the manufacture of the tinted glass (*smalti*). Thus we find at the time when the Normans gained foothold in Palermo, throughout the rest of Italy, then slowly rising from centuries of humiliation, an established architectural tradition with numerous local variations developed from the three Medieval derivations of Greco-Roman art; the early Christian or Classic Romanesque, the Byzantine, and the Transalpine traditions, besides which a fourth element, the Arab, is found at Palermo, and on the Continent, at Amalfi and Ravello, on the peninsula of Sorrento. The latter was originally developed from the Byzantine, but with a system of decoration thoroughly Oriental, and at the time of the Arab conquest of Sicily was fully developed as a separate tradition or style."

This is a very good summary of the elements and genesis of the Siculo-Roman style, to which the Normans really seem to have contributed little more than the impulse.

* "Norman Monuments of Palermo and Environs; a Study." By Arne Dehli, architect; assisted by G. Howard Chamberlain, architect. Boston: Ticknor & Co. London: B. T. Batsford. Leipzig: Karl W. Hiersemann.

which furnished the occasion for the development of this beautiful and picturesque combination of styles in the shape of important and richly decorated buildings.

Mr. Dehli, who in spite of his continental-looking name is we presume an American architect, as his publishing head-quarters are Boston, has produced a very careful and admirably drawn series of illustrations of the works which he has made his study. A few of the illustrations of exteriors and interiors are reproductions from photographs, but the majority are careful and cleanly executed line drawings from measurement, and form a valuable record of the detail of the various buildings referred to. Some of the most important illustrations are from the Cathedral of Monreale, and in particular an admirable photographic reproduction is given of some of the clustered columns of the cloister, an illustration which entirely bears out the author's view that the shafts are later than the arcade. The arcade itself is late in the period, as indicated by the heavy mouldings of the arches, in contradistinction to the prevalent flat soffit of the earlier buildings, showing a distinctly northern influence and a feeling more approaching to Gothic work. Mr. Dehli regards these arches of the cloister, however, as of the same date with the main building, with which they coincide in general style, and which is in the main a late example of the period. But the contrast between the arch-mouldings and the columns is too striking to leave any doubt as to the later insertion of the latter. The heavy roll-moulding of the arch seems ready to crush the thin abacus and delicately worked capital, and moreover projects considerably beyond the capital in a manner in which no builders would ever have left it if the two had been worked at the same time. Mr. Dehli is probably right in his conjecture that the mouldings were originally continued down to the plinth or base-course on which the bases of the shafts now rest. The piers have been cut away and the clustered shafts inserted in their place. The most curious point about this bit of work is the strongly-marked Byzantine character of some of this inserted work. The capitals have a certain degree of Byzantine feeling in them, though not quite so strongly marked; but the clustered shafts in the foreground of the illustration, which are entirely carved in low relief, are singularly Byzantine in character, more especially in the animal forms introduced. The main ornament consists of intertwined strap-work or surface mouldings which are more or less Roman in the arrangement of their lines, intertwined so as to form large and small circles alternately, these circles being mostly filled in with rudely sculptured animal forms in rather flat relief, squeezed up and contorted to fit into the circles in a very Byzantine manner. Certain of the circles, on the other hand, are filled up with symmetrical rosettes, of almost classic character, while in others we see the Byzantine variation on the classic acanthus—a leaf severe in its pointed outlines, and sunk into a V section on the surface. Altogether a curious amount of architectural history is suggested on the surfaces of these sculptured columns. The square-headed doorways of the church are almost frankly classic in character, except that the place of the moulded architrave is supplied by a flat inlay of mosaic, some of the details of which much resemble some of the inlaid work on the Florence Campanile and on some other thirteenth-century buildings, and are perhaps not far from them in date.

The cloisters of S. Domenico in Palermo give us some capitals of very decidedly Byzantine outline and carving of flatly treated foliage. A more curious example is the column in the nave of the Capella Palatina at Palermo (Plate XII.). Here we have a capital which roughly imitates the classic capital, with two orders of leaves, and scrolls above meeting at the angles, and with scrolls turned inwards to meet in the centre

of the face, as in some typical examples of Corinthian capital; but the lines of the leaves are perfectly straight and stiff save for the slight curl over at the apex, and slope or expand outwards from the necking upwards, thus giving approximately the common outline of the true Byzantine capital, while the details are an imitation of the classic capital. The abacus is clumsily moulded and very heavy, while the base is a pure attic base.

In the organ-gallery at the Capella Palatina (Plate XVIII.) we have another curious assemblage of detail. The balustrade of the gallery is decorated with mosaic in which the prominent feature is a large ornament of intertwined bands forming circles, according to a common Roman device, but filled in the centre with very Byzantine-looking crosses. Of the three columns supporting the gallery, shown in the drawing, one has a capital of rather coarse classic character, with a column of nearly classic proportions (rather thicker than the true classic column), and covered with a zigzag ornament worked in relief on the surface; the same idea as the zigzags on some early Norman columns in this country, but carried out in a different manner. The next column is a plain shaft of much more slender proportions, with a clumsily-designed classic base and capital, the base-mouldings much too large for the scale of the column; and the next is a pilaster, with ornament in the panels which is classic in the upper panel, and of Byzantine type in the lower one, while the capital has one of the characteristic Byzantine forms of outline, a convex bulging from near the necking, and the ornament on it is a mixture of classic and Byzantine detail. The whole thing has the effect of being pieced together from the remains of various buildings of different date and place, though it may very possibly have been all erected at one time.

Other illustrations in the Second Part illustrate further the shafts and capitals of the Monreale cloister, and form an interesting collection of the peculiarities of this collection of details, all of them rich and beautiful, but looking like a museum of experiments in the treatment of a cloister, rather than work deliberately carried out on a preconceived scheme.

The literary portion of the book, though short and condensed, is well written and thoughtful, and contains a good many suggestions worth consideration in regard to the history and peculiarities of the twelfth century architecture of Palermo and its neighbourhood.

NOTES.

THE method of enlarging the House of Commons which is illustrated and explained by Mr. Charles Barry in a communication to the March number of the *Nineteenth Century*, is so completely the best that has been proposed, in regard to simplicity and avoidance of any unnecessary cutting up of the existing building, that it may be considered as the one which is likely to be carried out if any such scheme is. Mr. Barry proposes to remove the longitudinal walls at each side of the present chamber, carrying the roof on longitudinal girders, and extending the House on each side into the space now occupied by the division lobbies, these latter being provided for by a further extension encroaching to some extent on the space occupied by the Commons Court and the Star Chamber Court, but not in such a way as materially to interfere with any important light. The enlarged House would practically be turned round, i.e., its greatest length would be at right-angles to the centre gangway opposite the Speaker's chair instead of parallel to it; the seats would be arranged, however, on the same lines as at present, parallel with the centre gangway, and arranged on two inclined planes facing each other and rising from the centre gangway to the

walls. The seat space obtained in this way would provide a seat for every member on the floor of the House, with the important advantage that no member would be much further from the Speaker's chair than are those who occupy end seats in the present House. The Reporters' gallery would be enlarged; and Mr. Barry calculates that while in the present House 430 members have a cubic space of 296 ft. each, in the House as proposed 670 members would have 343 cubic ft. of air space each. The method of alteration is one which could be carried out without interference with Parliamentary business. The preparations for the enlargement could be made during one recess, leaving the walls for the present intact, and the removal of the walls and the finishing and furnishing of the enlarged chamber carried out in another; and the scheme affords a satisfactory answer to the absurdities of men like Mr. Labouchere, who would without scruple pull down the present world-famed building to provide a common-looking chamber in which every member should have a seat. Nevertheless, we are of opinion that the House of Commons would be wise to think twice before enlarging its tabernacle. In the present House an average speaker can render himself audible without difficulty; in a chamber practically more than twice the size he could not. Speaking has to go on every day, during the Session; a gathering of all the members, all wanting seat-room at once, happens but rarely. Members might find that by enlarging the House in their desire to provide against a temporary and occasional inconvenience, they had subjected themselves to a permanently increased tax on their physical endurance which would prove the more serious evil of the two.

TO the same magazine (*Nineteenth Century*) Mr. T. G. Jackson contributes an article in reply to that by Lord Grimthorpe, who he is obliged rather reluctantly to admit as an ally, in regard to all events to the destructive side of the criticism of himself and his friends on the Institute of architects. The article contains however some very neat hits at Lord Grimthorpe, neater perhaps than the object of them will altogether realise. The concluding page of the article is a very good *resumé* of what has been often urged before, by those who give any thought to architecture, as to the importance of studying architecture as a living art and not as an imitative one. That in the present day it is very difficult to do this is, however, evident from the amount of imitation of old styles which we find in many of the works even of those who most ardently, and we have no doubt sincerely, deprecate the system. We may add that those who most respect Mr. Jackson both personally and as an artist must regret that he should have thought it necessary to ally himself, as by implication he does, with the author of the foolish and dishonest article in the last number of the *Quarterly Review*, which was simply an endeavour to discredit the Institute of Architects and all its ways by absurd exaggeration and a misrepresentation of facts. Surely in this matter Mr. Jackson and his friends might have found it more dignified to say, *non tali auxiliio*.

THE new number of the German *Archæologisch "Jahrbuch"* (1892, part 4) is rich in contributions to the history of ancient sculpture. Dr. Milchhoefer discusses the beautiful female statue found at Epidaurus, and currently known as the Epidaurus Aphrodite (Cat. Central Museum, Athens, 121). Its chief claim to the name has been that it represented a woman clad in a close-fitting transparent *chiton*, which recalled the drapery of the Venus Genetrix type. The statue, however, always presented one difficulty—over the right shoulder is passed a belt, which must have supported some weapon. This has led to an attempt to identify her as a Mænad who might

he supposed, accidentally, to be carrying a knife or sword. Dr. Milchhofer solves the difficulty by interpreting the statue as Dike, Justice, who, alone of women figures, rightly carries the sword as her regular attribute. She is so represented on the well-known under-world vases. Moreover, at Epidaurus, and, so far as we know, there only, was a regular cult of Dikaiosyne, the same personality, attested by an inscription. The statue of Dike may well have stood in the shrine of her mother Themis, which formed one of the complex of sanctuaries at Epidaurus. Another paper of great interest is that by Dr. Six, of Amsterdam, on the statue seen by Pausanias near the Propylæa, of a wounded man pierced by arrows. The statue has a double interest—it was made by the famous sculptor, Kresilas, and we possess the actual basis which still stands approximately *in situ* (figured in "Mythology and Monuments, Ancient Athens," p. 387). Pausanias made the mistake—a not unnatural one—of supposing that the statue represented Diitrephe instead of his more famous father, Hermolyces. The interesting point is that in the de Luynes collection of the Bibliothèque Nationale at Paris, Dr. Six has discovered a vase painting which gives us a copy of this very statue of a man falling pierced by two arrows, but still fighting with his spear, just as they describe the statue, *vulneratum deficientem in quo possit intelligi quantum restet anime*. The position of the figure on the vase just accords with the curiously placed attachment marks on the basis. Moreover from the technique it is manifest that a bronze statue is copied. In this vase therefore we have our best clue to the style of Kresilas, who seems to have made a speciality of wounded figures, as it will be remembered he made also a wounded Amazon. Space forbids us to do more than note a very valuable article by Dr. M. Mayer, in continuation of his Mycenæan researches.

THE question of the contract for the Woolwich ferry boat again came before the London County Council on Tuesday. The question has more than usual interest because it exemplifies the certainty that where a body interested with the management of public affairs endeavours to benefit one class at the expense of the community a conflict must ensue. We have before this occasion commented on this same matter, in which the struggle was between accepting the lowest tender in the public interest or a higher tender in the interest of London artisans, and fortunately the public interest won the day. On Tuesday the question arose whether Messrs. Simons's tender should be finally accepted or whether the matter should be gone into again because Messrs. Simons wished to modify the standing order of the Council with regard to contractors paying trades union rate of wages by adding the words "except so far as the rate of wages and hours of labour may vary in the Clyde district." In other words, facts were combating theories, and the theory that the Council could regulate the fair rate of wages has had to go down before hard facts. The Council adopted the Scotch contractors' modification, and thus, in effect, modified their own general resolution on one of the first occasions when it could be seriously tested. It is pretty clear that as time goes on it will be found that many of the theories put forward by the advanced members of the County Council are incompatible with the public interest and sound business and economical principles. We therefore look forward to the day when the Council, having passed through a period of probation, and having shed its shallow theories and its philosophers, will become a practical assembly of business men of moderate principles.

WE are glad to learn from a paragraph in the *Times* of Thursday that some petitions are to be presented to Parliament

against the one-sided and inconsiderate course proposed to be taken in regard to removal of all street gates and bars in London. The Duke of Bedford, in a petition on this subject, alleges with perfect truth that the Bill prejudicially affects the rights, property, and interest, of himself and of his lessees and tenants; and a petition from the trustees under the will of the fourth Duke of Portland objects to the removal of the gates in Park Crescent, Harley Street, and Devonshire Place, the erection of the gates and the restriction on traffic having been the subject of an express Parliamentary contract. The onus of the Bill lies in the proposal to remove these gates without compensation to tenants or ground landlords, in defiance of the obvious fact that their existence makes a great difference in the value of residential property. And even apart from the question of compensation, it is very doubtful whether public interest, in the widest sense, requires the removal of all of these gates. Many of them are practically no obstruction to public traffic, they only compel vehicles to take another course which is just as convenient, and prevent them from needlessly and wantonly destroying the quiet of a residential street. The residents in such streets are a portion of the public of London, and a more important portion than many of those who are clamouring for the removal of the gates. Why are not their rights and claims to be considered just as much as those of the people in the street?

OUR attention has recently been drawn to a new artificial sandstone, of German origin, which has now been placed on the English market, and is worthy of a short description. It is known as one of "Moehle's Building Patents." Unlike many other artificial stones, it does not require much preparation before being ready for use, and indeed it would, perhaps, be better described as a new form of cement than as a building stone properly so-called, though the product closely resembles in appearance certain kinds of natural sandstone. In its preparation blast furnace slag of the special kind obtained in the manufacture of foundry pig-iron is granulated by being run off into water, then finely pulverised and thoroughly mixed with cement, with or without the addition of soda, in the proportion of one part cement, one to three-tenths part soda, to one to eight parts pulverised slag. This mixture is moistened with only as much water, as to be just damp enough to work, and is then rammed firmly into iron, wooden, or gypsum moulds. The moulds are removed immediately after the ramming, or, preferably, after the lapse of from one to five hours. When it is desired to produce a coloured stone, the requisite colouring mineral matter is added to the mixture of slag powder and cement. For rough work, and also for the inside of shaped blocks, gravel or small pieces of slag may also be added. According to tests made at the Royal Academy of Charlottenburg this artificial sandstone increases in strength for some time after it is made. After seven days samples withstood the pressure of 3,723 lbs. per square inch, after twenty-eight days 5,147 lbs., and after ninety days 6,227 lbs. The patent composition for making the stone is forwarded to the building site in bags or barrels, and local sand or gravel may be used. Moreover, the builder may mix his own cement with the composition. It is said that the material is very durable, and whilst we do not desire to dispute this statement, it may be well to bear in mind that it has not been long enough in use to enable us to judge of its durability from a practical point of view. Under the microscope it certainly appears to be compact, and the materials of which it is composed bind firmly together. There seems also to be a slight proportion of iron present, though this is probably not sufficient in quantity to seriously interfere with the weathering of

the stone. A sample of the powdered compound, ready for mixing, contained quartzose grains, which would have been more suitable for the purpose were they sharp or angular. The question of durability must also be governed to a large extent by the quality of the cement used. The stone, no doubt, would be durable when the best cement and sharp grit or sand were used, for the nature of the "patent composition" is such as to constitute a valuable addition to good cement; but when we learn that builders are allowed to buy the composition, and to add cement of their own choosing,—for that is practically what it amounts to,—we fear that the enduring qualities of this artificial sandstone will be found to vary considerably.

ANOTHER of "Moehle's Building Patents," also recently introduced into this country, consists of a peculiar method of lining shafts and wells by means of specially-formed blocks of concrete. The underside of each block, or segment, has a semi-cylindrical projection running along it, with a groove on either side, whilst the top of each block has a semi-cylindrical channel, the two vertical sides having each a fluting. When placed in position in building, the projection at the bottom of the block fits into the channel on the top of the corresponding block beneath, and the whole is firmly set in concrete. Further, each block has a hole running through the centre from top to bottom, and the sides of the block are grooved so that when two blocks are placed side by side a hole is formed into which the cementing material is rammed. In building, the blocks are so arranged that the hole running through always comes in a straight line with, or is directly over, the hole formed by the grooved sides on the junction of the blocks. Besides materially assisting in the general construction of the well-lining, one or more of these holes is fitted with iron tubing in cases where much water is met with in sinking. The advantage of this will be at once seen, for the water, which would otherwise try to force its way into the shaft, is enabled to be conducted up the tubing to the surface, and thus a considerable proportion of the pressure at the sides is relieved. Where that pressure is very great, and the necessary hydrostatic conditions prevail, the water finds its way up the tubing to the surface unassisted. Many modifications may be adopted in building, such as providing the well or shaft with two linings, one within the other, leaving a space between to be filled with concrete, &c. The blocks may be made near the spot where they are required; the concrete is rammed into cast-iron moulds, the shape of which corresponds to the diameter of the shaft. This invention will prove useful in well and shaft sinking, especially in cases where there is much influx of water.

IN the course of next Spring the ground lease, fifty years unexpired, of Campden House, Kensington, will be offered for sale, at the Mart. The mansion stands within its own well-timbered grounds, four acres in extent, and about 120 ft. above the river level. The ground lease contains no restriction against building other than that houses shall not be of value less than 30*l.* a year, nor is it covenanted that the present house, which was built about twenty years ago, shall remain. The District Railway line passes beneath the property. The original house, containing thirty rooms, a theatre, and a picture-gallery, was destroyed, together with its costly contents, by a fire that broke out early on Sunday morning, March 23, 1862, being then occupied by Mr. W. F. Woolley.* It had been built, *circa* 1612, for Sir Baptist Hicks, the wealthy mercer of Cheapside (who was elevated to the peerage as Viscount Campden), on the heath near the

* See the *Builder*, March 29, 1862.

old Gravel Pits, which, it is said, he won at play from Sir Walter Cope. Cope was then lord of Kensington manor by purchase from Archibald, seventh Earl of Argyll, and his wife, Anne, daughter and heiress of Sir William Cornwallis. The house was constructed of red brick, with stone coigns and mullions, having three bays in the main (south) front, surmounted by a stone balustrade, and attic floor, and flanked by two square towers with pyramidal roofs—some-what after the style of Holland House, built by John Thorpe for Sir Walter in 1607. The grounds extended further southwards than they do now; the avenue of elms reaching to the new graveyard west of the parish church, is drawn in Rocque's map of 1764. In 1691 Princess Anne rented the house, and there lived five years with her son, named Duke of Gloucester by William III., the story of whose childhood has been written by his servant, Jenkin Lewis. For Anne's retinue was built (and some say by Wren) the adjoining house, The Elms, now called Little Campden House. The Elms suffered damage from the fire of 1862. It was then tenanted by A. E. Egg, R.A., and was afterwards the home of Mr. and Mrs. Alfred Wigan. Campden House passed in marriage to the Noels, and then to the Boyles, and there Richard, third Earl of Burlington, the architect, spent his boyhood. In 1719 the Boyles sold the estate to Nicholas, afterwards Baron, Lechmere, satirised in the ballad "Duke upon Duke" written by Swift or Gay, from whose representatives, after a long Chancery suit, it was bought by Stephen Pitt. Pitt had married the heiress of the Orbell who built Orbell's-buildings—two houses (but now thrown into one), in one of which, since called Buckingham House, Sir Isaac Newton lived, though not continuously, from January, 1725, until his death there on March 20, 1727. That house appears in our illustration, July 10, 1886, of the Carmelite Monastery. Pitt broke up most of the park, cut off the old house from their present position in Gloucester-walk; the eastern pier still carries its original greyhound. Faulkner gives a view of Campden House in his "Kensington," 1820; by that time the front had been stuccoed over, and had lost most of its ornamentation, including the parapet and the tower roofs. In the re-building the main features of the front elevation, with the towers, appear, but five curved gables replace the parapet. We are informed that the District Railway Company own the freehold of this site.

A PROPOS of the sanitary condition of some of our city churches, upon which we have commented of late, as occasion arose, we find that application has been made to the Consistory Court for a faculty to remove the remains from beneath the floor of St. Michael Bassishaw church. At their meeting last week, the City Commission of Sewers resolved, at their Sanitary Committee's instance, to reduce the fees from 3s. to 1s. 6d. per ft. superficial for the ground, and from 17 to 15s. for the interment of each coffin, as may be removed to Ilford Cemetery from St. Michael's. That church was rebuilt of brick, with a tower, since cemented on face, by Wren, at a cost of 2,823*l.*, on the site of one erected in the middle of the fifteenth century which had replaced the church founded *circa* 1140, and bestowed by Henry III. upon Adam Basing, a member of the family who gave a name to Basing (afterwards known as Bakewell) Hall and to the ward wherein the church stands. In 1697 the interior was repaired and beautified. Hatton mentions the burials of Sir John Gresham and his brother, Sir Richard, elected Lord Mayors in 1547 and 1537 respectively. The latter was father to Sir Thomas, founder of Gresham College, for which new buildings were erected in Basinghall-street in 1842-3, after the late George Smith's designs. The late George

Godwin thus describes the fabric in his "Churches of London"—

It was completed in 1699, and is a plain substantial building, without any striking features. The length within the walls is 70 ft., the breadth 50 ft., and the height 42 ft. A description of the interior will not occupy many lines. Corinthian columns, thinly set, supporting an ugly entablature, divide it into three aisles. The ceiling is cambrated, and formed into panels, having also openings on each side for light to the church. In each of the side aisles there are windows, and at the east end above the altar-piece, was formerly a very large window, now stopped up.

MR. T. W. THOMPSON'S report to the Local Government Board on the general sanitary condition of the York Rural Sanitary District, dated January 14 of this year, deals with the sanitary condition of a considerable tract of country, containing forty-seven villages, each of which is briefly reported on. The general condition of the district is summarised in the body of the report, and the following quotations suggest that there is much need for improvement:—

"Speaking generally, the water supply must be said to be of a very unsatisfactory character. With the exception of some parts of the district contiguous to the city, such as Fulford Gate, Dringhouses, and Clifton, which are supplied from the mains of the York New Water Works Company, the inhabitants are dependent upon wells, or, as in a relatively few cases, on springs. Almost all the wells are, I was informed, merely dry stoned, and this was certainly the case with regard to all but one or two of those which I had an opportunity of inspecting internally. They must therefore, as a rule, be looked upon as open to the admission of water from the superficial layers of the soil, indeed in not a few cases percolation of this kind was seen to be taking place. Inasmuch then as these wells are in very many instances situated within short distances of privies, middens, foldyards, and pigsties, it may be safely concluded that numbers of them are polluted. The likelihood of their being polluted, too, is increased by the fact that over the greater part of the district they are sunk in porous soil, and are surrounded by gravel. Proximity to the foldyard is an extremely common defect in the position of farm wells in this district; in some cases wells were found actually within foldyards. Many of the cottage wells are recognised by the tenants as being polluted, and with regard to others, it was said that the water was thick or bad after rain.

Most of the villages in the district have sewers of some sort. Where these sewers have been recently put down, they consist of socketed 'sanitary' pipes, but in the larger number of instances they are old 'tile' pipes, sometimes socketed and sometimes not, often, no doubt, put down originally for storm water alone. In certain cases they were said to be merely tile drains without bottoms. . . . The sewers generally are without any proper arrangements for inspection or flushing, and are usually deficiently ventilated. Some, apparently, are not ventilated at all. . . . The sewage in all cases, except at Clifton, where it goes into the city system, is discharged in a crude state into rivers, streams, or ditches, and ultimately finds its way into one or other of the large rivers which run through the district. . . . Except as regards the larger houses, where water-closets are employed, the usual mode of excrement and refuse disposal is by middens and privies. A very large number of middens are roofed over, but many were found still uncovered. Some of the more recently constructed middens have been rendered in cement, but the older ones, as a rule, are not so constructed as to prevent the soaking into them of surface water, or the percolation of their contained liquid filth into the surrounding soil. Many were found large, deep, wet, and offensive. . . . Not a few privies or middens were found adjoining, or very near to dwellings. Accommodation for the deposit of ashes and house refuse was sometimes either absent or of very defective character. In the former case ashes and house refuse were found heaped up in the garden."

The report concludes by pointing out that since it was drafted the extensive prevalence of cholera on the Continent has added a fresh danger to those parts of the country characterised by unwholesome conditions and defective water supply, and that if the York Sanitary Authority do not avail themselves to the utmost of the interval before the hot weather, to improve the sanitary condition of their district, "they will be incurring a responsibility the gravity of which it would be difficult to exaggerate."

THE first of the series of lectures on matters connected with building given annually in the Carpenters' Hall, delivered by Professor J. M. Thomson, on February 22, on the subject of "Pigments and Protecting Agents," was a kind of supplement to his former lecture upon the "Chemistry of Building Materials." He dealt at some length upon the change of colour in pigments, showing that this may be brought about (1) by change in molecular condition, (2) by loss of water of combination, or (3) by change in chemical composition. To illustrate changes of the first description he painted some sheets of drawing paper with mercury and cobalt colour respectively and warmed them over a gas-burner. In a few moments the mercurial pigment had changed from vermilion to a light yellow, while the cobalt compound changed from a black or dark slate colour to a bright green. He pointed out that no alteration had been effected in the composition of the compounds, but that the change in colour was entirely due to a change in their molecular condition. To demonstrate change of colour produced by dehydration he subjected some "blue stone" or copper sulphate to distillation and called attention to the fact that as the water of crystallisation or combination was driven off the copper sulphate lost its colour and remained as a white powder. In illustration of the third cause of change of colour the lecturer showed the rapid discharge of colour produced by the oxidation of potassium permanganate, and also the alteration in the colour of precipitates manufactured with ferrous salts, remarking that in the latter case the rapid change was due to the oxidation of the ferrous compound into a ferric compound by the oxygen of the atmosphere. Passing on to the manufacture of pigments by precipitation, Professor Thomson said that white lead may be made very rapidly by precipitation, but that the product was inferior in "body" to that obtained by the old "Dutch" process. He illustrated the manufacture of lead carbonate by the precipitation method by passing carbon dioxide gas into a solution of basic lead acetate. He considered that in many cases the slower process of manufacture the better is the resulting pigment. Referring to the action of sulphuretted hydrogen upon white lead, he said painters who had been careful not to use a lead pigment were sometimes puzzled by the subsequent discoloration of their paintings. The fact was, lead was often to be found in the "driers" employed, and this was likely to be the cause of the trouble. With regard to the poisonous pigments he said that the most injurious were those containing copper or arsenic salts, and that, although barium was also poisonous, the compound most commonly employed—barium sulphate—was so insoluble that the small amount that might be taken into the system from a wall paper or wall painted with this compound would probably not be sufficient to produce symptoms of poisoning, but would pass through the system unchanged. Professor Thomson then showed some experiments by which arsenic in wall paper or pigments may be detected, but these have recently been fully described in our "Student's Column."

ON Wednesday last, Professor Silvanus Thompson delivered the second of the Carpenters' Hall lectures for 1893, Sir Jas. Clarke Lawrence being in the chair. The subject was "Electric Lighting from a Popular Point of View," and it was, perhaps, inevitable that the lecture should have much in common with those on the same subject recently given by the Professor at the London Institution, and noticed at the time in these columns. The lecturer said that he did not intend to mention that night either frictional or voltaic electricity, but would only consider that mode of producing a current based on mechanical action. He warned his

* This note was unavoidably postponed from last week.

audience that it was not electricity that was produced at a station, any more than water was created by a water works company. Electricity was everywhere, the business of the companies was merely to pump it round the circuit in a current. After sketching the evolution of the dynamo, which word, he said, was invented by Dr. Werner Siemens to indicate the origin of the current, the Professor called attention to the curious fact that the dynamos used in the arc lighting of the City at the present time, namely, the Brush machine, which lights the west end of the City, and the Thomson Houston, which lights the east end, were both of American origin, and were both early types, having been invented in 1878, and but little modified since. The lecture was illustrated throughout by lantern slides, and by experiments with instruments and apparatus lent by the City of London Lighting Co., and by Messrs. Rindwanger; but, since the slides and experiments were the same as those used in the London Institution course, it is unnecessary to repeat our account of them. The Professor dwelt especially on the difference between English and American practice in the method of driving. "The Americans hold," he said, "that there is nothing like leather," but the English practice is more and more in favour of direct driving, and, even when pulleys are used, they prefer ropes to belts. This was illustrated by plates showing the Westinghouse Station in London, which is on the American plan, and contrasting it with the Deptford Station and a station at Bath, which, he said, was nearly on the same plan as that at Bankside, from which came the current he was then using. In conclusion, the lecturer expressed his confidence that the price of electric energy would fall greatly with extended use; and pointed to electric heating and cooking, as likely to lead to a demand for the current in the daytime.

WE are glad to hear that the Architects' Benevolent Society has received a most welcome addition to its funds by the bequest of 500*l.* under the will of the late Mr. John Gibson. During his life Mr. Gibson was a liberal donor and subscriber to the society, and this bequest will be an important addition to the invested capital, the further increase of which, by donations and bequests, would warrant the conferring of additional pensions beyond those which the limited means at the disposal of the council now enables them to grant. The income available for the relief of urgent cases is mainly dependent on the annual subscriptions, and a large addition of subscribers would greatly benefit those who, by reason of adverse circumstances, are compelled to apply for relief in their distress.

THE drawings to which prizes have been awarded by the Institute are now being sent round for exhibition to some of the provincial architectural societies. The Dundee "Institute of Architecture, Science and Art" has issued a special circular to its members recommending the exhibition of prize drawings to their attention, stating that "whether for records of old work, designs of new work, draughtsmanship, or colouring, the R.I.B.A. prize drawings are well worth a visit" and inviting members to bring the exhibition to the notice of any students of architecture among their acquaintance, "as the standard of work will rise higher every year by means of such Exhibitions."

THERE have been more interesting exhibitions of the Society of Painter-Etchers, whose works are now to be seen in the gallery of the Society of Painters in Water-colours, forming the eleventh annual exhibition; but there is a great deal to look at, though including a good deal which does not properly come under the province of etching. The essential quality of etching is that it

combines the permanence and the duplicating power of engraving with the freedom of hand of pen or pencil sketching. Etchers who neglect this freedom of hand and aim at the finish and comparative realism of a highly wrought engraving are simply parting with the essential characteristics of their art, and wasting time in elaborate work which might as well be done in engraving, and would print more easily, more forcibly, and in much greater number, from an engraved plate. Thus we can see no excuse for such etchings as Mr. Law's, which are merely like popular engravings worked up in a rather sensational manner, and in which there is more of labour and patience than art. The same of Mr. Sherborn's "Book-plates," which are admirable in design and execution, but might just as well be engraved. On the other hand, there is a point at which freedom degenerates into what we should call "scratchiness," a point reached by Mr. Percy Thomas and Mr. O. Hall in some of their small sketches, where lines seem to be scribbled about without definite meaning. In a perfect etching there should be freedom of line combined with definite intention in each line. The most typical works in this sense in the collection are the studies of heads by M. Helleu, mostly in dry-point, which are masterly in their indication of modelling by pure line, and some of the small carefully considered studies of scenes by Mr. Short, such as "The Solway at Mid-day" (49). The amount of effect indicated in this, without a single superfluous or uncertain line, is a good lesson. Among other works which are specially good from the line-etching point of view are those by Mr. Slocombe, or most of them; "The Matterhorn from the Riffelberg" (21) conveys no sense of the scale and distance of the mountain. M. Jacob-Hood's "On a Paris Quay" (30), is an admirable little bit; his "Siren" (32), is too pictorial but has a certain sentiment, reminding one of Corot. Mr. Strang's motley collection contains some things very clever and some outrageously ugly and repulsive. Mr. H. R. Robertson's studies of heads are good; Miss Bolingbroke's dry-point "The Loom" (80), Mr. C. J. Watson's and Mr. Herbert Marshall's sketches of cities and streets, Colonel Goff's contributions, especially "The Métropole, Brighton" (122), are among the things that should be looked at, also those by Mr. Cameron and Mr. Urwick, and the sea subjects by Herr Storm van Gravesande, who has a way of indicating the movement of the sea by thick rosy black lines, which is perhaps too defiantly free, but is in the true spirit of etching. Mr. Haig has a fine and highly finished interior of Durham Cathedral (204); this again, however, is rather engraving than true etching. There is a small collection of works by old masters, including a considerable number of Hollar's elaborately wrought drawings of shells, which are tolerably familiar objects now, but are always interesting.

LETTER FROM PARIS.

AFTER having acquitted the sculptor "Jacques France," as already mentioned, for an attempted assassination, the Assize Courts have now also acquitted the Spanish painter Jean Luna de San Pedro, who had murdered his wife and her mother in a paroxysm of jealousy. These untoward events have not unnaturally caused a considerable perturbation in the world of artists, whose peaceful studies have been twice disturbed by these unaccustomed deeds of violence.

Besides the exhibition of the Cercle Volney, to which we have already referred, about half-a-dozen small exhibitions are open, each of them with a certain interest. We may give precedence to the oldest, that of the "Aquarellistes," which has now had fifteen years of existence, but has suffered the loss of many of the most brilliant among the artists who originally founded it as a kind of imitation of the Society of Water-colour Artists of London. The society, however, is still numerous and flourishing, and the older members are among the foremost in the field.

We find among them M. Harpignies with his bright river-side scenes and large spaces of sky. M. Paul Lecomte exhibits still his slight but bold sketches. M. Lhermitte is there with his simple but broad and grand charcoal studies, M. Boulet de Monvel with his scenes of child-life: MM. Clairin and Pujol illustrate Venice, and M. Jeannot has gone for subjects to Zola's "Débâcle." The illustration of "Napoleon III. and his Staff," by a painter who was originally an officer, deserves special mention for its spirit and reality in the representation of types of French military life.

The "Cercle des Mirlitons" has transferred its quarters to the fine house in the Place de la Concorde, formerly occupied by the "Cercle Impérial," the garden of which extends to the entrance of the Champs Elysées. Thus transformed and enlarged, the club has dropped its former title for that of "L'Epatant," a nomenclature essentially Parisian, and which may be rendered into English as "most fashionable." Its annual exhibition, as usual, is one of the most important artistic events in the fashionable world. There are this year a great number of portraits, bearing the signatures of MM. Maignan, Courtois, Weertz, Benjamin Constant, and Carolus Duran. M. Gervex is conspicuous by a very remarkable study of a head of a young woman. Among other works we may mention especially the two fine landscapes by M. Cazin, "L'Eclaircie" and "Temps Calme." There are also some very fine landscapes by M. Pierre Lagarde.

What can one say of the exhibition of the "Femmes Peintres et Sculpteurs" at the Palais de l'Industrie? This attempt has been going on for twelve years, and nothing has come of it, and this year's exhibition is one of the weakest of the whole series, and certainly shows nothing whatever to justify the efforts which its president, Madame Léon Bertheux, has made to get the Institut and the École des Beaux-Arts open to female artists. A certain review, entitled *L'Art Français*, has been asking and publishing through its columns the opinions of various leading artists on the admission of women to State instruction in art. M. Puvion de Chavannes has declined to pronounce any opinion, while M. Bonnat, on the other hand, has plainly given his opinion that "women have something better to do than paint pictures." M. Henner says it is useless to propose to increase the number of pupils in schools that are already overcrowded. MM. Chartran, Dagnan-Bouveret, and Rodin are of the same opinion, and M. Carolus Duran alone has pronounced in favour of State teaching for women, provided it be in perfectly separate ateliers from those of the men. M. Dalou has a special view of his own, and declares with the rather blunt frankness which characterises him that he has no time to discuss the futile question of the admission of women into a school the very existence of which he considers as a "calamité artistique," and of which he only desires to see the total suppression.

Another small exhibition has been opened under the title (as already mentioned) of the "Société des Parisiens de Paris." As its name indicates, this new society is restricted to artists who are natives of Paris. From an artistic point of view it presents nothing very remarkable, and the origin of the painters has not conferred originality on their works. The only things in it worth remark are some portraits by M. Régamy, a pastel by M. H. Cain, flower-pieces by M. Cormon, a panel by M. Barrias, and a fine ivory statuette by the late M. Moreau-Vauthier.

We may also notice a small exhibition at the Georges Petit gallery by a group of painters who style themselves "Les Inquiets." Why this title it is difficult to understand, unless it is a modest indication that they are very diffident of criticism and consequently afraid of the judgment which may be passed upon an exhibition which in reality is an interesting one, and better than some others with more high-sounding titles.

To terminate this cycle of small exhibitions we may mention one more, which has been organised by a certain number of artists who excel in the representation of horses, and have got up a small exhibition of their works for the occasion of the forthcoming horse show at the Palais de l'Industrie. Among them we note the names of MM. Gerôme, Aimé, Morot Gavarni, Georges Besson, the Comte du Passage, and Froment Meurice.

To-morrow is the opening day at the much-talked-of Meissonier exhibition, when the entrance fee is to be 100 francs for each person, the proceeds to go to a charity. Eleven hundred pictures

have been collected in this exhibition, for which the Government has, as a very exceptional favour, granted the loan of the painter's few works which are in the Luxembourg, viz.—"Solferino," "L'Homme à la Fenêtre," "Napoleon III. et Son État Major," and "Le Chant."

We have already alluded to the scheme for the exhibition of 1900 devised by M. Saint-Lane. Here is the outline of that submitted by M. Berlier, the engineer. He has selected the Bois de Vincennes as a site, where the available area will be about 1,400 acres. At the extremity of the exhibition, the principal entrance to which will be by the Lac Daumesnil, M. Berlier proposes to establish a temporary town with a dozen streets, hotels, a theatre, a circus, &c. The principal means of transport, besides the boats and the tramways, will be a railway connecting with the Ceinture line and with the existing line to Vincennes. M. Devie (architect) proposes on the other hand the plateau of Courbevoie, on the prolongation of the Avenue de la Grande Armée. He proposes to occupy more than three million square metres, the site being in the form of a fan spreading over the width of two kilometres and with a radius of 1,000 metres. At the extremity of each stick of the fan will be a palace, in the rear of which will be the special galleries of the exhibition. We may notice also the project of M. Gervais, who proposes as a site the large area of ground situated between the fortifications and the Commune d'Issy, at the south-west of Paris. Lastly, M. Muet, also an architect and brother of the celebrated Egyptologist, proposes to establish the exhibition of 1900 on the outer zone of fortifications comprised between the Bois de Boulogne and the Avenue de St. Denis. However interesting the consideration of these different projects may be, we do not believe one of them has a chance of success, seeing that the Municipal Council, with all the authority derived from its financial participation with the scheme, is resolutely in favour of the Champ de Mars site, the area of which it is proposed should be nearly doubled by the addition of the whole of the Quartier du Grenelle situated alongside the Avenue Suffren. This is the conclusion embodied in the report of M. Alphonse de Humbert, which is shortly to come under discussion, and in which it is proposed to devote 40 million francs to the expense of compensation in securing that part of Paris as a portion of the site for the exhibition.

The monument to be erected to M. Thiers in his chapel in Père Lachaise is in active progress. The monument, designed by M. Mercie, is composed of three figures each three metres in height. That of Thiers, standing with half-closed eyes, appears as if in profound thought; a female figure, symbolic of Immortality, offers him a crown, while another figure representing "La Patrie," is seated on a broken cannon; she holds in her right hand the staff of a standard, the folds of which, behind, partly cover the pedestal of the monument. She looks sadly at the crypt before her, in which is placed the sarcophagus of the deceased statesman. This figure and that of Thiers are in marble, the figure of Immortality is in bronze. An exterior view of the mortuary chapel, designed by M. Aldrophe, the architect, was published in the *Builder* about two years ago.

We have to record the premature death of a sculptor of talent, M. Louis Alexandre Lefèvre-Deslochamps, who died at Paris on February 22, at the age of forty-three. Born at Cherbourg, he became a pupil of Duñont, and produced a certain number of works which were much admired, and most of which were exhibited at the Salon between the years 1873 and 1890. Among these were "Jeune fille se retirant une épine du pied," "Marguerite à l'Eglise," the marble group entitled "Premières Joies," which decorates the Hôtel de Ville of Havre; "A l'Abattoir," a marble group decorating the entry to the abattoirs of La Villette, to which the "Étamage" of M. Albert Lefevre forms a pendant; "Muse Eplorée" intended for the tomb of Millet, the painter, and which was purchased by the State from the Salon of 1890. He made also some fine portrait busts, among them those of the Comte de Chambord, M. Henri Gréville, M. Andrieu, and Admiral Peyron. He also executed the sculptural decoration of the Theatre at Cherbourg.

We have also to record the death, at the age of seventy-three, of M. Léopold Gély, a distinguished artist in Sèvres ware, and who was the first to apply to porcelain the "pâtes colorées," discovered by the chemist, Robert. This process, then entirely novel, was applied for the first time in the pieces made for the London Exhibition

of 1851, and formed the commencement of a complete change in the decorative treatment of Sèvres porcelain.

WHAT IS ARCHITECTURE, AND HOW CAN IT BE ADVANCED?*

BY PROFESSOR AITCHISON, A.R.A.

My last lecture was only a sketch of the beginning of Greek art, followed down through Roman, Byzantine, Romanesque, and Gothic days to the extinction of Gothic. This extinction was caused by a sudden awakening of the human mind in the West, and to a new standard of taste being offered to it. Though we have nothing to do with any philosophical considerations, it can, I think, do no harm to notice this, that Saracenic architecture goes on still in India and in parts of the far East, in the phases adopted by the Mogul conquerors. The merits of this Eastern architecture may or may not commend themselves to our taste, but this curious fact is patent, that English architects, having no living English or European style to work in, at once adopt the Eastern style they find. This, I think, is scarcely what we wish; I think all persons, architects included, would prefer that the Westerns should teach the Easterns how to build properly, than be taught by them; but, as it is, architects have to go to India, Siam, or Burmah to learn the æsthetic side of their profession; for we must, of course, learn from those who can teach.

I think some lessons may be learnt from what has been said in the last lecture. We see the art of building first absorbing all useful constructional inventions, then gradually converting them into æsthetic features, and producing in special buildings, mainly made up of these mechanical and æsthetic features, grand emotional results. The question we naturally ask ourselves is, why we cannot do the same? All events in which humanity is concerned consist of many factors; for instance, in this case, of natural capacity, strong desires, their direction by education which give aims to life, industry, opportunity, surroundings, and methods. We may, of course, put our capacity as below the Greeks, Romans, and Byzantines, below the savages who overran the West, or below that of the people of the Middle Ages; we may have feebler desires, and a worse education; we may lack opportunities, our surroundings may be unfavourable, or we may have no method, or only a bad one. It would lead us much too far a-field to attempt to make all these comparisons, and on some of these points we know, and I fear can know, but little; yet I think most people would say we had excellent capacities, good education, were very industrious, had splendid opportunities, and excellent surroundings, though I do not take that view in regard to our opportunities and surroundings; let us then look at the method.

The Romanesque method was to give some general instruction, then to teach the technical arts and sciences that underlie most of the trades connected with building, and then to take the students who showed aptitude into the school for architects. We may be sure that there they studied the last successful building of the school, and tried to surpass the best one of a rival establishment; and when they were advanced enough, they were sent to the churches, abbeys, or monasteries, then being built by the mother abbey, to see the designs of their school carried out. When buildings fell into the hands of lay architects, the first guild must, in all probability, have been composed of pupils of the abbey schools. You may be sure, too, that there was keen competition between the various religious corporations, to have their churches made the best and most taking, of those they had seen; which particularly applied to those near them; and there was also a keen desire on the part of the communes to have their cathedrals bigger, handsomer, and more impressive than the abbey churches. The churches and cathedrals themselves were mainly built for emotional effects, and the Christianity of the day was, for all practical purposes, believed to be the true religion; though this unanimity was greatly brought about by the burning of heretics. This teaching of architecture had lasted from the fourth to the beginning of the thirteenth century.

We cannot adopt this method of teaching, for we have no schools; but even if we had, they would not be schools for designing buildings for the proprietors. Even if we let our fancy run away with us so far, as to imagine a building company beginning by starting a school for architects, the ends in view would be different, for the com-

pany would certainly not confine its buildings to barracks and churches for single men devoted to asceticism, whose only object was to get to heaven themselves and to teach others how to get there too; nor would such a company have the perfection of teaching that centuries of experience had given. I never heard of there being any heresy or schism, of an architectural sort, in these monastic schools, but if any such symptoms showed themselves, a very strong discipline would have been applied. I doubt if any Act of Parliament in our day, would allow a company to tie up and well flog with a cat-o'-nine-tails, the pupils who tried to introduce elements foreign to the traditions of the school. The abbey school, I too, did not only teach architecture, but every art connected with building, as well as the sumptuary and some of the fine arts. Masons, carpenters, joiners, plumbers, slaters, smiths, and glaziers were taught there; as well as cabinet-makers, braziers, glass-painters, silver and gold smiths, jewellers, perfumers, scribes, illuminators, and bookbinders; and also painters sculptors, singers, and musicians,—so that whatever principles of design were taught in the schools, were taught to the whole body of workers affected by them.

If we allow ourselves to imagine Phidias and Ictinus living in those days, and being forced, through distress, to enter the schools, Phidias would have been told by the master or the abbot, that naked ruffians were not fit for Christian churches, and that the heads of his statues had no character; while the architectural master would have told Ictinus that he was ignorant of the first principles of construction, and that his forms were childish and without expression.

I am afraid we must look forward to the entire liberty of the subject in matters of architecture, provided always that the practitioner does not injure anyone else, either in his person or material interests; the injury bad architecture inflicts on society, can only be punished by scorn and contempt. We can only hope that when each architect has taught himself what he ought to know, that the Classic, Romanesque, Saracenic, Gothic, Indian, and half-dozen Renaissance schools may, between them, finally evolve a product that may captivate the people of the day. Architects admit that certain buildings evoke certain emotions in them; some of these buildings we call ugly, some frowning, some beautiful, some graceful, some masculine, some robust, and some sublime. I am afraid I can only aid students thus far, by saying that when any architectural monument raises an emotion in them, they must analyse that emotion, so as to be sure that they recognise the real one that the building evokes; then see if it be the one the building should excite; and then try and make out why and how this has been caused. To ascertain the cause, they must measure the height and width of the building, measure and draw the shapes of the parts and their position, see what effect the colour of the whole and the parts have, and what are the effects of the sculpture, of the painting, and of the lighting. Those who do this will then have a tolerably exact notion of why the building has so affected them. It would be better still if they could make exhaustive experiments, but I fear these would be too costly for any one, for absolute size has a great effect.

There was a narrow alley in the City, between the walls of two lofty warehouses, and the going down this alley always affected me with a certain awe, when I looked up and saw the narrow strip of sky between those lofty walls, the view excited in me a feeling of sublimity. I was more strongly affected on the night I first alighted at Bologna, and passed between the two tall leaning towers, the Asinelli and Garisenda; the latter seemed, like Jack's bean-stalk, to reach the moon. Neither tower has any particular merit in daylight except its height; but this bare height strikes every one, and has been immortalised by Dante.

Elegant proportions are absolutely necessary if beauty be the main object of the building, and I think a contrast between solidity and lightness greatly adds to the effect; but the lightness should not suggest instability. Giotto's bell-tower at Florence is a lovely example, though it would have been better, had he not made the columns corkscrews. Genius and great skill are, however, so rare that we should be thankful for their masterpieces, even when they are not quite perfect. At the same time, when we study anything to learn principles, we should not allow our admiration to run away with our sense, but admit that Homer sometimes nods.

The gateway at Perugia is another instance of

* Being the fifth Royal Academy Lecture on Architecture this Session. Delivered on Monday evening, Feb. 6.

the happy effect of contrast; the gateway itself is massive, and, looking at it from the outside, the walls beyond it to the left project, and rise in one steep slope to form a bastion; on the top of this is an arcaded building, and the group is both striking and graceful, for the light arched on the bastion acts as a foil to the size and massive dignity of the Roman gate.

I think the most divinely beautiful thing that I have seen is the little caryatid temple on the flank of the Erechtheum; possibly the monument of Lysicrates would be so too, if one's imagination were vivid enough to fill up all the gaps that "time, war, flood, and fire" have made in it. One hardly claims the Parthenon and the Propylæum as belonging to this class, as elements of sublimity carry the mind to loftier altitudes. In almost every other work but Greek, you make allowances for some feebleness, incompleteness, or false note, but in the perfect work of the Athenians you feel that nothing can be added and nothing taken away. Fine Greek works are as superior in quality to all others, as Raffaele's pictures are in form and composition, Titian's in colour, and Milton's poems in nobility of thought and perfection of grace and workmanship. These poems are what has been called "a sculpturing of the imagination."

Perhaps for a single building of modern days, Bramante's Cancelleria at Rome is the most perfect, the Palazzo Vendramin at Venice the most stately, and the Palazzo Spinelli the most delightful. The arcade at the end of the Court of the Fishpond at the Alhambra is a most lovely piece of work, but no comparison can be made between Saracenic and Athenian art,—in fact these two arts cannot be spoken of in the same breath. The nearest approach to Greek work was that of the Italian Quattrocentisti. Some of the tombs in the Badia at Florence and elsewhere are exquisite, like the sarcophagus on the circle in the Frari at Venice.

To speak only of the later great English architects, Wilkins had caught something of the graceful majesty of Greece, as may be seen at University College, London; some of Soane's buildings have great merits; Sir Charles Barry was most admirable in his proportions, and his clock tower at the Houses of Parliament is a masterly design; and there was a distinct and graceful individuality about all Prof. Cockerell's work that showed a refined and dignified mind, and he had, besides his architectural gifts, the genius of a sculptor.

To obtain sublimity, disproportion is mostly adopted, exaggerated height or exaggerated width, and sometimes a look of exaggerated strength; I have never observed that length, however excessive, produces a feeling of sublimity. The look of exaggerated strength is seen in the piers of Durham and Seville cathedrals, and in those of the Town Hall at Brescia; and exaggerated height as compared with width is shown in many cathedrals. Amiens is said to be but 46 ft. wide and 140 ft. high, while Beauvais is said to be but 45 ft. wide and 153 ft. high, and both are examples of sublimity in height. It is not surprising that St. Sophia looks so sublimely vast, if we consider that its nave is about 105 ft. wide, while, with the exception of St. Peter's, which is about 80 ft., the naves of most cathedrals do not exceed 65 ft. The nave of St. Sophia is 227 ft. long without the apse, and its height to the apex of the dome 182 ft.; besides, the shapes of its parts are both novel and fine, and its treatment as a whole is original. The vastest looking building for mere area is the Mosque of Abd-el-Rahman at Cordova; the innumerable columns, as you go down one of the central aisles, give diagonal vistas, and from the distance, the walls are not seen. To get scale is one of the means of showing sublimity in things that are immense, whether that immensity be in bulk, width, or loftiness. And when the opening, which is usually the means of giving scale to vast walls, is exactly of the right shape and size, and in the right place, it makes a more effective composition with a plain wall, than the greatest elaboration or ornament, if the opening is of the wrong size or in the wrong place. I do not know the size of the wall of the theatre at Orange, but it looks stupendous—the great Pyramid could not have looked so vast, if seen from the top; when it was cased with smooth stone, as it does now, when you see the courses widening continually beneath your eye. And the seats in the Flavian amphitheatre have the same effect.

Towers and spires had a great charm for the Medievals; some see in them one of the most popular signs of worship. Doubtless there is a sublimity about those that are well-designed and are very lofty; they are, too, wondrous instances of the skill and perseverance of so diminutive

a creature as man. As a means of safety and defence they had their use in military works. From the tops of towers a hostile force could be seen at a long distance, and things hurled from them must have had a destructive force almost equal to that of artillery. After the communes were established in Italy, a bell-tower was the sign of a free town, and the bell was rung to call the citizens to arms, either for manning the walls or for quelling a riot; and they were equally loved in France and England. Many cathedrals were designed to have a group; Læon had seven. The first towers in ecclesiastical buildings were mainly the upward prolongation of lanterns to light the altar when it was put at the junction of the nave and transept; and from this practice central towers are said to have arisen. The Baptistery of St. George of Ezra, said to be as early as the sixth century, had a tall, egg-shaped dome. A steeple put in the centre of a cathedral is a bad position for it, as the steeple dwarfs the building and the building dwarfs the steeple. The wooden spire at Amiens, though taller than the steeple of Salisbury, looks insignificant.

For effect there is nothing like the square towers of Italy, springing straight out of the ground, and carried up sheer, with a graceful top like Giotto's, and the one in front of St. Mark's; there are others attached to buildings which are very graceful, such as those at the town halls of Verona and Siena. Most of the minarets of the Moslems are graceful and well designed, and show the good effects produced by a judicious change of form from square to round, through octagons and hexagons, they are also admirably divided horizontally by projecting balconies on stalactites. I may mention those at the Mosques of El Azhar, Barkhly, of El-Bordeyn, of Sultan Hasan, of El Ghury, of Kait Bey, and others among the tombs of the Mameluke Sultans, though I have been able to trace to the Saracens but little of Gothic architecture, except the cusping; and this, I believe, was taken by the Saracens from India; the whole cusp, though with the two half cusps, are said to have been taken from the form of Persian sepulchres. This form is at least found in Cashmire, in buildings said to date from 600 B.C. There are at Cairo both Norman ornaments and motives, and one piece of absolute Gothic in the Maristan of Kaloun, of which I think we may safely say that it was designed by a Mediaeval architect; but whether that architect was borrowed from Europe, or was a prisoner, I cannot say. The Norman work has probably the same origin, but such is our archaeological ignorance, that it cannot with certainty be affirmed that the features and ornaments common to Normans and Saracens, were not copied by each from an independent source. I think that there can be no doubt that the Saracen passion for geometry, and their knowledge of it, was communicated to the Christians of the West. I think, too, that the form Gothic took was greatly due to Saracenic influence, that is to say, that the Western Christians saw and admired the Moslem architecture, and endeavoured to equal or surpass it by different means. There are geometrical patterns in Saracen Egypt, that might be Gothic ones, and the Christians undoubtedly appreciated the marvellous effect got by the ingenious repetition of comparatively simple forms, and applied this discovery in their own way.

In one of my former lectures I said that some of the most striking effects are to be got by the lighting, when a building is to be used for emotional purposes; for when it is for ordinary use, a sufficiency of light is wanted for the purposes of life. Supposing Dr. Dörpfeld's theory of the lighting of the Greek temples turns out to be true, we can scarcely imagine a more impressive effect, than when the horizontal rays of the rising sun lit up the statue of the deity, which blazed out on a back-ground of gloom; and the gold and ivory of the statue must have added greatly to the magnificence of the spectacle. I think we must allow that painters are not only the best judges of effect, but search out for it with more care than ordinary persons. On the north side of the choir of St. Mark's there is a little chapel lit by one very small window; under this window is a seat, whence you get a glimpse of the bright light of the transept, against which the ikonostasis with its figures stands out dark on the sunlit ground; while all the shade is enriched with reflected and coloured light, from the mosaic of the ceiling, and from the rich marbles of the walls and floor. This chapel is a favourite subject for artists to paint. Another charming effect is to look from light through comparative gloom to brightness. An admirable example of this is found in St. Maria della Salute at Venice, and is pro-

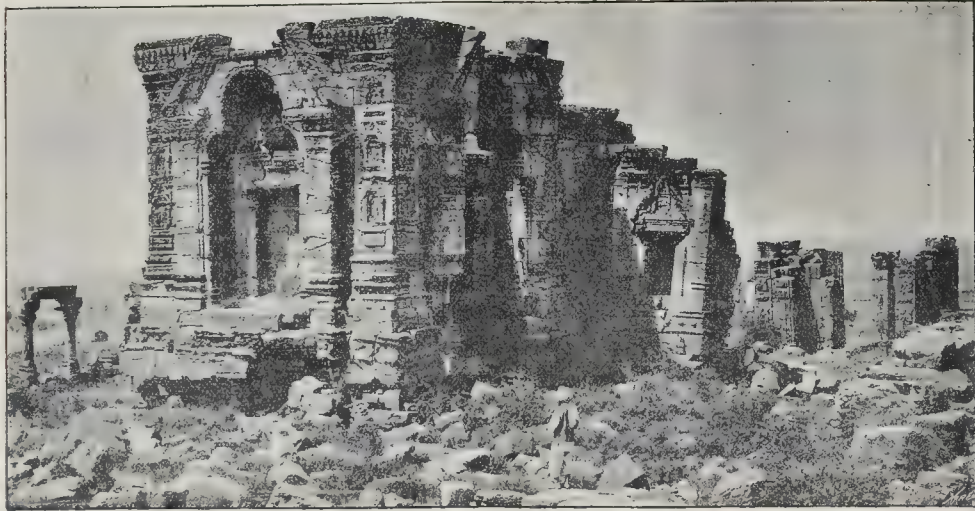
duced by the intervention of a long oval chamber between the nave and the altar. A piece of bright light seen amid gloom not only gives scale, but suggests size and grandeur in the parts beyond the light. This effect may be seen in the magnificent Cathedral of Seville; for when the sun is shining the sacristan carefully closes all the windows but one, with their thick red curtain.

In England, and the North of France, we mostly lose the contrast between broad surfaces and deep recesses, from the mistiness of the atmosphere, for the light and shade is not sufficiently marked, when the recessing is slight; but this seems to me to be an insufficient reason for the contrast being so rarely attempted. The west front of Peterborough Cathedral, and the great porches at Coutances and Dijon, are, however, effective examples to the contrary; in the two latter it is produced by their great depth. The front of the palace at Blois next Place St. Vincent is most effective in sunshine, but this effect is gained at the expense of the light of the rooms, which are very dark.

I cannot believe that the great cathedrals of the Middle Ages were intended to be kept light, as they now mostly are, thus giving them the monotonous effect we all deplore. At Rheims the whole of the upper windows are full of magnificent and deeply-coloured stained glass, while the aisles have plain white glass; this reverses the proper effect, and gives some appearance of instability. The best stained glass is that of the twelfth and thirteenth centuries; for the later light glass is merely a very skillful human production, and has no more effect on us than the tapestries that hang on the piers or under the windows; only the figures and buildings in the tapestries have at least the merit of solidity. The grand glass of Chartres and Rheims comes upon us as a new revelation, and we think these windows must have had angels for designers. In the best windows no subjects are to be made out, but there is a divine and palpitating melody of colour in them; they look as if the jewels of heaven's pavement had been melted into flame, to give mortals some glimpses of heavenly glory; so that men might strive and suffer, to inherit such ineffable bliss. You come away from these cathedrals thinking that all the arts are but "as dust in the balance" compared with the glazier's. These cathedrals, the wondrous monuments of man's power over matter, and of his skill and science that have enshrined the labours of thousands for long years, seem but unworthy frames for this divine glass that wraps us into ecstasies and brings all heaven before our eyes. Divine beauty is not to be weighed or measured against mere mortal achievements. An Indian story prettily illustrates this:—

"One of the ancient Buddhas before Sakya-Mouni (our Buddha) reached the Nirvana in a strange way. One day he saw a falcon pursuing a little bird. 'I beg you,' said he to the bird of prey, 'to leave that pretty creature, and I will give you its weight of my flesh.' A pair of scales at once came down from heaven, and the settling of the bargain began. The little bird comfortably nestled into one of the scales; in the other the saint put a large slice of his flesh: the scale-beam never budged; strip by strip his whole body passed into it; the scale did not yet move. At the moment the last morsel of the body of the holy man was put into the scale the pan with the little bird kicked the beam, the little bird flew away, and the saint entered into Nirvana."

To sum up all that has been said, you can arrange each room or division of your buildings so as to afford the exact accommodation wanted, and so as to allow the people to group themselves as the nature of their occupation will force or incline them. You can properly light the room according to the wants of the occupants, and ventilate each room also according to its wants; you can arrange the whole of them together into the most convenient group, which may often put you, to shifts for the lighting, and you may at least see how former architects managed under similar exigencies. You can learn the qualities and powers of the materials you are obliged to use, you can arrange all the structural parts in strict accordance with the weights to be carried and with the laws of statics. You will thus get a proper carcass, with all the characteristics that the shapes give and the construction requires, and if you could follow this out completely, as nature can do, you would have the building complete both for utility and character; but at present the solution will only be in the rough, and you next have to consider how you can arbitrarily add to it, so as to obtain the right expression for its purpose, by æsthetic devices. Let us



Temple, Montaut, Calcutta.

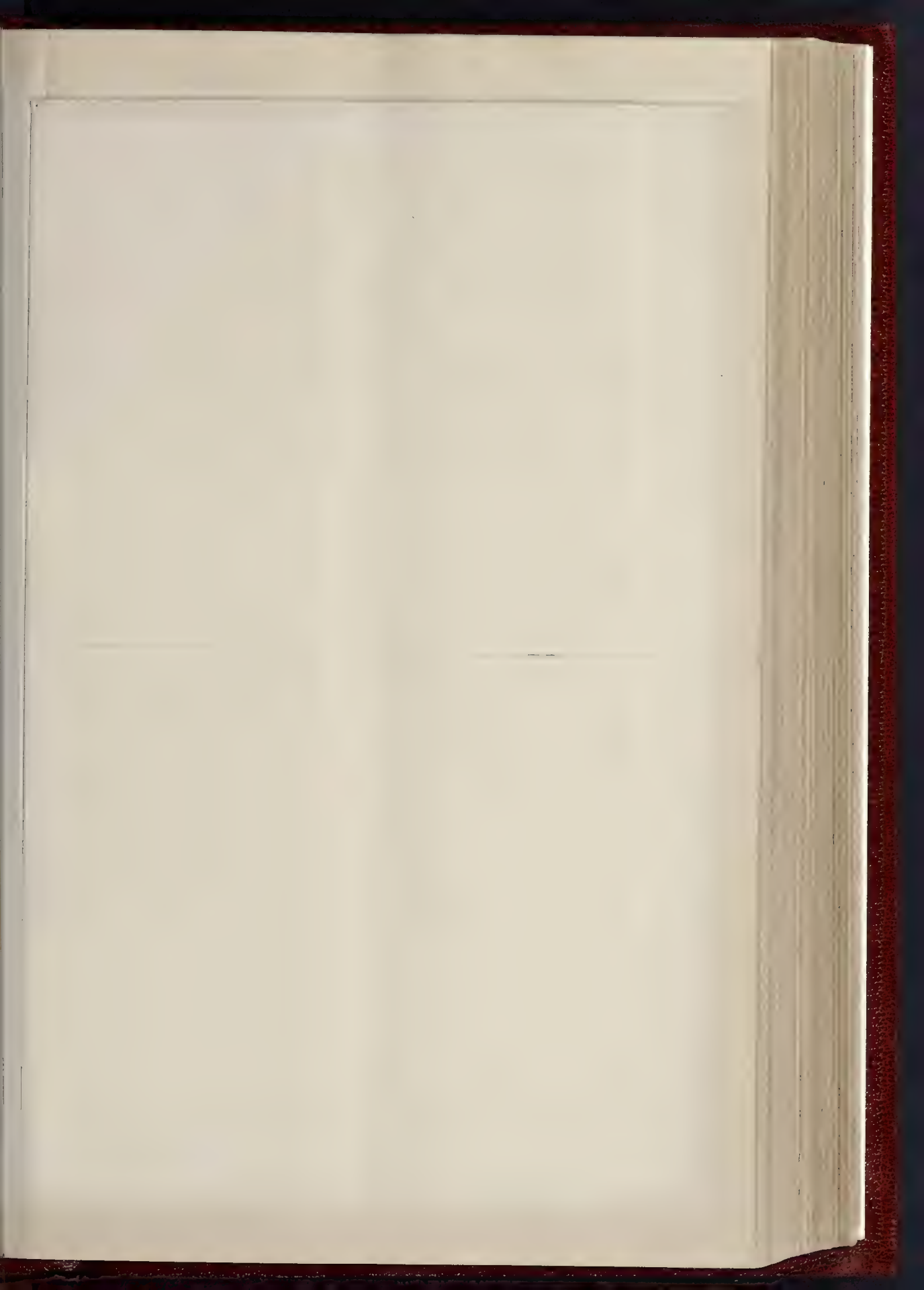
Suppose the student to have completed his studies so as to know how any or every one of the people, from the Greeks downward, have got over the difficulties of gracefully bringing one form into another, of accentuating parts, of drawing attention to one part more than to another, of dividing surfaces agreeably, and lighting the building properly, and that he has roughly found out what mouldings should be used; and has also learned that which is the crowning knowledge of the architect, how things will look in the positions in which they are to be put. Directly he has a building to design it will be marked by his personal proclivities; supposing him to be a great man, his building will, in the eyes of other architects, be a success, and they will try and improve on his work, and as soon as the whole profession is embarked on this scheme of improvement, there will be a much greater chance of nearing perfection. When such a one gets a building mainly for delight, he will no doubt enlist the sculptor and the painter to enrich certain parts with ornament and colour, but if the building appeal to some high motive in mankind, he will want the sculptor and the painter to make it speak more distinctly, by showing examples of men who are doing, or have done, such great acts.

To show how some advance may be made in simple matters, I may say that we are always wanting mouldings for division or accentuation. Let us suppose our student has a large garden to his house, and puts up groups of Greek mouldings every day for a year, at sunrise, mid-day, and sunset, and twice between, and notes how they look at these times. He will then find that, although these Greek mouldings may look admirable on a few clear sunny days in summer, they will have no effect at all the greater part of the year; he will not want to sacrifice the appearance of his building for three-quarters of the year; so he will get some clay, and see how he can make these mouldings tell for the three-quarters of the year that are dull or misty. He will find that he must deeply undercut the mouldings for shadow, and exaggerate the curves that are to tell bright, he will at last find out how to make mouldings that will tell what he wants in England, particularly if he does not neglect the hints he may get from Gothic mouldings. If he be a genius, he will thus form a school for mouldings. To take all this trouble, may possibly appear Utopian to many students, but it is what the Greek architects must have done; they could not have succeeded in perfecting their mouldings in the way they did, without constant observation and striving, and I beg you to observe that such laborious study is by no means unknown in the fine arts; I might say in arts that are not fine. Roberts, the billiard player, said if he left off practice for six weeks he could "not



Temple, Montaut, Calcutta.

hit a ball within an eighth of an inch; musicians, even when arrived at eminence, frequently practise for eight or ten hours a day. The great landscape painter Claude is said to have inhabited an isolated tower for two years, and during that time to have made studies of the clouds every hour from sunrise to sunset, and he too was a genius! I once inlaid a chimney-piece with a representation of some reeds in the flat. I had got some reeds, studied and drawn them, and composed the pattern; I asked a friend who was a painter what he thought of the inlay. He said "It is pretty bad." I asked how I could improve it. He said: "Take a lodging for a few months near the banks of a stream where reeds grow. First pull up a few reeds and draw them properly, then draw them growing in the best forms they take every day, both when they are at rest and when they are moving; after that watch them for a week or two, without drawing them, in still and windy weather; then come back and design your inlay. You will have got a fair idea of the form and behaviour of reeds, and will do something better." All that can be taught is the method, mechanism, or what you like to call it, of the art; you cannot give originality or genius, but you can teach, so that when the genius comes he has his tools ready for the work. We are apt to think that in work where there is no handicraft, that the skill is inspiration; but this is not so; the orator, playwright, or poet has to learn his art as well as to have his inspiration. As Ben Jonson said, it is true that "the poet i

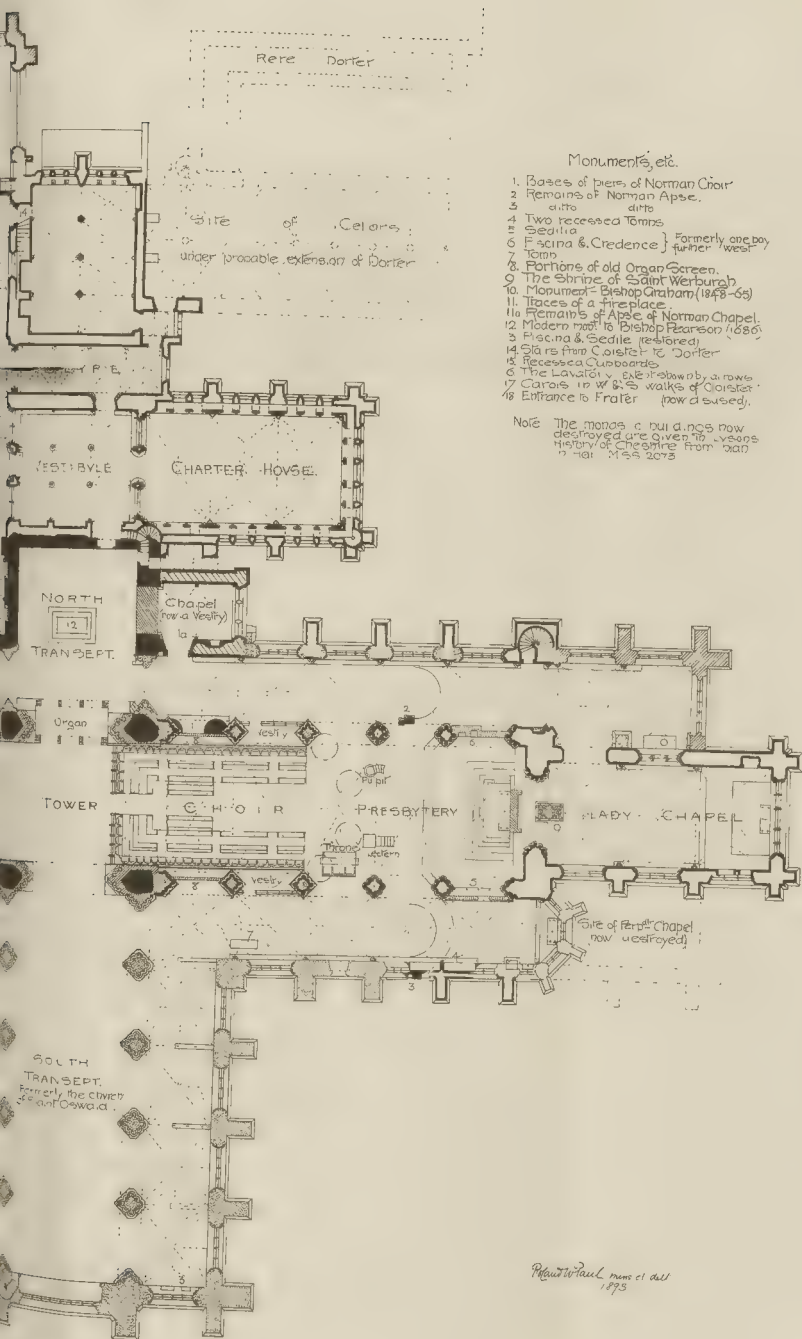


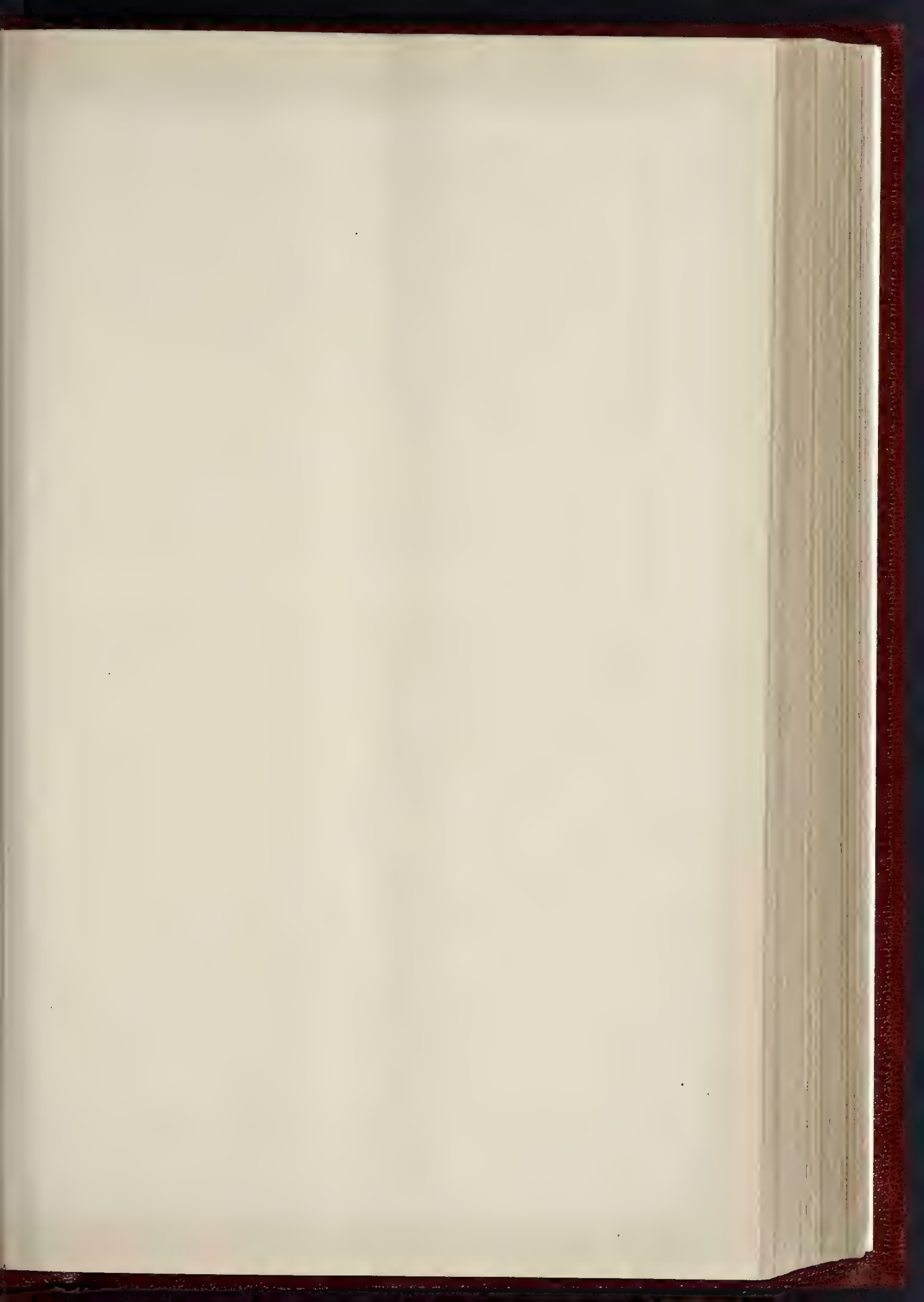
CHESTER CATHEDRAL GROUND PLAN

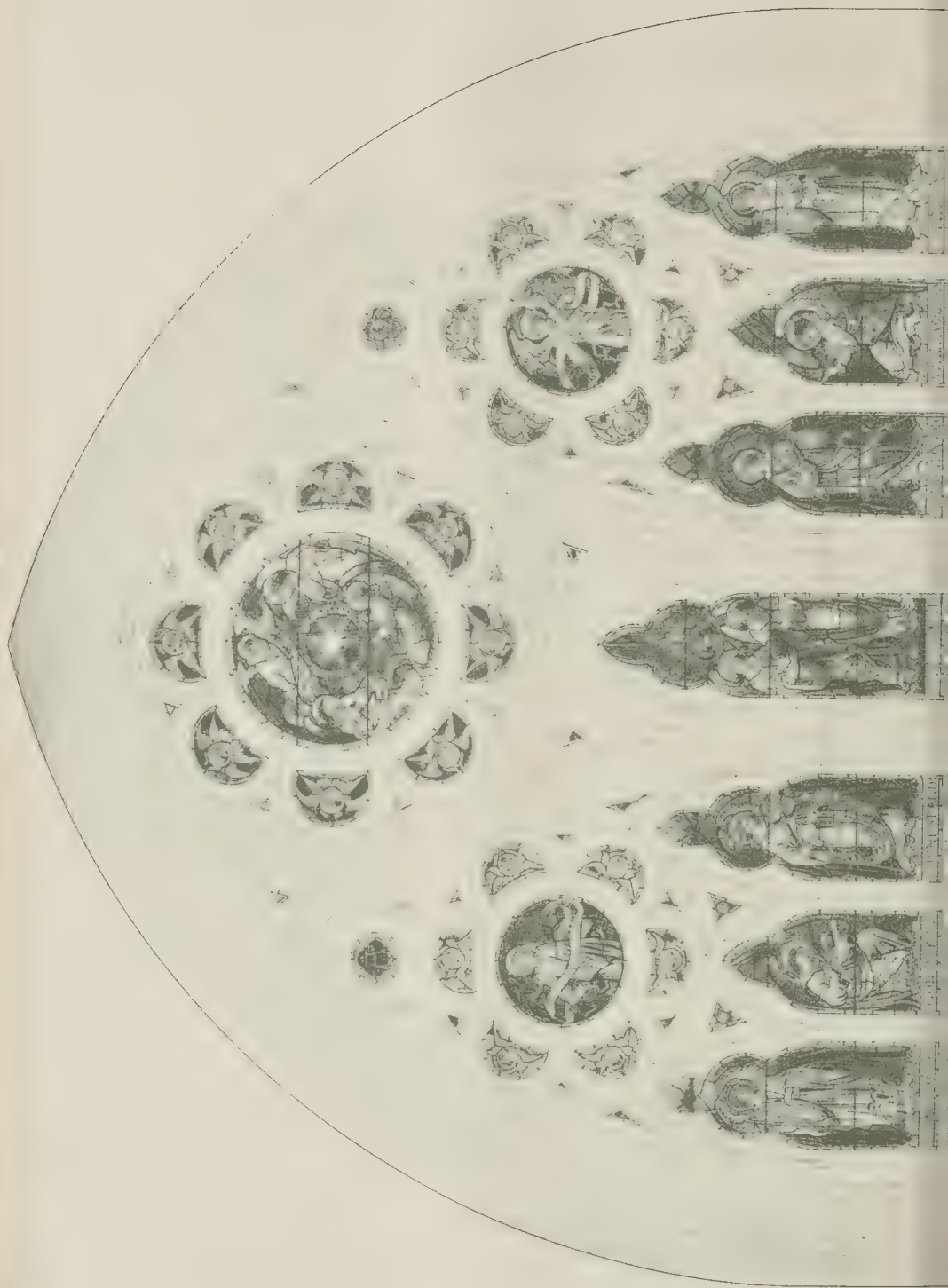
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DESIGN FOR WEST WINDOW, JESSE HAWORTH MEMORIAL CHURCH, WALSHAM - BY MR. WILLIAM PAGE



Temple in a Tank at Pandretan, on the Jhelum, about five miles above nearest bridge in Srinagar, Cashmir (nearly 1,000 years old).

born and not made," still there is a good deal of making in a poet.

Written words give neither the tone of the voice, the expression of the face, nor the soundings of the scene, and perhaps do not always meet with the proper vein in the reader. If we want to write a good style, we usually paraphrase some of the best authors; and, if we propose to tell a pathetic story, or to raise a laugh, specially in writing, it would be necessary for us to see how the masters of pathos or humour managed their words, so as to produce tears or laughter in their readers or hearers. Tennyson puts us into one of his secrets as a poet; that he was a student of the mechanism of his art. In his "Dream of Fair Women," he tells us of his reading at night the "Legend of Good Women" by Chaucer, and then he says:—

"And, for a while, the knowledge of his art
Held me above the subject, as strong gales
Hold swollen clouds from raining, tho' my heart,
Brimful of those wild tales,
Charged both mine eyes with tears."

So I think you will see that it is necessary to study the mechanism of architecture, to learn how beauty, sublimity, or any of the emotions are produced.

We may think that it is not a time when much original conception in our art is likely to be forthcoming, on account of many circumstances that tend to repress it, and also to turn any natural aptitude into a different direction. But we must recollect that, though the present age seems unlikely to afford matter for poetical inspiration, we have had several distinguished poets, of whom, perhaps, Tennyson was the greatest. It is true that these poets had the command of past times as well as of the present, and could therefore draw on incidents that occurred in more stirring times, and amongst people with more violent desires, and at a time too when outward expression was less restrained; while architects only deal with the present: but still they found some of their poetical motives in contemporary life. They were to us like the lapidary, who moves the pebbles we tread on to be gems, which we do not recognise till he has cut and polished them.

Though architects are mostly employed on nonemotional subjects, there are some opportunities of exercising their art on semi-poetical subjects. Houses are of the mixed sort; and when they are built for the owner himself to live in, it

is always possible to adorn with propriety, those parts devoted to the exercise of the higher sentiments. In some cases, if the owner were encouraged, he would have some of the achievements of his ancestors, or a stirring event connected with himself or his family, sculptured on the front of his house, by one of our best sculptors. We still have churches, but they do not hold the position that they held in the Middle Ages. And besides this, the Protestant Church may be said to be destitute of ritual; its scheme is to affect the worshippers wholly by intellectual means, for with the exception of the architecture and some music, nothing that appeals to the emotions is allowed to be represented. Cathedrals are an impossibility, except as imitations of the Romish ones, as the clergy do not seem to know to what purpose they are to be devoted, and still less how the worshippers, who ought to fill the vast empty space of the nave and transept, are to be affected.

The largest important buildings that architects are now called upon to design are town halls; these are very different from those of the communes of the Middle Ages. Then they were a sort of Parliament House on a small scale; the councils that met in them did for the towns and their dependencies what Parliaments now do for their realms; peace and war were in their hands, as well as the punishment of malefactors, the fettering or unfettering of trade and manufactures, taxation, honours, and rewards. But our town halls are only a collection of offices, sometimes with a law court attached, and almost always with a music-hall. Now, although we may grumble about our water-rates, gas-bills, scavengering, and paving; they are not subjects that excite in us very lofty sentiments or high enthusiasm: so these buildings cannot with propriety be made as dignified or beautiful as the ancient town halls.

Religion must, I think, always exist, and must move mankind more deeply than any other subject, for though portions of it merely satisfy our curiosity, such as the creation of the Universe, and the reason of man's existence, the ills of life, over which he has no control, move him most deeply, and he not only wants consolation under these afflictions, but some sort of compensation for their injustice. The doctrine of the Stoics would not be very consolatory to us; their axiom that pain is no evil, does not commend itself to us as a truth, and though we admire their fortitude,

their aim at rendering the will superior to misfortune must, if they ever attained it, have given them an overweening pride; so that the consolation they derived from their creed more resembled that which Milton's Satan proposed to himself, than that which most of us would desire.

There are many buildings that are worthy to have great efforts made, to give them their proper and high character; but none of them are so intimately bound up with our hopes and fears as the Church. The next thing that most nearly moves us all, is the well-being of our country; but a House of Parliament is only likely to be wanted once in several hundred years. Besides the want of great opportunities, there are many hindrances to a noble architecture. Perhaps the greatest, beyond the wants of a worthy object, is the absence of a succession of nearly similar buildings all over the country for objects that mankind are deeply interested in. We want buildings requiring the highest skill and daring in construction, of vast size, and to raise strong emotions in us; thus calling for the greatest intellectual and æsthetic skill, and such that require the type that is first chosen to be continued, with all the improvements that time and experience can give. The only building I can think of that would combine most of these conditions is a Temple to Mammon: here there would be no want of worshippers, nor would there be a town in the United Kingdom that did not require one; particularly if Mammon were believed to favour his worshippers. Think of the enormous crowd of gamblers on the Stock Exchange, on the Turf, and at the gaming table, who would add to the number of the faithful; and would contribute their gifts to the wealth of the Temple. Chapels would be erected all round the central temple to those whom Mammon had most favoured, with a master chapel to Midas; while Midas might have his chapel of chiselled gold; covered, roof, pavement, and all, with enamels and the most costly gems, if he would but bestow on his most fervent worshippers one hour of his power of turning everything he touched into gold. We are struck with the richness, cosiness, and splendour of some of the chapels of the Byzantine Emperors, where the floors were of chased and enamelled silver, and the walls enriched with plates of jewelled gold; but these would fall into complete insignificance as compared with Midas's Chapel, whose golden casements, storied in colour, would be made of cut jewels, exceeding those we are ravished with in the Arabian Nights. This scheme, however, might not meet with general acceptance; and then the question is, "What class of building is to take the place of the old temple?" For unless the building is to aim at strong emotional effect, and to be repeated in all the large centres of the country; how is it possible that we can hope to rival the temples of antiquity or the churches of the Middle Ages?

TEMPLES AT MARTAND AND PANDRETAN, INDIA.

THESE temples were incidentally referred to in Professor Aitchison's Fourth Royal Academy Lecture (page 148 *ante*) as showing the employment of cusped openings at an early period, and are, in other respects, interesting architectural remains. The remains at Martand Professor Aitchison puts as probably before the Christian era.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

TERRA-COTTA AND ITS TREATMENT.

THE ninth general meeting of this Institute for session 1892-93 was held on Monday evening last, at No. 9, Conduit-street, Regent-street, the President, Mr. J. Macvicar Anderson, in the chair.

The minutes of the previous meeting having been confirmed,

The Secretary, Mr. W. H. White, said he had to announce with regret the death of Mr. W. A. Boulnois, Fellow, of Waterloo place, London. He was elected an Associate of the Institute in 1848 and a Fellow in 1859. He had also to announce the death of Mr. J. M. Cory, Fellow, of Shanghai, who was elected an Associate in 1880 and a Fellow in 1886.

The President said that happily they had no business that need detain them from at once listening to the papers which had been prepared for their edification,—papers devoted to a very interesting subject, which could not fail to interest all architects. He, therefore, without

further preface, would call upon Mr. Ingress Bell to read his paper on Terra-cotta. Mr. Bell's paper would be followed by one from Mr. S. H. Leech, and finally Mr. Leonard Stokes would read a paper on the subject.

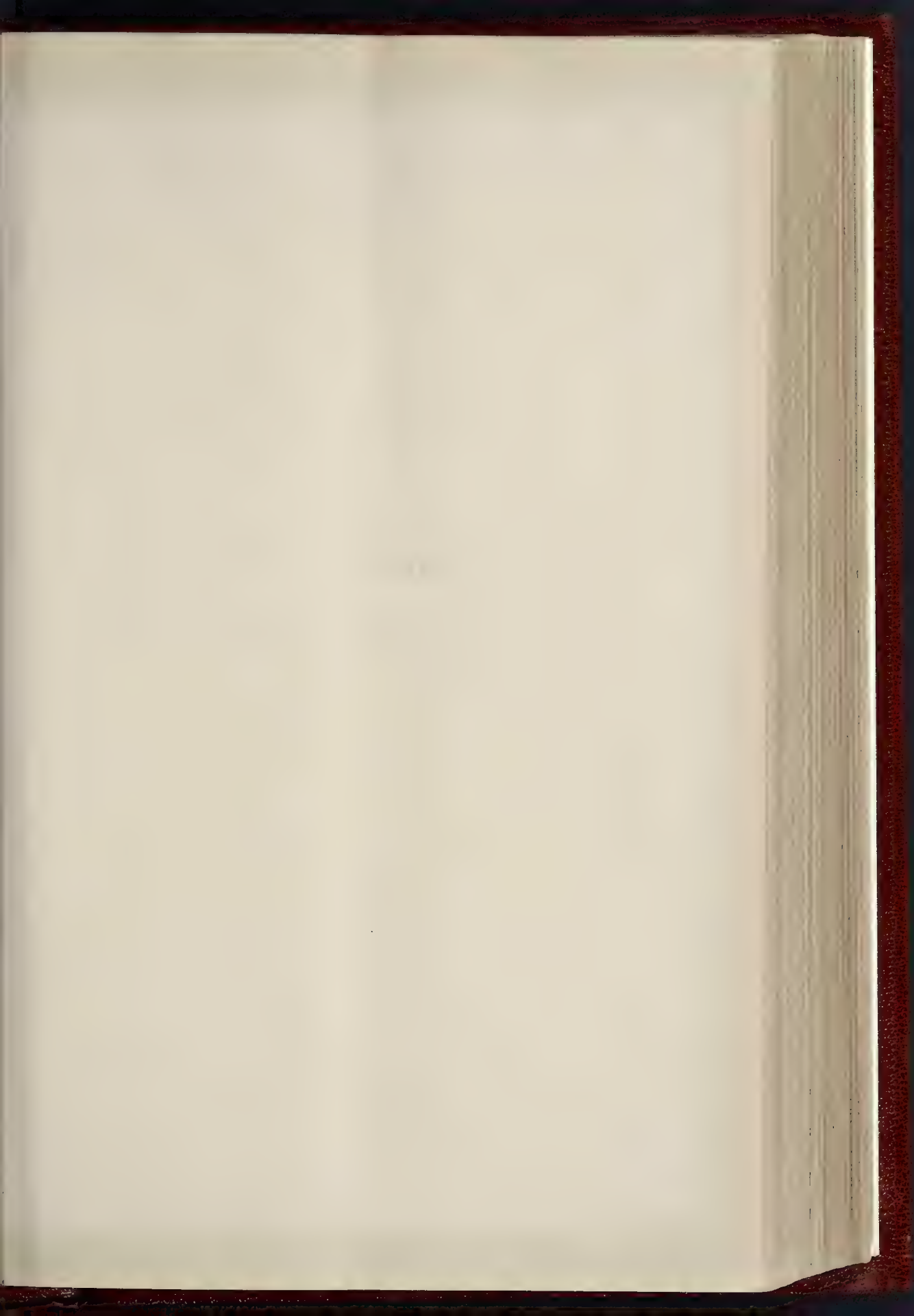
Mr. E. Ingress Bell said he should endeavour to present the case for the employment of terra-cotta. He was disposed to advocate the use of that material on these broad, general grounds: that as it was, notwithstanding a few ancient examples and some recent experiments, practically a new material in our hands, we might reasonably hope that its careful and intelligent treatment might lead to new developments in architectural design. Architects in all ages of the world had addressed themselves to the solution of architectural problems by the aid of brick, stone, and marble, and so successful had they been in relating design to material that their more perfect works were accepted as standards of excellence to which we might conform, but which we could not hope to surpass. They seemed to have anticipated every combination of appropriate and agreeable form, and to have exhausted every source of artistic effect. So long as we worked with the materials with which they worked, we had no option but to follow in the same path: the problems of to-day were substantially those of old; the needs being the same and the materials the same the treatment was perforce similar. We needed the stimulus of change in architectural as in other matters, and relief from the stereotyped and too familiar forms. In what direction should that relief be sought? The elementary forms in architectural composition were scarcely susceptible of any material alteration; opportunities for variation must be left to the detail. It was detail in the main which supplied expression in architecture, and detail was excellent in the degree in which it conformed to the qualities of the materials employed. Did the peculiar properties of terra-cotta, suitably treated, promise new varieties of detail, new possibilities of architectural expression? He hoped in the end to elicit an affirmative reply. He would, first of all, clear the ground by touching upon one or two objections to the use of terra-cotta. It was sometimes urged in disparagement of terra-cotta that it was a cast material. It might be or it might not; but suppose it was? There was a time when such a charge would have been conclusive, but even cast iron was coming again into repute. That if cast iron, why not cast clay, provided always that the design was suited to the material? We had gone on for a long time producing, by patient human labour, miles of dentils, and dog-teeth, and ball-flower ornament, each item the exact counterpart of its neighbour, and the practice had been generally approved, or at least condoned. If the result was commendable, where was the evil of obtaining it by a short cut? The position taken up by a certain school, with whom he was in more or less sympathy, that each item should be differentiated by healthy human labour, within certain limits free, was an intelligible one; the practice of setting human labour, healthy or otherwise, but certainly not free, to produce multitudes of ornamental features, all exactly alike, had immortal sanction. But the contention of those who allowed the identity and objected to the cast was difficult to appreciate. The use of terra-cotta was by no means limited to cast work. Mouldings could be run as plasterers' mouldings were, and with equal freedom; and the clay could be moulded into any form that the artist might dictate, or all three could be combined, or the field or background might be cast. The moulded lines, and the general features of the work might be run, and the artist's hand might easily and swiftly elaborate and embellish the forms thus mechanically supplied. Another objection to the use of terra-cotta was that the clay shrank and warped in the kiln, and the work was consequently untrue. That fact simply pointed to the abstention from the use of those traditional types which depended for their effect upon refinement and subtlety of line and contour. There were other and more picturesque forms of art where that peculiarity of material was even helpful, and went far to mitigate the hardness inseparable from work in which casting played a part. The lines had a free sketchy look, as though put in by hand, and the surfaces, not lying in one absolute perfect plane, diversified agreeably the general effect of light and shade. A more formidable charge against terra-cotta was that it did not "weather"; in other words, that it did not encourage that lichenous growth which was so grateful when seen on brick and stone. But the charge was not wholly true. In course of time terra-cotta did take some

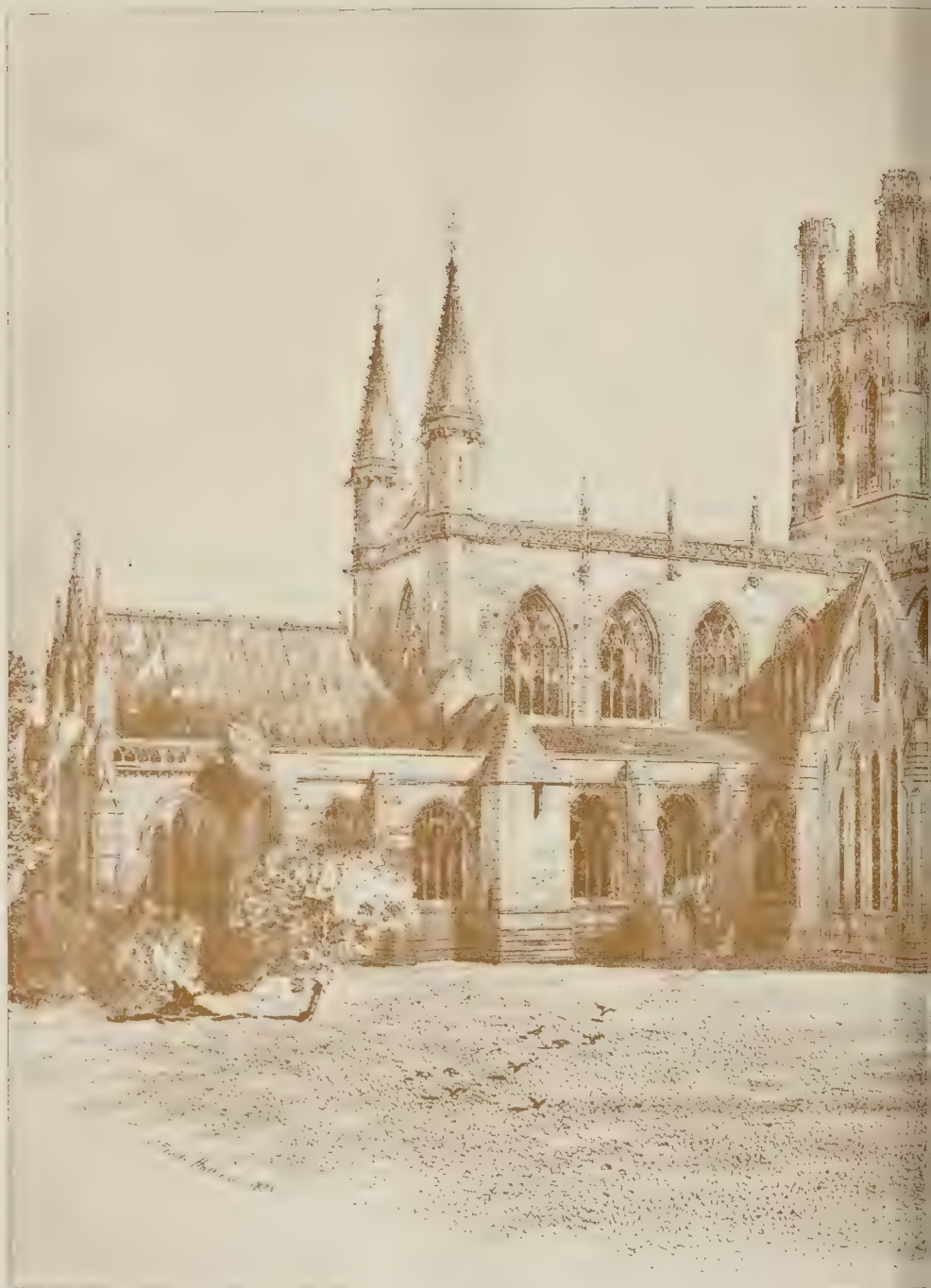
natural tinting, but it assumed this parti-coloured vesture very slowly. The question was mainly one of texture. Texture on terra-cotta varied almost from that of stone to that of porcelain. Even stone buildings in town did not "weather" in the above sense, and town buildings were, of course, much more numerous than country ones. The atmosphere of our towns, he would not say Nature, finished our work in black and white, without any regard to shape or form; one half of a vertical column being sometimes white, and the other half black. That brought them to the practical question—Should the façades of our buildings be daubed over with soot and water under pretence of "weathering," or should they be composed of a material which every shower would cleanse? An objection to the use of terra-cotta was that the too facile production of ornamental features might lead to their indiscriminate use, and that we might suffer from a plethora of poor ornament. But he was advocating the "careful and intelligent" use of terra-cotta. How, then, could they best develop the special attributes of terra-cotta for the purpose of architectural design? First of all, it was necessary for them to divest their minds of the habit of thinking in stone. They must not look upon terra-cotta as a sort of artificial stone, affording the means of doing easily and cheaply in one material what was done with difficulty and cost in another. The two materials demanded entirely different treatment. If they looked into the sources of expression in ancient and Mediæval art, they would see one characteristic pervading the whole: the labour was applied in the most rational and least wasteful manner consistent with the qualities of the material. The roughly squared block was reduced to planes below which the mouldings were sunk. Sometimes they were a broad splay. In all, the light and shade were obtained by deepening down from the surface, hollow being added to moulding, and moulding to hollow, until the desired richness of effect was produced. Elaborate and complex work was of necessity costly, and work which could not be costly must be plain. One invariable universal system of *intaglio* governed all architectural expression in the past. The first thing which an architect, dealing with terra-cotta, realised was that the above methods were inapplicable, and the above restrictions were almost entirely removed; in fact, the architect was practically free from what the surveyors called "labours." The clay did not reach the workmen in square blocks, but in amorphous lumps, and would readily take any desired form, and one form as easily as another. Stone and marble, on the other hand, were costly to win and to transport. They were more or less refractory under the chisel, and they could not be elaborated beyond a certain point without impairing their durability. But with the tempered clay—the good-tempered clay,—all that was wanted; it was easy to manipulate, the surplus could be re-used, so that there was no waste, and it made little difference in point of cost whether a designer confined himself to the simple chamfer, or indulged in series upon series of mouldings. There was no limit to the delicacy and complexity of detail attainable; and it could, in theory at least, and practice was fast overtaking theory,—be hardened by fire to imperishability. In colour there was a wide range, from leaden grey, through dull reds, and golden brown to buff. How could these several qualities be turned best to account? It was impossible to forecast the direction which the study of terra-cotta as a medium of architectural expression would ultimately take. The yielding clay was open to receive the impression of many minds. It might be that some development of Romanesque—a style which the American architects had found elastic enough to cover many modern requirements—would provide the most suitable basis, or it might be that the free and picturesque handling of our early Renaissance, before it quite broke with the Gothic spirit, would supply the desired motif. In any case, the limited size of the blocks procurable seemed to point to some style in harmony with our native art, which was essentially an architecture of small pieces. Was it too much to hope for the resuscitation and evolution of our native and indigenous architecture, from the point in its career which gave the first hint of its decadence—when the first importation of a foreign influence checked, convulsed, and then destroyed it? That period coincided with the reign of Henry VII. The art of that period was tending towards a kind of design perfectly suited to the use of terra-cotta. The rule which had hitherto determined

all architectural expression was relaxed, and even reversed. In the blank tracery, the wall-panelling, the heraldry and heraldic badges, and in the ornamental scheme at large, it was the *field* which was worked down and reduced, a proceeding which was wasteful and irrational in stone, but which gave the clue to the absolutely proper treatment for clay. It was possible, in fact, to get by the use of terra-cotta a sort of *gesso* work in a far more pliant and accommodating medium. The kindly clay was responsive to the artist's lighter touch, suave, facile in the working and tenacious its grasp of the life with which the artist's skill endowed it. Had not the possibilities of the older art, when confined to the traditional materials, been played out? And did the new material place in our hands opportunities for new and legitimate forms of expression? He had sketched the direction in which he thought such a result might be sought. If the idea was worthy of serious pursuit it was to the younger members of the profession to whom we must look for its realisation, whose freedom in design had not been hampered by the prejudices which cramped the youth of their seniors, and whose artistic education is so much more liberal, systematic, and complete.

Mr. S. H. Leech read a second paper on the subject, which treated in great detail of the technical *minutiae* of the manufacture of the material, from the selection of the clay to the firing. The different varieties of clay suited to certain work, the mode of its manipulation, the various methods of burning for the production of certain effects of colour, and other highly technical details, were described and discussed, and in conclusion Mr. Leech referred to some new developments of cellular terra-cotta construction recently perfected by Messrs. Doulton. These were illustrated by large diagrams exhibited in the meeting-room. Messrs. Doulton also exhibited a large and representative collection of specimens of terra-cotta work, showing very clearly the wide capabilities of the material, whether regarded from the point of view of the size of blocks, the texture of surface, or the range of colour. We should have devoted more space to Mr. Leech's paper, but it was so full of technical details, and was so rapidly read, that it was not possible to take a reliable shorthand note of it,—for of neither of the three papers read were any copies or abstracts placed at the disposal of the Press, as is usual.

Mr. Leonard Stokes read a third paper. He said that Mr. Ingress Bell and Mr. Leech, having treated of terra-cotta from their own particular points of view, he proposed now to treat of the disadvantages and abuses of the material. But he felt that the disadvantages of terra-cotta had been so often made apparent, and that its capabilities had been so often abused, that words from him were almost superfluous. He simply proposed to take that much misused material as he found it staring him in the face, and to point out its vulgar ostentation. He had never used the stuff himself, and he trusted that Fate would never deal so hardly with him as to cut him off from the use of honest building materials, and so send him to the crockery merchant in despair. Holding the views he did he felt that if he was to treat his subject honestly he should inevitably run the risk of bringing about his ears a host of terra-cotta horns. However, undeterred by that consideration, he thought he should be able to make out a tolerable case against the use of terra-cotta. He held that terra-cotta (of course as generally used only) was nothing but a miserable mockery, composed of mimic masonry; that it had neither constructional, artistic, or businesslike advantages to recommend it; and that it was, therefore, unworthy of the consideration of the architect. Was he right in saying that terra-cotta had no constructional advantages over other and more natural materials. He thought so. In the first place, the usual terra-cotta block had practically no weight-carrying power, as it was simply a hollow cube, with one side open like a biscuit tin with the lid off. In order to make it do its work it was stuffed with cement concrete, and it was that stuffing which really did the work. Why not trust to the cement concrete alone, which, he believed, could be treated as terra-cotta was? Instead of that a brittle material was introduced, and we had a wall composed of three materials of unequal character: terra-cotta, concrete, and brick backing. In principle, he maintained that that was bad construction. Even though in practice the difficulties could be so far got over as to make a building stand, the result was no credit to the architect, who relied upon the manufacturer and the builder to get him out of his difficulties.





Cathedrals of

No. 25 CHESTER NORTH-EAST VIEW



St. Asaph and Wales.

WALLS DRAWN BY MR. E. HOLKINSON

There was, no doubt, great skill shown in the manufacture of terra-cotta, but if the manufacturers were not so clever, the architect would be forced into treating the material more reasonably, and we should get better results. We suffered all round from misdirected dexterity of production, combined with poverty of design. He did not think that the cellular system of constructing terra-cotta blocks proved to be a reliable one, for he thought that in case of fire they would burst. The manufacturer also seemed generally to place the cells in the wrong direction for supporting weight; viz., horizontally instead of vertically, and he (the speaker) was not quite satisfied that the ends of the cells of these blocks were always perfectly closed up. By testing, it had been found that this form of terra-cotta would not stand as much weight as good brick-work, and therefore only about one-third of the weight of good Portland stone. Terra-cotta being very hard, and to a great extent non-porous, and consequently non-absorbent, neither mortar nor cement would adhere properly to it, and anyone who wanted to test this principle for himself might do so by trying to fasten two pieces of glass together with Port-land cement. Another objection to terra-cotta was that after waiting several weeks for it, when it arrived on the works it was often found to be only half baked; but the joy of getting it was so great that it was apt to warp the judgment, and lead the architect into using it when his better judgment would say, "reject it as unfit for use," as he understood was the case with about 10 per cent. of it. It was often said that terra-cotta was everlasting wear. If that were so, he could only say he was sorry for it; but it was not so, as anyone could judge for himself. During the last few days he had examined several terra-cotta buildings in London, and those which had been erected for anything like ten years showed signs of crushing. He might mention as examples the Science Schools, South Kensington; the Natural History Museum; Albert Hall; St. Paul's School, Hammersmith; New Court, Carey-street; the Constitutional Club; and strange to say, the work in front of Messrs. Doulton's own office door at Lambeth. He had been told by a friend that he would never advocate the use of concrete constructionally except as a casing for the ironwork of shop-fronts, &c., for which use of it there was perhaps something to be said, although, as long as we could get such good shop fronts as that lately erected by the Orient Company in Cockspur-street, he (the lecturer) could only say, "Save us from spurious imitations!" He maintained that to conceal iron construction inside a make-belief stone design was most reprehensible. If terra-cotta was a proper material to employ constructionally, it would have been more largely used. Did anyone ever hear of engineers making use of it? He certainly knew of one use for it, viz., in damp courses, where it answered its purpose tolerably well, although it looked extremely ugly. There was a church approaching completion not 100 miles from Soho-square, in which terra-cotta was used both internally and externally, and in which, he ventured to think, there were the usual mistakes in treatment. The nave and aisles were all of forms and lines suited only to stone work. When he visited the building he asked whether the terra-cotta piers and arches really carried the walls and roof above. "Oh, dear, no, sir," said his informant, "there is a solid iron stanchion inside each of the piers, and a girder over the arches; they take all the weight." The sectional area of these piers was, he found by measurement, 3 super. ft. Now, a manufacturer had told him that terra-cotta would carry 70 tons per foot super. If that were so, each of these piers ought to carry 210 tons, or rather more than ten times the real load, he should think. Evidently architects and manufacturers did not agree as to the strength and reliability of terra-cotta in construction. All terra-cotta buildings that he knew of in this country, or on the Continent, were designed and executed on quite different lines from those employed by modern builders in the material. All constructional blocks were small and solid, and were, strictly speaking, brickwork, and not what we called terra-cotta at all. Coming to the second head of his subject, was he right in saying that terra-cotta had no artistic advantages? He thought so; at any rate, he could not see any; possibly that was his fault. To him there was a most distinct and well-defined difference between architecture and ornament, proportion and mere prettiness, good building and showy vulgarity. To him, a great deal of terra-cotta looked about as lifeless as the cheek of a dead Chinaman. The Albemarle

Hotel was a building in which much care had been taken to obtain a good effect, but the result, to his mind, was not satisfactory, and in that respect he could not trust himself to speak of some terra-cotta buildings which he knew. By the use of stone or marble there was a chance of getting dignified, and at times even noble effects; but in terra-cotta all restraint, reserve, and reticence seemed to be removed, and sensuality took their place. Let them imagine, if they could, St. Paul's Cathedral built in terra-cotta, or Westminster Abbey! Would either of them look better for being erected,—he would not say constructed,—of a rich plum-coloured terra-cotta? He might be told that they would look cleaner than in stone. Granted, for the sake of argument, that they would, but they would look cleaner still if erected in white-glazed bricks. The effect of a terra-cotta building, however, was, to his mind at least, always mechanical and dreary. Spontaneity and freshness seemed to be impossible with such a material, which never even weathered, blended, or toned harmoniously. Let them compare the Law Courts with the Natural History Museum, quite apart from the design, of course. In one case quite a picturesque effect was coming over the building, while in the other the material was as uninteresting and as unsympathetic as when it was put up, or even more so. How was it that Mr. Bodley, Mr. Philip Webb, or Mr. Norman Shaw had never used terra-cotta, or if they had, had taken it up only to drop it? If Mr. Norman Shaw had hesitated to take up the material, how much more should they hesitate to adopt it? That some men in the profession had used it, and did so constantly, with more or less effect was a matter of notoriety. If mere pretty buildings were their only aim, he could understand it, but to put up large mock masonry buildings, constructed, apparently, entirely of terra-cotta was to his mind little short of criminal. The design of such buildings appeared to him to be entire violations of those principles which they were taught to respect as students. The bad effect of these buildings upon the profession and the public at large was, he feared, retarding architectural progress, and was much to be regretted. He had been told that the old Italian terra-cotta buildings would have lost much of their charm if they had been erected in any other materials; but the real charm of the Italian terra-cotta buildings was that they were indigenous, and the natural outcome of local circumstances. The architects of old made the best of the materials on hand; they never abandoned stone for the sake of such an inferior building material as terra-cotta. We were now beginning to learn that there was a proper and legitimate treatment of cast iron, and it was to be hoped that some men would arise amongst us to show us what terra-cotta was really capable of as a material used architecturally. We now looked with righteous horror on the cement-covered churches of a past generation; how long would it be before our children arose in their turn against the earthenware erections of the present day? Thirdly, as to the business-like qualities of terra-cotta, it was a material which was miserably unbusiness-like. Putting on one side the trouble of drawings made extra-large full size for details, which might or might not allow for the exact amount of shrinkage of the work in burning, and which often nearly doubled the number of drawings, and consequently doubled the chances of mistakes, he would come to the question of cost. How did that stand this test? For his own part, he thought terra-cotta was dear at any price, but he believed that a well-designed building of a dignified character could be erected quite as cheaply in Portland stone as in terra-cotta. Why, then, use earthenware? He was not going to say that all terra-cotta buildings, with all their pretty prettinesses, could be erected for the same price in Portland stone. For purposes of comparison, he would take the Banqueting House in Whitehall as a Portland stone building, and the Constitutional Club, Northumberland Avenue, as an example of a terra-cotta building. He knew of two important buildings in London in which the average price of Portland stone was 6s. 6d. per foot cube fixed, and he had very good reason for believing that the terra-cotta of the Constitutional Club cost—or at any rate would cost to-day—quite 7s.* per foot all

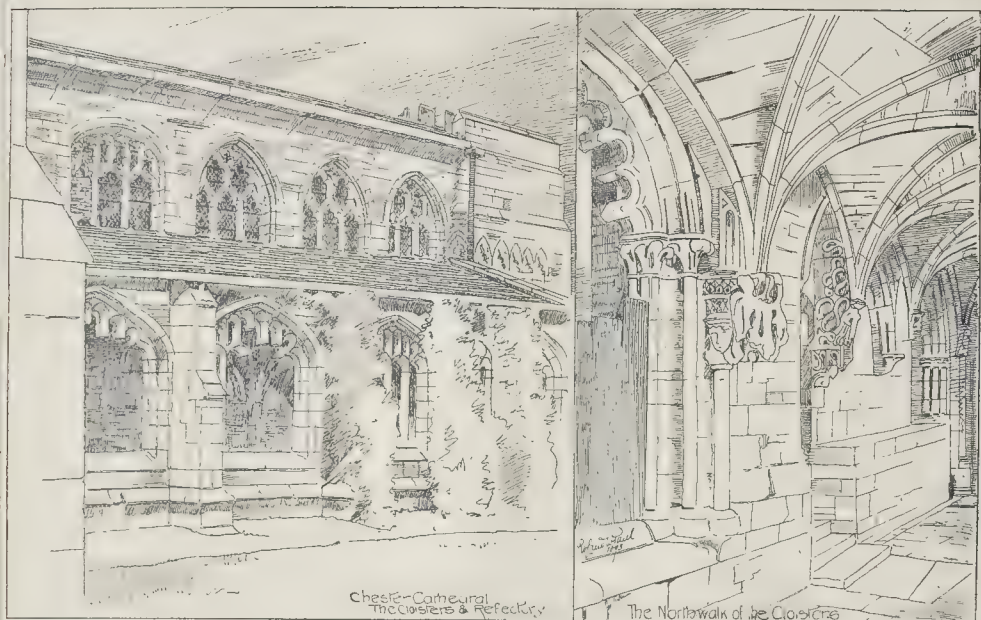
* Mr. Stokes writes to us in reference to this point: "In order to show how I arrived at this figure, I had better perhaps give an extract from a letter which I received from a terra-cotta manufacturer who is well acquainted with the work at the Constitutional Club. He wrote me on February 20: 'The approximate price per foot cube for terra-cotta work like the Constitutional Club would be 5s. 6d. to 5s. 9d. per foot cube delivered at a railway station in London. I don't undertake the filling and fixing, and therefore regret I could not tell you what it would cost.

round, fixed. Which was the building for their money? To take, as another example, the new building erected for the Institute of Chartered Accountants in London, than which few better buildings had been erected during the present century. It was a Portland stone building, and the stone had cost 7s. per foot cube. He defied anyone to put up a building in terra-cotta which could hold a candle to it. The price of terra-cotta had to be considered rather carefully, as there were several points to be taken into account. First there was the iron-founder's bill; next there was the manufacturer's bill; then there was the cost of filling blocks with concrete and fixing; then there was an extra 10s. per rod for the brickwork, on the ground of allowing for fiddling about. Add to these the extra cost of supervision involved, and the unavoidable delays which occurred through the use of terra-cotta. Taking all these and other expenses into account, and he should be surprised if in most cases the result did not come out higher than the cost of Portland stone. The result of using terra-cotta was often to delay the completion of the building, to the discredit of the architect and to the great loss of the client. All these points went to prove that as a business-like material to use terra-cotta was a delusion. It was very hard to get it up to time; and when it was obtained it was very hard to fit and fix. It was not cheap, or at any rate not any cheaper than a very much better, stronger, and more durable material. It was good neither constructionally nor artistically, nor from a business-like point of view, and it was as bad theoretically as it was practically. He had consulted architects who would not use it constructionally, and he had been told by others that they had used it twenty years ago, but had not used it since. Builders disliked it; one to whom he had spoken on the subject said he could not "find words to fit it"; a clerk of works had characterised it as a "pest, not fit to be used in a respectable building," and an architect well known to fame had called it "filthy, degraded stuff." In conclusion, he would advise those who were thinking of using terra-cotta to adopt the advice of *Punch* to persons about to marry, viz.: "Don't." At any rate, if they were obliged to use it, let them try to grasp the limitations of the material, which might, after all, be more suited to sculptors than to architects. Some of our leading and most eminent architects had used and were using the material, and should by now have become masters of it. If we were dissatisfied with the results we must therefore either blame the material or the men. He maintained that if they wanted to produce architecture they must use a material in which it was possible to express fine ideas on a fine scale. He did not wish it supposed that he wished to contend that terra-cotta should not be used at all, he did not go quite as far as that; but he contended that it was at any rate quite unsuitable for large public buildings like South Kensington Museum, for example. Terra-cotta had led some men so far astray that even when they worked in stone they thought in terra-cotta, and the result was often to make their stone buildings look as if they too had been burnt and had shrunk in the operation. Layer Marney Towers, in Essex, East Barsham and Ox-burgh Halls, in Norfolk, and much of the work in the North of Italy, Holland, and Belgium exhibited the true treatment for terra-cotta, and not the buildings of Shaftesbury-avenue, Charing-cross-road, Kensington, or Hammersmith. He had only become a specialist on the subject during the last fortnight, but he had during that short time, as well as before, seen it made, used, and fail; he therefore had no hesitation in saying, as to the advantages of building in terra-cotta, "There are none."

In the discussion which followed, Dr. A. S. Murray, Keeper of the Greek and Roman Antiquities in the British Museum, being called upon by the President, referred to a few small specimens of ancient Greek terra-cotta, which he exhibited. They dated from the early part of the sixth century B.C., and were found on the site of an ancient Greek colony at Civita Lavinia, near Rome, during some excavations carried out by Lord Savile. They were of the nature of slabs or tiles, and one specimen had moulded ornamentation on one face, while the other still preserved traces of colour decoration.

(Continued on page 174.)

Of course, the above price is not inclusive of any enriched modelling. The price given me being, 'at a railway station, I added what I thought proper for carriage, filling and fixing, &c., and thus arrived at the approximate sum of 7s. per foot cube given above.—I. S."

Chester Cathedral
the cloisters & refectory

The North walk of the cloisters

Illustrations.

ROYAL ACADEMY DRAWINGS.

THOUGH it is perhaps hardly necessary for most of our readers, we may here formally repeat the offer which we have been in the habit of making for several years back, to take charge of and forward to the Royal Academy any drawings intended for the Architectural Room, and which the owners are willing that we should photograph for illustration in the *Builder*. Drawings so illustrated, if accepted at the Royal Academy, will have as usual a double publication; in our ordinary issue, and in our annual Album of Royal Academy drawings, a copy of which is presented to every contributor of a drawing.

CHESTER CATHEDRAL.*

THE present see dates from the reign of Henry VIII., who created it in 1541, and converted the Church of the Benedictine Monastery of St. Werburgh, founded by Hugh Lupus, Earl of Chester, in 1095, into the Cathedral of the Diocese. It is still a building of considerable interest, although at first glance the feeling is distinctly one of disappointment. The red sandstone of which it was built weathered badly, and in the fifteenth century this was no doubt the cause of a good deal of the recasing that was done. In the present century the process has, from necessity, been repeated to a very large extent; the restored parts being, however, in Runcorn stone, and more durable than the ancient material, and this gives to the exterior of the cathedral that modern appearance which is, perhaps, more noticeable on the side from which it is generally approached—the south—than any other. What the state of the building was before the restoration, which began in 1844, under the late Dean Anson, can be gathered from engraving and photographs of the period, and it will be seen by them that almost every particle of detail had been destroyed, or had so crumbled away as to require rebuilding. It is, nevertheless, a building that contains much that is highly valuable, and the monastic buildings which are grouped round the cloister on the north

* This series of illustrations of the Cathedrals of England and Wales was begun in our issue of January 3, 1893. A list of those already illustrated, with particulars of future arrangements, will be found on page 184.

side are in a very perfect condition, and rank, next to Canterbury and Durham, with the best of our examples of conventual buildings attached to what is now a cathedral establishment.

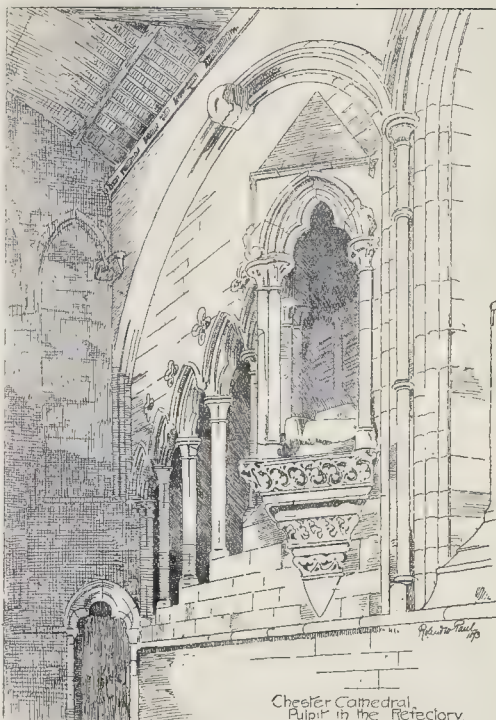
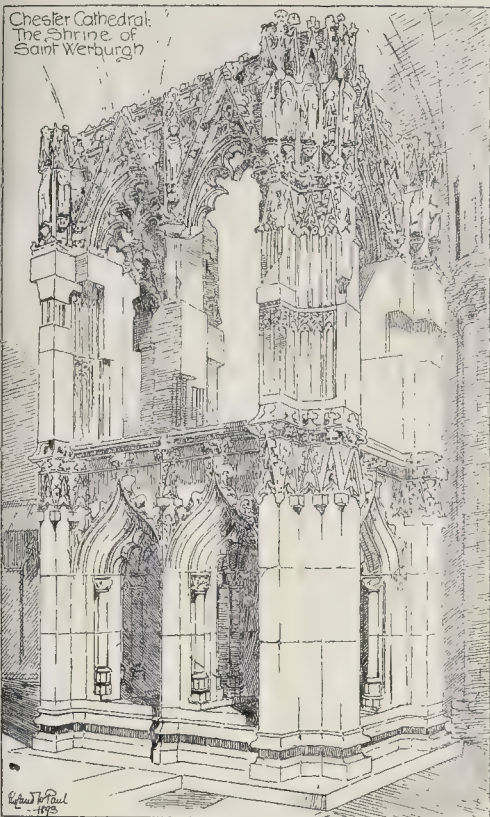
The church itself consists of a nave of six bays with aisles, the bases of two west towers and a south porch, transepts with a central tower, and a choir and presbytery of five bays with aisles, beyond which extends a Lady Chapel of three bays, with a side chapel on its north side, with which formerly corresponded a similar chapel on the south, now, however, destroyed. The most marked peculiarity of the plan is the unusual size and importance of the south transept, which is of five bays with side aisles, and equals in length that of the choir and presbytery. It was formerly partitioned off from the cathedral at the first bay south of the central tower, and was used as the parish church of St. Oswald. It has now been again opened to the cathedral.

Chester Cathedral, although from external appearances a building of late date, retains a considerable portion of the Norman church—enough, indeed, to enable us to ascertain with a degree of certainty its form and extent. The present remains of Norman date consist of the base of the north-west tower and its arches into the church, the whole of the north aisle wall of the nave, the north transept, and the core of the piers of the central tower. Eastward we have still visible in the first bay of the arcade on the north the bases of two of the Norman columns of the choir of rather over six feet in diameter, and further eastward in the last bay but one of the presbytery aisles are the positions, marked by stones inserted in the pavement, of the two apses which terminated the aisles. Mr. R. C. Hussey, who was then architect of the restoration, discovered the columns of the great central apse, and he described them in a short paper illustrated by a ground plan, published in the fifth volume of the *Archæological Journal*, from which we have taken the indications of this portion of the church shown in the ground plan now published, and which are of course now under the pavement, and therefore invisible. Two very interesting fragments are still in place however. On the north side of the arcade of the presbytery is a piece of Norman walling with the remains of two small columns undoubtedly, from its position, the remains of the arch at the springing of the small apse. Again, on the exterior of the south wall of the presbytery the springing of the southern apse has been disclosed, with a small Norman pilaster buttress, still showing. These remains, with the existing outer wall of the nave,

prove that the width of the Norman church was identical with that of the present one. There were apsidal chapels on the east sides of the transepts. The arch can be still seen in the north transept wall, and the springing of the apse is still visible in the pavement near the entrance from the north aisle of the choir, to the small Transitional chapel of two bays which has replaced the earlier one, and which is the only example of this period in the church.

The work of the Early English period is confined to the eastern arm of the church. It appears to have been entirely rebuilt at this time, the presbytery being lengthened two bays, and having a lady chapel thrown out eastward. The aisle terminations were again apsidal in form, semi-octagonal on plan, and the remains of these are clearly visible just east of the large square tower on the north side. The south end has been restored by the late Sir Gilbert Scott on the old lines. The Early English presbytery terminated in a massive wall pierced by a deeply-moulded arch below, and this wall and the first two bays westward of it on the north side appear to be the earliest portion of the work, the corresponding bays on the south being of slightly coarser detail. The remaining three bays are distinctly later still, and the columns are of an altogether different section, and approaching more towards the Decorated style. It must not be overlooked that the whole of the choir and presbytery has, as far as its fittings are concerned, been shifted considerably eastward. The stalls and choir proper were under the central tower, and the high altar was one bay further west than at present. This admitted of a procession path or ambulatory round the east end behind the reredos, and gave space for the shrine of St. Werburgh which stood in this bay, in all probability in a corresponding position to those of St. Albans and Westminster.

The Decorated work in the church was more extensive. A good deal of the window tracery in the choir aisles was remodelled, and the whole of the arcading and aisles of the south transept and the greater part of the nave are of this period. There was not in its design any unusual feature. The window tracery was of flowing design, and the piers were clusters of eight columns arranged round a central pier of square form set diagonally. Preparations were made for vaulting, but the transept and its western aisle were never completed, the aisles of the nave were carried out in Perpendicular times, and the nave itself is covered by modern vaulting. The east aisle of the transept was also vaulted at the time of the restorations. The clearstory of both nave

Chester Cathedral.
The Shrine of
Saint WerburghChester Cathedral.
Pulpit in the Rectorial

and transept are Perpendicular. To this last period belongs the west front, and one or two of the columns of the north nave arcade have been rebuilt by and bear the initials of Abbot Simon Ripley, who, with his successor, John Birchenshaw, made considerable alterations to the fabric in the fifteenth and early part of the sixteenth centuries (1493—1537). The casing of the tower arches and the upper portion of the tower itself were probably included in these works. The tower, however, was practically rebuilt by Sir Gilbert Scott during his restoration, which began in 1868. Of the other portions of the fabric of the Perpendicular period those not already mentioned are the base of the south-west tower, now used as a Consistory Court, and the chapels flanking the Lady Chapel. Of these latter only the north chapel remains. The other has been pulled down, and that side of the Lady Chapel against which it abutted rebuilt, as was also the east end.

Werburgh, which, after serving as a bishop's throne, now stands under the arch at the east end of the presbytery, being in as near a position to that which it occupied originally as the altered position of the sanctuary would allow. It is altogether about 14 ft. in height, and consists of two portions. The lower half is solid, being pierced at the sides by two recesses, and at each end by a corresponding one. At the angles are buttresses, which are plain below but pannelled above, and terminate in canopied arches with figures. The sides of the upper portion are divided into two bays, with open tracery enclosed by arches and crocketed gables. Over all is an open cornice and cresting. In plan the shrine is oblong, measuring, exclusive of the buttresses, 5 ft. 7 in. in length, and 3 ft. 3 in. in breadth. It has been raised on one step. The whole is of Late Decorated date, and is an interesting example for comparison with the other shrines in the country, which differ from it considerably in proportion, and lack the dignity which is given to the Chester shrine by its great height. We give a view of this shrine as it stands at present, the missing portions being made up with modern masonry left in the block. Some of the missing fragments are, we understand, still in the neighbourhood of Chester.

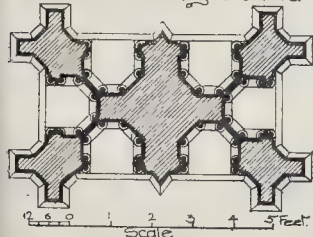
The choir stalls are, to a great extent, ancient, of Perpendicular date, and exhibit many beauties in the carving of their canopies and the grotesques and figure subjects of the misericords and stall ends. All the other fittings are modern. The organ now stands on a loft erected under the north arch of the central tower, and is not happy in design. The modern monuments are also more remarkable for their incongruity than for their beauty, and nothing could well be less satisfactory than the clumsy monument erected to Bishop Pearson, who died 1686, which fills up a large amount of the space in the centre of the north transept.

Two doors in the wall of the north aisle lead to the cloisters, that at the east end being Norman, that at the west end a Perpendicular insertion.

The cloisters themselves are of Late Perpendicular date (the South Walk has been rebuilt on the old lines), but round them on the north-west and east sides are grouped a highly interesting series of early monastic buildings. On the east side is the chapter-house, approached through a vestibule, and beyond it, separated from it by a slype or passage which led to the infirmary, a vaulted room of three bays running north and south. The north side of the cloister is entirely occupied by the frater, while against the west wall is a building of Norman date, occupying the whole length of this side of the cloister, with the exception of a passage next the church, which communicated with the buildings which extended west of the church.

The whole of the outer wall of the cloister on the north and east is Early English, and the buildings on those sides are of the same date, the only exceptions being the alterations and additions which were made to the frater in Perpendicular times.

The chapter-house is a very fine room, 50 ft. in length and 27 ft. in width, vaulted, and lighted by lancets in triplets at the sides, and a group of five at the east-end. The exterior of it is prominently shown in the general view of the cathedral in this number. There is some excellent modern glass in the east window. It is approached from the cloister by a vestibule divided into three alleys by columns without caps. The entrance from the cloister has been considerably restored, and the doorways communicating with the north transept on the one side, and the slype on the other, are also modern. The slype itself, which adjoins the vestibule on the north, and is also approached from the cloister, is vaulted, in four bays, but there is no point of detail requiring special mention. Beyond the entrance to this passage, and near the north-east angle of the cloister, is a doorway leading to a broad staircase, which formed a communication between the cloister and the dormitory which ran over it, and known as the day stairs. Eastward of these stairs is the

Chester Cathedral.
Plan of Saint Werburgh's Shrine

Chester is not rich in monuments, the only one remaining being a tomb of late date, and two early slabs under canopies in the south aisle of the presbytery. It, however, fortunately has preserved a considerable portion of the shrine of St.

vaulted room before mentioned, divided into two aisles by two octagonal columns carrying the vaulting. It is lighted at its north end by two sets of short lancets, and measures 38 ft. in length and 27 ft. 6 in. in width. The precise use of this room is not very clear. There are two deep recesses in its west wall under the day stairs, and a shallower recess in the east wall at the north end, but there is no evidence of a fire-place. It seems to have formed a cellar below the dormitory, which formerly ran over it and the chapter house vestibule, and communicated with the church by stairs in the north transept.

With the exception of a passage at its west end, the whole of the north side of the cloister is occupied by the once very beautiful frater. It was a noble room, 32 ft. wide and 98 ft. long. About 10 ft. must be taken from its total length for the butteries and screens, of which traces remain. The principal entrance was from the cloister near the west end, and near this in the north walk of the cloister was a long lavatory with three deeply moulded arches over clusters of small columns. In modern times a passage has been cut through the frater at this point, and has partially destroyed the lavatory. The remains of it show in the sketch of the north walk, also the frater door. The passage is still in use as a communication with the deanery and other houses. The portion of the frater west of the passage is roofless and the eastern portion is now used as a choir school. In the first-named portion are distinct marks in the side walls of the buttery screen. There are likewise two recesses or lockers in the south wall, and in the north is a four-centred doorway, now blocked, which led to the kitchen. The larger portion of the frater has several points of interest. Its Early English character is clearly seen in the interior. In fact, everything is Early English except the window tracery and the stone cornice which carried the wall plate. It is lighted by seven windows on the north side and four on the south, besides having had formerly a large window at either end, both of which are now blocked. Projecting from the south wall, and approached by a staircase in the wall, is the well-known reader's pulpit, one of the most perfect and valuable specimens in England. Others exist in a more or less perfect condition at Beaulieu, Hants, Shrewsbury, and Tintern Abbey, but they are all of slightly later date than the Chester example. The staircase, with an open arcade towards the frater, was lighted by a row of small windows at the back, which over-looked the earlier cloister. They appear in the sketch we give of the exterior of the frater, but are now blocked up. The rear-arches of the Early English windows (which were probably groups of lancets) remain perfect, the windows themselves having been altered to Perpendicular. A good deal of the exterior generally seems to have been recessed, and the buttresses are likewise Perpendicular, although doubtless standing on old foundations. A good deal has recently been done to clear out the disused portion of the frater, west of the passage; and it is to be hoped that steps may shortly be taken to re-roof this portion of it and arrest any further decay.

The passage which ran north and south at the west end of the frater is now closed a few feet distant from the cloister end by the modern house, which has been built on the site of this and the last bay of the Cellarer's Buildings. This last-named building is Norman, and, therefore, the earliest of the monastic buildings now remaining. It was a long vaulted apartment of seven bays, divided into two aisles by a row of circular columns carrying the vaulting. The west side was lighted by a series of lancets, which has been a good deal interfered with in later times. Towards the cloister, however, two narrow openings appear to have been the only means of obtaining light from that side. The building, which was probably a cellar, has had two halls over it, approached by the staircase from the cloister, and divided at this point by a wall, which is shown to have existed by the treatment of the vaulting at this point. One of these was known as the Green Hall, probably the smaller of the two occupying that portion north of the staircase. The passage between this building and the church led to the buildings west of the church in the outer court of the Monastery. It is also Norman, with doorways at either end. It is now used as a wood store. West of this are new buildings standing on the site of old buildings formerly monastic, and in some cases built over ancient crypts. The only portion, however, remaining visible of the outer court is the great gateway, a simple building of some dignity, and remarkable for the span of the arch over the entrance.

The monastic buildings now destroyed are shown in a plan in Lyson's "History of Sheshire," which has been taken from a plan in Harl. MSS. 2,073. The dormitory or dormer to which we have already referred, seems to have occupied the whole of the space over the east walk, from the north transept as far as the vaulted cellar north of the slype, and to have had at this north end a continuation running at right angles (from west to east), with a re-erector parallel with it on its north side, communicating by a short passage, and doubtless provided with a stream running underneath. The position of this building is marked in the old plans, and is shown on the large ground plan in dotted lines. The ground on this side of the Cathedral has within recent years been cleared of the buildings which formerly prevented a good view being obtained of the north side of the Cathedral. It is now open to the city walls, and our large lithograph shows the picturesque grouping of buildings on this side, a considerable contrast to the somewhat monotonous lines of the south side of the Cathedral. The site of the kitchen is still covered by a modern house north-west of the Frater, but in all probability much of the ancient walling would be discovered if the house were at any time pulled down. Some slight clearance of buildings has recently been made on the north side of the Frater, exposing the western position of its north wall.

AMBO, STA. MARIA IN COSMEDIN, ROME.

This illustration shows the Gospel Ambo in the church of S. Maria in Cosmedin, at Rome. The Easter candlestick is probably of the thirteenth century. The church was founded in the fourth century, but was "restored" by Adrian I. in 782, in the form of a Basilica. One wall has the remains of columns of a Roman temple built into it. There is a fine Opus Alexandrinum floor in the church, and an Episcopal throne, of the time of Calixtus II., early in the twelfth century.

G. C. HORSLEY.

DESIGN FOR WEST WINDOW, JESSE HAWORTH MEMORIAL CHURCH.

The subjects in this window form the commencement of a complete scheme of stained glass for the church. In the centre of the uppermost circle of tracery is the Star of Bethlehem, around which hover angels and cherubs. In other tracery openings and heads of lights a heavenly choir heralds the advent of our Lord. The Nativity, with shepherds and magi, fills the middle openings of long lights, and the lowest openings are occupied by the Baptism, the Presentation in the Temple, and the Disputation with the Doctors.

The window has been made to this design, and is now fixed.

The main outlines for the complete scheme were laid down by the architects of the church, Messrs. Booth & Chadwick, of Manchester. The window is executed by Mr. W. Pape, of Leeds, and the drawing of it was exhibited in the late Royal Academy exhibition.

COMPETITIONS.

FRAMLINGHAM MILLS GRAMMAR SCHOOL FOR GIRLS.—We hear that sixteen sets of designs were submitted in competition for this school, and the selected plans were by Mr. Frank Brown, architect, of Ipswich. The designs of Messrs. George J. and F. W. Skipper, architects, of Norwich, were awarded the second place, but the premium was declined, the architects preferring to have their drawings returned to them.

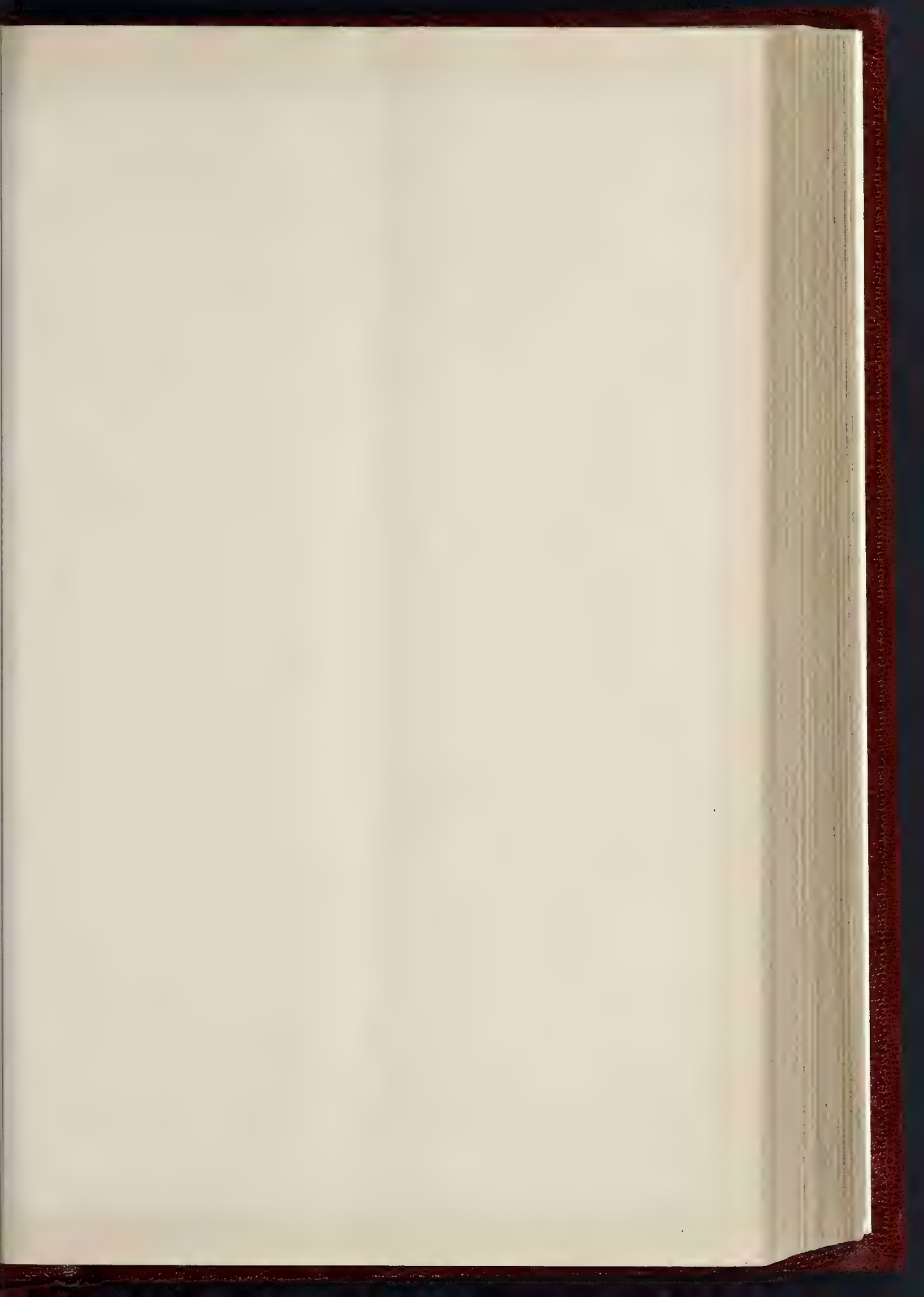
VERDIN TECHNICAL SCHOOLS, WINSFORD AND NORTHWICH.—The trustees of the Verdin Fund (which was at first given for the purpose of compensating sufferers from subsidence in the brine-pumping districts of Cheshire, but afterwards devoted to technical education and allied purposes) had before them, on the 22nd ult., fourteen sets of plans and designs for technical schools to be built—one at Winsford and a similar one at Northwich, at a cost of 4,600*l.* each. Premiums were offered for the best designs, and these were awarded as follows:—First premium, 50*l.*, to Messrs. Woodhouse & Willoughby, Manchester; second, 15*l.*, to Mr. Joseph Cawley, Northwich; and third, 10*l.*, to Messrs. Goldsmith & Son, Manchester. The plan includes lecture-hall to seat 250, gymnasium, art school, small lecture-hall, class-rooms for cookery, laundry work, chemistry, ironwork, wood-carving, modelling, &c.

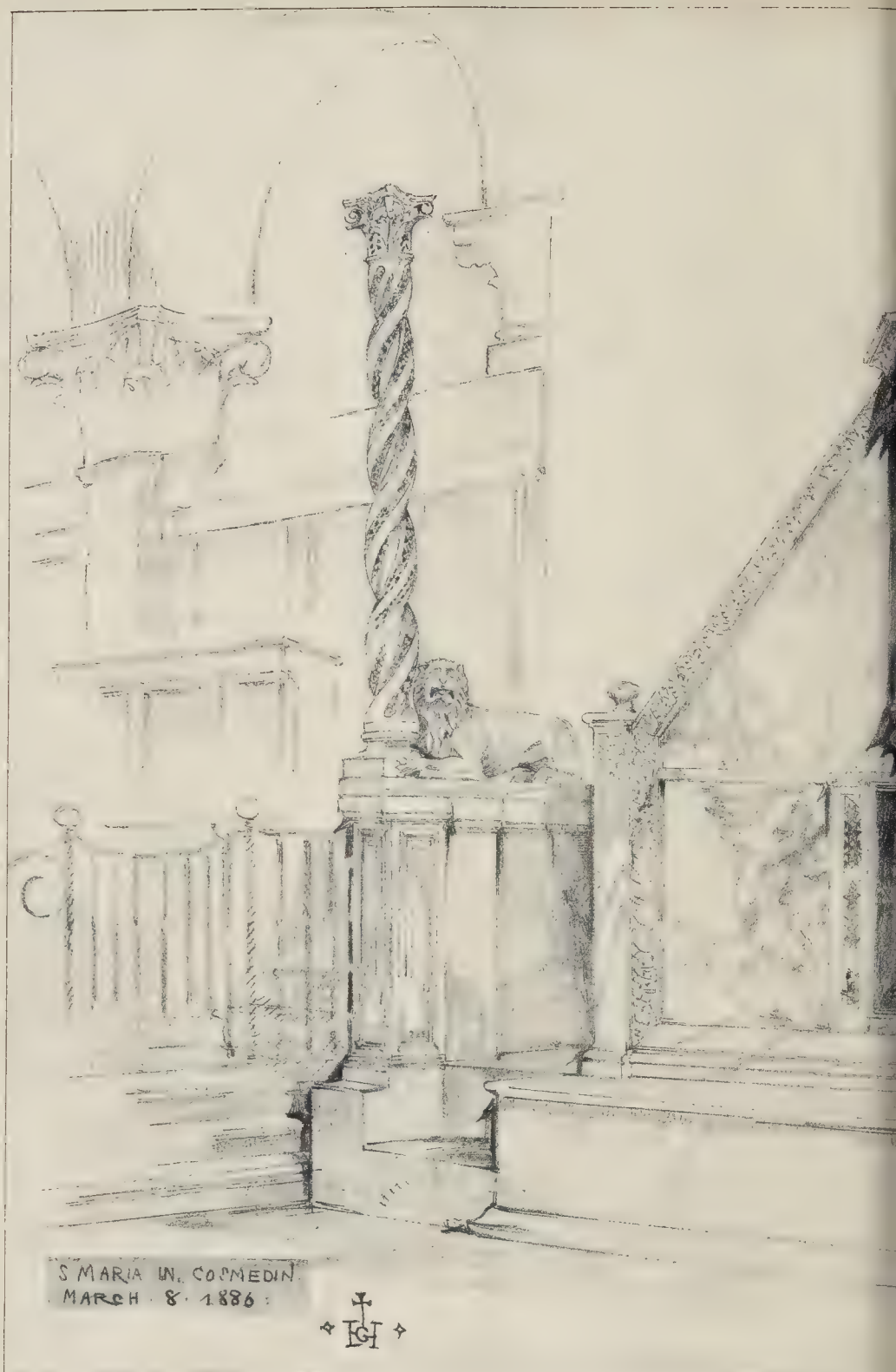
THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

(Continued from page 171.)

Sir Henry Doulton, who rose on the invitation of the President, said he had not intended to make any remarks that evening, his exhibit was the best speech he could make; but as he had been called upon he could only say that he was proud of being a potter until he heard Mr. Stokes's paper; but he now learned for the first time that it was a vulgar occupation. He might say that he thought the plasticity of the material in which the potter worked had never been appreciated. As to the durability of modern terra-cotta he need only mention two or three examples that occurred to him. One of them was the figure of Britannia on the top of the Exchange at Liverpool, made a hundred years ago at Lambeth; another was a figure of Sir John Crosby; and there were also two large statues in the triangular space opposite St. Thomas's Hospital. Of course, there was terra-cotta and terra-cotta; but there was no reason why terra-cotta should not be absolutely imperishable. There had been great advances made in pottery of late years, and Mr. Leech had assisted in developing some entirely new effects and new modes of construction. As to the power of terra-cotta to resist fire, they happened to have had a large fire at Lambeth which destroyed some of their buildings, and the only thing which stood was the terra-cotta.

Mr. J. M. Brydon said he had very great pleasure in proposing a vote of thanks to the readers of the three papers. They had all listened very attentively to everything which Mr. Ingress Bell had said in advocacy of the use of terra-cotta, but he had not given them any adequate reason for using terra-cotta instead of that much nobler material, stone. For his own part he (the speaker) could not see where their advantages of terra-cotta came in. They, as architects, were always being told to use the noblest materials they could get, and that was the aim which they should always keep in their minds. But in using a material which depended upon the chemical laboratory and the kiln for its excellence, were they not going the wrong way to work? Of course there was no material so noble as marble; the next noblest material was stone, and happily there was no difficulty whatever about getting good building stone in London. He did not think that the case for terra-cotta had been made out. Terra-cotta was not a nobler or more enduring material than stone, nor was it one likely to produce nobler or more enduring buildings. The fact that it could of necessity only be used in comparatively small blocks cramped the design and hampered the designer. In the case of small buildings in the country terra-cotta might perhaps be appropriately used to some extent, but when we were erecting public buildings we should use stone, the noblest material to be had. One of the grounds on which the use of terra-cotta had been advocated was the alleged economy of the material, but he should be very much disposed to question its economy. Knowing that the subject was coming before the Institute, he had taken the trouble to ascertain in two or three directions the relative cost of stone and terra-cotta when used in London, and he had been told by several of the leading builders of London that they would rather erect a building twice in stone than once in terra-cotta, owing to the cost and difficulties and delays involved by the use of the latter. He might mention some figures which had been placed in his hands by the architect of the Battersea Polytechnic (Mr. E. W. Mountford). Alternative tenders were invited for the erection of that building in Bath stone (Monk's Park, an excellent stone) in terra-cotta, and in Portland stone. The prices asked for the ornamental work were 4*s.* 8*d.* per foot cube for the Monk's Park stone, 5*s.* 11*d.* per foot cube for terra-cotta, and 6*s.* 9*d.* per foot cube for Portland stone—all these prices including fixing. But if terra-cotta were used, there was a stipulation that there should be 10*s.* per rod added to the price of brickwork. Now he contended that if they could get a good material like Portland stone for only 9*d.* a foot more than terra-cotta would cost, and if they could get Monk's Park stone—a very good stone, as he had said—for 1*s.* 3*d.* a foot less than terra-cotta, there was no ground whatever, in point of economy, why they should use terra-cotta instead of stone. Of course he knew that they could not produce elaborate detail in stone at the same cost as in terra-cotta; but did they want all that surplus ornament? He thought not. The fact was that







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architects were learning to erect buildings like furniture; they were not doing big things, but they were doing small things bigly, and they were therefore on the wrong tack. He held that to construct in terra-cotta was wrong, for terra-cotta was a decorative material pure and simple. Why should they put up immense and elaborate buildings in a material that had to be baked in kilns, when they could erect the buildings so much more satisfactorily in stone? Though he held that the case for terra-cotta had not been made out, he had very great admiration for the efforts which had been made in surmounting the difficulties of its manufacture. He hoped that architects would all come back in time to good old honest building in stone.

Mr. C. F. Hayward said that he was familiar with the ancient terra-cotta work at Layer Marney, mentioned by Mr. Stokes. The work there was, as far as he knew, in solid blocks, as had been stated. Some of the ornament on it would compare very favourably with the specimens before the meeting. As the durability of terra-cotta had been called in question, he was bound to say that the terra-cotta at Layer Marney had stood very well ever since it was put up in 1530, or 360 years ago. As a further but smaller testimony in the same direction, he might mention that twenty-eight years ago he was erecting a very large building of its kind at Plymouth. The materials intended to be used were granite with limestone dressings. During the progress of the work there was a strike of masons, and the work came to a standstill. The late Mr. Blashfield, of Stamford, who would be remembered by many as a manufacturer of terra-cotta, appeared on the scene, and offered to execute the details of the building in terra-cotta. The offer was accepted and the work executed, and it had admirably stood the weather to which it was exposed from the south-west—weather which was very destructive to stonework generally.

Colonel Edis expressed his surprise that Mr. Stokes, who had confessedly never used terra-cotta, should presume to speak so strongly against its use. He had, in fact, shown his ignorance of the subject. As to the question of cost, Mr. Stokes was utterly wrong; the cost of the terra-cotta at the Constitutional Club was nothing like so much as had been stated. Was there to be no progress in building? Was no use to be made of an admirable material like terra-cotta—a material likely to withstand our town atmospheres much better than stone? Were they not all aware that the only stone to be depended upon in the London air was Portland stone? But much of the Portland stone in London buildings was showing signs of decay. The brilliant whiteness of some of the Portland stone used at Somerset House and St. Paul's was evidence of decay in progress. As to using Bath stone in town buildings, could anyone be really serious in making such a proposal, in face of the costly reparations which had had to be made wherever that material had been used in London? He was astounded at Mr. Stokes's statement that terra-cotta was not a constructional material. That statement was wholly incorrect. Terra-cotta blocks of good material did not need to be filled up with cement concrete, and they would stand weight better than many stones. Then as to the statement that the builder would want to be paid something extra for the brickwork where terra-cotta was used, did anyone ever know a builder who did not want more money for more money for his brickwork because terra-cotta was used instead of stone, he would get it if he had a credulous architect to deal with, but not otherwise. Having himself used terra-cotta very largely, and hoping still to use it very largely, he was convinced that it was one of the most suitable materials to use in cities like London. He was sorry that he was not able to be at the meeting in time to hear Mr. Ingress Bell's paper, because that gentleman had been associated with Mr. Aston Webb in the production of one of the most artistic buildings of this country, the Birmingham Assize Courts, a terra-cotta building. Although the potter's art had been sneered at, it was one of the greatest arts the world had ever known.

Mr. James Neale said he had much pleasure in seconding the vote of thanks to the readers of the papers. The meeting was especially indebted to Mr. Ingress Bell for the moderate way in which he had put the case for terra-cotta, and to Mr. Leech for having told them so much about the technicalities of terra-cotta production. They were also indebted to Sir Henry Doulton for having sent for their inspection so interesting a collection

of specimens of terra-cotta. The only feeling that he (the speaker) had regarding those specimens was that they were too good,—too alluring by their attractiveness. He personally objected to using terra-cotta, because he thought that its prettinesses were apt to carry one away. The meeting had been told that they need not, with terra-cotta, have plain plinths,—that they could have any ornament they desired upon them. Now he thought that that very facility for ornamentation was going to be the ruin of terra-cotta work. Whatever might be their opinions as to Mr. Stokes's views, they must all admire his thorough candour.

Mr. Aston Webb said he thought that Mr. Ingress Bell had put the case for terra-cotta very admirably, and had answered by anticipation some of the objections urged against that material by Mr. Stokes. Mr. Stokes had questioned the durability of the material, but he had skimmed very lightly over that part of the question. He thought that if Mr. Stokes, in the course of his fortnight's peregrinations, had met with any seriously decaying terra-cotta building he would have given them a picturesque account of it. With regard to the charge against terra-cotta that its use involved concealment of construction, there was, no doubt, some truth in it, but the same thing was equally true of a great many modern buildings (even where terra-cotta was not used), owing to their complexity. The old teaching at the Architectural Association twenty years ago, that construction should never be concealed, was charming in theory, but it could not very often be thoroughly carried out in practice. The critics of terra-cotta and its users should bear in mind that the material was practically a new one, and that in using a new material mistakes were at first almost inevitable. He thought that those who criticised the material would do well to try and work in it, and endeavour to show how it could be best and most appropriately used without mistakes. That would be a much better course to take than to avoid the material altogether. Terra-cotta was a new material, in which architects might obtain new effects, and it was therefore not a material which could be lightly discarded.

Mr. Lloyd Edwards, of Ruabon, being called upon by the President, said he thought Mr. Stokes was in error as to the cost of the terra-cotta work at the Constitutional Club. Mr. Stokes had evidently founded his remarks on that subject upon a quotation for terra-cotta work, based on no drawings or other precise details, which he had obtained from him (the speaker) about ten days ago. He was principally interested in the subject from a manufacturer's point of view, but he might perhaps be allowed to say that he was no advocate for the use of terra-cotta in imitation of stone; he believed it was much better employed when used in small blocks. He confidently looked forward to the time when terra-cotta would have a treatment of its own. It was a mistake to treat it in a stone manner; architects who treated it in that way would never be successful with it.

The President, in putting the vote of thanks, said that at that late hour (10.30) he would not detain the meeting with any remarks of his own on the subject of the evening, which was one upon which there was a good deal to be said on both sides. With the vote of thanks to the authors of the papers, he begged to couple the names of the several manufacturers who had kindly sent specimens,—viz., Messrs. Doulton & Co., Mr. Edwards, Messrs. Gibbs and Canning, and the Burnmantofts Company.

The meeting then terminated.

ORIGINALITY AND INDIVIDUALITY IN ART.*

IN making a few observations to-night on the subject of Originality in Art, I shall begin by offering the smallest possible contribution to the literature of the much-veiled and well-worn question, whether or not a new architectural style is possible. The question seems to me a perfectly futile one, but there have been not a few in the past who have been unwilling that the nineteenth century should pass away without having affixed its signature definitely to some new development, or even to some new birth, always to be associated with its name thenceforward. Such an aspiration tells for me a sad story of self-importance, and is indeed no bad symbol of an age which has created advertisement as a fine art. A style started under such auspices, properly perfected in

all its parts, and duly patented, should, in the eternal fitness of things, become the stock-in-trade of a limited liability company, pass through a fitful and fevered span of existence, secure, who knows, a quotation on the Stock Exchange, and be buried at last with becoming obsequies by an official receiver. Let the style grow if it will,—but let the aspiration take care of itself. I can conceive of no Zeus among architects from whose teeming and fertile brain such another Pallas-Athena should spring, fully grown and completely equipped? When, indeed, we may ask, in the whole history of the world has there been originality in the sense of absolutely new invention? Modification and evolution have been the watchwords all through. Those who cry out for an original style ask, as I understand them, for a tabula rasa on which to inscribe hieroglyphics never before seen, or combinations of forms without precedent. They ask for an artistic cataclysm, for a labouring of the mountains and a new and strange birth, but history will tell them that the most fundamental changes have been happened on rather than discovered,—that forms have existed as results before they were recognised as the embodiment of new principles, and the starting-point for fresh enterprise. All growth must be gradual; the new must germinate in the decay of the old; there is no solution of continuity in the process, no moment at which you can say that the change in degree has become one in kind, or you might argue that one moulding makes a style, as the Sophists of old that one grain makes a heap. Further than this, all experience tells us that in the sphere of Art, unlike that of Science, the limit of perfectibility is reached while the study is still, comparatively speaking, in its youth. "Those arts," it has been said, "which depend on individual genius and incommunicable power have always leapt at once from infancy to manhood, from the first dawn of rude invention to their meridian height and dazzling lustre, and have in general declined after. This is the peculiar distinction and privilege of each, of science and art; of the one never to attain its utmost limit of perfection, and of the other to arrive at it almost at once. In after ages great men have arisen, one by one, as it were, by threes and at intervals; but, in the earlier stages of the arts, they rose by clusters and in constellations";* but I am flogging a dead horse, and am content to believe that the day for such crude imaginings has gone never to return, and that every one of us here realizes that the mere entertainment of such an ambition stamps a man as singularly ill-fitted to make the experiment. For my own part, I wish we could sink styles in style, and cultivate pure beauty of form and constructive propriety without troubling ourselves in any given instance what our sources of inspiration may be, or whether or not—if we care to run them to earth—they are all referable to one date of work. It is not everyone who can practise so bold an eclecticism, if I may use such an expression of an artist whose work can never have been consciously derivative, as Mr. John Sedding: to attempt to conjure with edge-tools, as he did, is for the prentice-hand to court death by the happy despatch; but when once we have gone thoroughly and systematically through the educational mill, when the mind has been impressed for good and all with the varied outcome of centuries of artistic energy, all of which the man of broad sympathies, who can feel the common principles underlying the different forms, may well enjoy; when the artistic sense has been cultivated and the proper appreciation of beauty has become an instinct, then it is time to throw off the leading-strings which, when they have ceased to guide, have begun to hamper us, and step boldly out into the field of practical architecture to do or to die.

One sees the pedantic attitude of mind to which I demur—the cultivation of the letter rather than the spirit—in the small body of amateurs who make the study of architecture their relaxation, and one sees it there perhaps at its worst. The building is too often a vile body on which to test a knowledge of styles and dates rather than the thing of beauty, and more importance is attached to the docketing and pigeon-holing of details, than to getting a large and comprehensive grasp of the whole. It will be understood that I am only speaking suggestively, but I have no doubt whatever that it is too often forgotten that the building which is a masterpiece should be approached in the same way as the book which is a classic. Dr. Johnson has told us with convincing wisdom that the beauty and unity of a great conception should not be broken, or its thread interrupted, by a reference to the notes on

* A Paper by Mr. Arthur Edmund Street, F.R.I.B.A., read before the Architectural Association, on Friday, February 24.

a first reading; "Notes are often necessary," he says, "but they are necessary evils. Let him that is yet unacquainted with the powers of Shakespeare, who desires to feel the highest pleasure that the drama can give, read every play from the first scene to the last with utter negligence of all his commentators. When his fancy is once on the wing, let it not stoop to correction or explanation and when the pleasures of novelty have ceased, let him attempt exactness and read the commentators." I suppose the commentator in our case is, strictly speaking, the Verger, whose mission it is to turn poetry into prose, but his mistake is shared by many in an unofficial way. I have been speaking of the mote in my brother's eye, but it does not follow that we have not a beam in our own; as a matter of fact, if not such sinners in our own persons, we must be held ultimately responsible for the shortcomings of others.

Let us hear what the oft-quoted Montaigne has to say on the subject: "When I hear our architects," he says, "mouth out those big and rattling words of Pilasters, Architraves, Cornices, Frontispieces, Corinthian and Doric works and such-like fustian terms of theirs, I cannot let my wandering imagination from a sordaine apprehension of Apollodorus his palace, and I find by effect that they are the seely and decayed pieces of my kitchen-dore."

Montaigne was common-sense personified, and gifted with that sort of perspicacity which makes his criticism valid for all time, and it is good for us to know how the hyper-professional attitude struck him, that seeming desire—if it is not a real one—to create a shillboleth, to make something of a trade secret of what is intelligible to any cultivated taste. But to look at the same failing in another aspect, I do not know what may be the experience of others—but I have frequently been confounded in the intelligent world of art with a feeling of resentment, not more at the rigid adherence of a modern building to an old model, when there was no special suitability to suggest it, than at its being deliberately labelled with the name and title of the type to which it conforms. For an architect to bind himself hand and foot to the rigid exercise of one style, no matter how varied the requirements he has to fulfil, if it is to cultivate dexterity at the sacrifice of the taste, judgment, and discrimination which a more liberal appreciativeness or a less cautious attitude will keep in constant activity, is at least a course which has its merits and claims our respect, but for the same man to say, Now I am going to design in the Perpendicular style, now in the Jacobean, now in that of Henri Quatre; to work professionally under several recognised sets of conditions, adhering blindly to precedent in each, and following the model with Academic scrupulousness,—in a word to be on terms of distant acquaintance with all, and familiar with none—does, indeed, seem the way to quench the spirit and leave nothing but the dry bones for our delectation. "Warnut I says, and I ups and gives it a twiddle this way," it is nothing but the attitude of the shoddy wood-grainer writ large.

I take it that no self-respecting man is a consciously satisfied with the paste and scissors method of design, however nearly he may approach it in actual practice. Even those who are least generously endowed by nature, or most conscious of their own deficiencies, feel that they have something within themselves, which it would be a satisfaction to them to put into their work. Originality is a wide and vague term, but at least, it conveys to most of us an idea sufficiently definite to admit of our aiming at it, and that it should be invariably made our object I do not doubt.

There seems to me absolutely nothing of real interest in a work which is simply free from solecisms and mistakes, in which all the virtues are negative, which is devoid of character and life in much the same way as the typical head which is produced by photographing one over another—where every feature is the mean between a variety of extremes. It is better to have fought and lost than never to have fought at all: it is better, vulgarly speaking, to have come an artistic cropper on one's own account, than to have skated about all one's life on the architectural ice leaning on the chair of convention.

I believe then that an independent and self-reliant attitude should be a condition precedent to all design, but I deprecate the encouragement of purely visionary aspirations for novelty. Only the other day I read in what should have been a sober publication, as it was an official one, a warm commendation by one Frenchman of the following rhapsody by another—M. Vitet. "Never,"

says the latter, "never in the world has an Art been produced twice in the same guise; or, if it has, it was a mere trade the second time, and not an Art. Honour to those who, even in our own day, do not despair of inventing a new architecture."

Let them draw their inspiration, neither from the forms of antiquity, nor yet from those of the middle ages, but let them be impregnated with the sentiment of a master-thought—the thought of an artist, not an archaeologist."

There is a great fallacy in this aspiration to start with, and one which has been exposed before now, and that is the assumption that the intellects of a new cycle must always approach a problem from a new point of view. The real truth is that the same class of mind in any age will always approach a problem in the same way and arrive at kindred results. Signal novelties in thought*, we are told, are as limited as signal inventions in architectural construction, and *vice versa*. The Rousseau of the Social Contract and Emilius was, to take one example, in close touch with the Spartan Lycurgus, or with the society which that name represents; his nature led him to approach a problem which he believed to be identical in a way which was identical actually. Classification, in a word, should not be made according to dates, but according to the nature of the thinkers, for that there should be a recurrence of ideas in similarly constituted thinking machines, is at once natural and the fact. Again, to tell one to lay violent hands on a master-thought, unless it is some one else's, is about as reasonable as to tell one to inherit £10,000 a year, or to suggest that one should become Archbishop of Canterbury; master-thoughts are not so easily come by, and still less if the master-thoughts of past generations are to be a dead letter to us; we must all too have been archaeologists in our degree or we shall find when we sit down to the desk that the teeming visions of an exalted fancy are all too ethereal for the sober process of transmission to drawing paper.

In saying that the meaning of originality is generally understood, I am not blind to the various glosses which ignorance or self-conceit put upon it, nor in suggesting it as an aim do I mean that the young designer is to set it up consciously as a thing to be won. Originality is a subtle quality, a fresh and natural sense of fitness, which bears no forcing, which to strain after is to put beyond reach. It cannot exist in the design unless it has existed first in the designer, because it is in its real nature an unconscious expression of the artist's own personality; a form of self-realisation—his way of viewing a thing, his way of seeing the possibilities and meeting the necessities of a given case, and no one else's. Nature breaks the mould, as has often been said, when she forms the man: individuals may approach or touch each other at points, but never all along the line. Each is an original piece of work himself, and his natural product cannot be less so; unfortunately for us it is very easy to go the wrong way to work, and to dam up the flow of our natural tendencies, or to carry them into an artificial channel is the simplest thing in the world. This conscious craving to do something fresh, as formulated by M. Vitet, is almost fatal in itself, and the very air we breathe nowadays teaches us to be self-conscious and introspective: for better or worse, and mainly for worse, we have eaten of the tree of knowledge of good and evil, and the charms of innocence and simplicity are not naturally inherent in anything we produce. Stendhal's autobiography or Marie Bashkirtseff's diary are only extreme instances of a common complaint, and nothing opens the eyes more thoroughly to the difference between the conditions which govern our work and those under which the masterpieces of our great predecessors were produced than the comparison of such morbid outpourings as these with the breezy simplicity of Cellini's life of himself.

If any proof were wanted of the need of an intimate converse with old work, it would be found, I think, in the aid which it gives to facility in production, so that it is half unconscious: the tools, at least, are all to the craftsman's hand, and the thread of inspiration is not broken by petty interruptions. I do not like to think of limiting the scope of study in any way, but at the same time it seems clear that a man has been both better endowed by nature, and will be actually better equipped, whose preferences lead him to put definite bounds to the sphere of anything like exhaustive inquiry. In this connection I make no apology for quoting from an essay by Mr.

* J. Morley.

John Morley on "Literature," because literature is one of the fine arts, and the same critical faculty, if not the same productive, is concerned whether architecture or English prose are in question. Mr. Morley has been speaking of the lists of the best one hundred books with which we were flooded a few years ago, and he says: "To fill a man with heterogeneous scraps, from the Mahabharata and the Sheking down to 'Pickwick' and White's 'Selborne' may pass the time, but I cannot see how it would strengthen, instruct, or delight. . . . The steady working down of these lists would end in the manufacture of a prig." Now, as Mr. Morley goes on to say, "a prig has been defined as an animal which has been over-fed for its size." Priggishness in design is only too real a thing, and it is almost marked by exaggerated self-consciousness; but I do not go so far as to say that it is inevitable, even where the designer, like a quick-change artist, appears constantly in a fresh character. It is only a shocking possibility.

Before leaving Mr. Morley, I am tempted to make a further quotation, from a series of quotations, which contain a truth quite as real for us as for the audience to whom they were addressed. "I have an unbounded faith," he says, "in the virtue of cultivating direct and precise expression. It is not everybody who can command the mighty rhythm of the greatest masters of human speech, but everyone can make reasonably sure of what he means, and whether he had found the right word. . . . It has been said a million times that the foundation of right expression in speech or writing is sincerity. . . . Right expression is a part of character. . . ." And again, "Truth is quiet; moderation and judgment are, for most purposes, more than the flash and glitter even of genius." I wish this were more generally recognised by the world at large for whom we have to cater. When we hear work qualified as original should we be right in assuming that it has been conceived and carried out in the spirit which Mr. Morley inculcates, or would we rather confess to a conviction, born of long experience, that oddity is meant rather than originality, rhodomontade rather than direct expression? Some would say that in the appreciation of the public lies the justification for such work as this. I don't know whether one would naturally go to Addison for an opinion as to the principles which should govern Art, but he had a judicial way of laying down the law on general questions, and this is what he says on the point: "I shall add no more than that music, architecture, and painting, as well as poetry and oratory, are to deduce their laws and rules from the general sense of mankind, and not from the principles of those Arts themselves; or, in other words, the taste is not to conform to the Art, but the Art to the taste." Of course, it is obvious that the fundamental principles of Art were evolved by taste and have their basis in it, but not in the taste of the man in the street. Addison's language is not perfectly clear, but if he meant that the general direction of uncultivated likes and dislikes, at any given moment, is the proper criterion of what is radically good and bad, it is impossible to agree with him, nor does it appear that he contemplated the interference of the public in his own special domain. Mr. Louis Stevenson, writing of the fine arts generally, does, indeed, say that their *raison d'être* is to please the world at large, and that we have no business to try and make our customers buy wares they do not want, but he goes on to expatiate on the intrinsic faculty of the artist's work for conferring happiness on its creator, quite apart from any question of success. "In the wages of the life" he says, "not the wages of the trade, lies the reward," and again, "Man's (i.e. the artist's) joy may consist with perpetual failure and find exercise in continued chase." Of the pleasure which his own work gives him he has spoken more than once: the public has the good taste to agree with him, but had it been otherwise, I, for one, decline to believe that he would have condescended to exchange his own reading of his art for a more ample measure of popularity.

To advise the young man to ignore altogether the necessity of getting his bread and cheese is, however, to offer a counsel of perfection. The unflinching prophet of a higher taste or purer aims runs a greater risk of being left crying in the wilderness. Still the heretic of to-day may be canonised to-morrow; how often, indeed, has it happened that the laughing-stock of one generation has become the idol of the next! Magna est veritas et prevalebit, but it is a question of time. "The books," says Lecky, "which have proved of the most enduring value, have

usually at first been only appreciated by a very few, and have only emerged into notoriety" as he oddly puts it, "after many years of eclipse." He continues in the following pregnant words, "There are demagogues in literature as well as in politics; and there is a degradation of style, springing from a thirst for popularity, which is at least as bad as the pedantry of scholars." It is quite true, then, that what the mature judgment of the world ultimately approves is really great; this is the ultimate test: the prophet takes a higher place than the demagogue in the long run, for in this case second thoughts are best and most permanent, and the craze of the moment rarely deserves anything better than the oblivion which is in store for it.

Many a young designer has been infected by the spirit of Impressionism which is in the air. Amid many signs of talent and imaginativeness there is in the Impressionist school too obvious an addition to novelty of effect for its own sake, though its hideousness may make it quite unworthy of reproduction: Flesh may look dirty to blackness under certain conditions, but there is no reason for so painting it. Still here is work done on principle, with good intentions, and often with great suggestiveness, and we have no real right to quarrel with it. Speaking of Impressionism I am reminded of an instance, in which the principle was carried beyond drawing and design into execution and in an odd way. The work in question was one of great charm, but I felt the presence of a great blot when my attention was arrested by odd and purposeless patches of brickwork and tiles spotted about, sometimes in wavy courses, on the general background of stone. At first I thought it a somewhat absurd affectation of taking any materials which were available at the moment, building from hand to mouth, so to speak, but afterwards I inclined to the idea that it had been done with the object of getting that indistinct and indeterminate effect so well conveyed in the clever draughtsmanship of to-day—which, as a matter of fact, a wall face does present, owing to the limitations of the human eye. The good sketcher only shows that he is, as fond mothers say of their children, "very noticing"; he is repeating a lesson which he has been alert enough to learn from Nature. But the architect, as he tried to work back again from the reproduction, as if Nature did not know her own business, and the result was to rivet the eye at once with an oddity, and to make one lament that a charming piece of work should be marred by a restless and conscious endeavour to be clever.

But if there are some who fly to excess on principle, there are others whose proceedings have not that excuse, who argue, seemingly, that as isolation is possible in the midst of a crowd, so it is possible to be original in company, to be somebody else and yet yourself, but I think that those who "convey" a startling feature, or a reminiscence of one from somebody else's work, with a vague idea that in thus showing their appreciativeness they participate to some extent in the credit of a piece of design, to which none may have been due in the first instance, become, as it were, accessories after the fact, simply pile Felion upon Ossa in the reduplication of mistakes; the step from originality, misunderstood to a veiled plagiarism, may not be exactly that from the sublime to the ridiculous, but the pettiness and absurdity of the latter is incontestable. Nothing is more contagious, nothing more difficult to throw off, than this diseased itching for effect, a malady which even blinds the patient to the passing of that critical moment when what he fondly believes to be new has already become stale.

Its popularity is one of the baits which such work holds out; its comparative easiness is another. "To be intelligible," says our latter-day La Bruyère, Mr. Oscar Wilde, "is to be found out," but to be unintelligible is either to have no meaning, or to be unable to express it. It has been well said that it is easier to be odd and enigmatical than to be sensible and simple.* It does not take much to collect a little gaping crowd in the street, nor is much thought nor much imaginative power requisite to provoke the attention of a people which is attracted by novelty, however crude. Before the young sailor launches his bark on the sea of architecture he must fill his sails with wax, or the soft tones of the siren of opium will wheedle him to artistic destruction, and the more easily that he is not completely conscious of the danger he runs.

It ought to be enough to ask ourselves whether

eccentricity has ever been a feature of any masterpiece, to avoid it like poison. In the whole sphere of Art, is the finest work ever marked by that oddity which, like a joke, becomes positively wearisome directly it is familiar? Has it not rather something of the measured cadence and stately rhythm of one of Burke's periods let us say? The test of a work's merit is the degree to which it will bear living with. There is a brilliancy in decay and degradation, like the lights of a festering marshland; it leads the followers into strange and fatal paths, like a will-o'-the-wisp, but the spell is soon broken. Rocco work of any kind is like the bright talker, the paradox-monger, for ever on stilts, whom to meet is, after a little experience, to avoid: the quips and cranks of such work, the pieces of wayward cleverness, like the sharp sayings of a naughty child, which amuse us in spite of ourselves, the conceits in which the designers displayed what Poe calls "the mad pride of intellectuality," are just what make it turn to ashes in the mouth.*

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

INSTITUTE OF CHARTERED ACCOUNTANTS.

THE new buildings in Coleman-buildings, Moorgate-street, now being completed for the Institute of Chartered Accounts, were inspected on the afternoon of Saturday, February 24, by a large number of members of the Architectural Association on the occasion of the second Spring visit. The party were conducted over the building by the architect, Mr. J. Belcher, and Mr. F. T. W. Goldsmith, the junior honorary secretary.

This building has become well known through being illustrated in this journal and the Academy exhibition. There are two elevations visible to the west and south, and these are executed in Portland stone with elaborate detail. The style adopted is both late and free, and much variety is observable in the details of every part. Great character is given to the building by the free use of sculpture, in which the architect obtained the valuable co-operation of Mr. Hamo Thornycroft, R.A., and Mr. Harry Bates, A.R.A. It is to be regretted that, for economical reasons, really good sculpture is rarely used in any quantity on London buildings. This, however, is a pleasing exception, and deserves a site where it can be observed with greater ease than in its present position. Closely encompassed by high buildings, it is impossible to get a good view of the building except at a very sharp angle. Mr. Thornycroft's work is represented by a deep frieze or set of panels placed between the three-quarter columns which support the enriched cornice terminating the façade. These panels, four or five feet in height, contain three or four figures representative of the arts, the crafts, mining, and other departments of commerce, in the existence and failure of which the labours of a chartered accountant are required. Mr. Thornycroft also contributes a figure of Justice blindfold, which terminates the projecting angle bay, which Mr. Belcher has cleverly introduced to mask the canted angle, upon which the County Council insist. Mr. Harry Bates's work is represented by the admirably-carved Caryatides above the ground floor, whilst the subsidiary carving is by Messrs. Farmer & Brindley. The interior of the building has been kept fairly plain with the exception of the reading-room and library with the council chamber over, and the work owes much of its charm to the excellence of proportion with which the architect has invested it.

The ground floor has the library on the left of the main entrance, whilst on the right four offices for letting are placed with a separate entrance from the side street. This new entrance gives access, by separate staircase, to the examination hall on the third floor, and the Institute's offices, secretary's room, waiting and committee rooms on the first floor. These rooms are also served by the principal staircase from the entrance hall, which gives an imposing approach to the council chamber on the first floor.

Illustrations of this building have appeared in our issues for January 12, 1889, August 27, 1892, and January 7, 1893.

The building has been admirably built by Messrs. Colls & Sons, of Coleman-street, E.C. Mr. G. Smith acted as clerk of the works.

* The remainder of Mr. Street's paper, together with some notes of the discussion, in our next.

ARCHITECTURAL SOCIETIES.

ARCHITECTURAL ASSOCIATION (LONDON).—The eighth meeting of the Discussion Section of this Association for the present session was held at the rooms of the Association on Wednesday evening last. The Chairman, Mr. S. B. Beale, presided. After the discussion of a practical difficulty, encountered in his practice by one of the members, on the treatment of provisional amounts in quantities, Mr. Alfred H. Clark, A.R.I.B.A., read a paper on "Town Houses." A discussion ensued, which was opened by the senior secretary, Mr. W. Henry White, and the subject was summed up by the Special Visitor, Mr. Francis Hooper.

ARCHITECTURAL SECTION OF THE GLASGOW PHILOSOPHICAL SOCIETY.—The Architectural section of the Glasgow Philosophical Society met on Monday last in the rooms, 207, Bath-street—Mr. Campbell Douglas presiding. Mr. T. Crichton Fulton, electrical engineer, Glasgow, read a paper on "The Economics of Electric Lighting and Power Transmission." Of all prime movers for generating electricity, he said, a water turbine, if there was a convenient and plentiful supply of water, was the most inexpensive and economical. It was clean, compact, steady, and very easily controlled. Energy in the form of water could be more economically transmitted than in any other way. In discussing the question of electric lighting, Mr. Fulton said that though perhaps the actual outlay would exceed that paid for a similar amount of light obtained directly from gas, yet, when one considered that electric light was safer, healthier, and steadier, and that it did not consume any oxygen nor vitiate the atmosphere, it would be found in the long run to be much more economical. The paper was illustrated by various experiments and lantern-slides.

LIVERPOOL ARCHITECTURAL SOCIETY.—On Monday last, at a special meeting of the Liverpool Architectural Society, held at the Library, 15, Cable-street, a paper was read by Mr. Herbert Rimmer (Soane medallist), entitled "Renaissance Architecture of Spain," illustrated by sketches and photographs taken during Mr. Rimmer's recent tour as Soane Student of the Royal Institute of British Architects.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A special meeting of the Edinburgh Architectural Association was held on the 22nd ult. in the Royal Institution, Princes-street, Edinburgh, for the purpose of discussing the paper on "Our Duty in Respect of Ancient Buildings," read at a previous meeting by Mr. W. W. Robertson, H.M. Board of Works, President of the Association. The chair was occupied by Mr. Robertson. In his paper Mr. Robertson had said he did not believe there was a single building restored during the first fifty or sixty years of this century, which would not call forth an almost unanimous verdict to the effect that it had suffered great and irreparable injury in the process. He pleaded for the careful preservation of our old buildings, and above all for their preservation from "restoration," and he maintained that restoration was only admissible where there was no possibility of its involving destruction. The discussion was opened by Dr. R. Rowand Anderson, who contended that they were not entitled to stop the history of a building, say, at the "Perpendicular" period or any other period. The history should be allowed to go on, and the fittings and furniture that marked these periods should be allowed to remain. A building was a thing to be used, and their life and comfort depended upon keeping it in a state of repair, and that implied changes more or less from time to time as their views on comfort and civilization changed. If buildings were to be restored for the simple purpose of showing the original design, he was not prepared to condemn that view of restoration, but if a building was to be restored for use, he held that the architect, while jealously preserving all that was old, had to meet the purpose to which the building was to be devoted, even if thereby he had to depart from the original plan and make additions that did not conform to the original style or design of the building. Mr. G. S. Aitken having spoken, Mr. H. Capper said that in the restoration of buildings they must consider each individual case. If the building was one of museum value, then by all means let it remain, but if it could be used they would be justified in making whatever alterations were considered necessary. Mr. Thomas Ross supported the views entertained by Dr. Anderson, and Mr. James Bruce dealt with national buildings put to use, referring specially to the Castle.

* A. Birrell.

Hall at Stirling. He held that to take such a noble building and turn it into barracks was not a use, but a misuse, and that in such a case what the country was bound to do was to restore that building to its original condition. Mr. Robertson, in replying to the discussion, maintained that the preservation of an ancient building, always supposing that it was worthy of preservation, should take precedence over every other consideration. With regard to restoration as a means of preservation he had not a single word to say against it. It was restoration of a different sort that he had tried to condemn most absolutely. If restoration was to be carried on with the main view of preserving everything that was valuable in the building, and if that was put before everything else, he thought that such restoration was in every way desirable. On the 25th ult. the members visited the S.S.C. Library, and the McEwan Hall, being shown over the former by Mr. James B. Dunn, and over the latter by Dr. Rowand Anderson. A description of the McEwan Hall will be found on another page, under the heading "General Building News."

GLASGOW ARCHITECTURAL ASSOCIATION.—On the 21st ult. a lecture was delivered before the Glasgow Architectural Association, by Mr. S. Henbest Capper, M.A., A.R.I.B.A., Edinburgh, the subject being "Architecture and the teaching of history, with special reference to Old Edinburgh." By way of introduction, the lecturer referred to the close relation existing between architecture and history, and illustrated the subject by means of a large number of lantern views of old work in Edinburgh, noticing more especially the Castle buildings, the Abbey and Palace of Holyrood, St. Giles's Cathedral, and in each instance he alluded to the historical associations which have gathered round the remains, with an account of the various points of interest to the architect and antiquarian. At the close a hearty vote of thanks was awarded the lecturer.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday afternoon at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

Tenders.—Tenders were received for the erection of a chrysanthemum-house in Finsbury Park, and for the erection of public conveniences, cartshed, and bothy at the Ladywell Recreation Ground, Lewisham. The lists will be found in another part of this number of the Builder.

The Markets Question.—The discussion of this question, arising out of the recommendations of the Report of the Public Control Committee (see Builder, p. 153, ante), was resumed. The recommendations referring to the proposed establishment of retail markets were, after a debate of some length, referred back to the Committee for further consideration.

The Contract for the New Woolwich Ferry-boat.—A long discussion arose out of a recommendation of the Bridges Committee as to the contract for the new ferry-boat required at Woolwich. On October 25 last, Messrs. Wm. Simons & Co., of Renfrew, sent in the lowest tender (amounting to £15,800) for the construction of a Woolwich ferry-boat. From correspondence submitted by the Committee, it appeared that the firm intimated that while they had "filled in the rate of wages of labour in Schedule III. (that are presently in force, these may vary according to the state of trade, and arrangements which may be made with trade unions in the Clyde district during the construction of the vessel." Objection being made to this, the firm on January 31 consented to delete the words "the state of trade and." On February 2, the Committee wrote to say they could not agree to the proposed stipulation, inasmuch as it did not comply with the following resolution of the Council:

"That all contractors be compelled to sign a declaration that they pay the trades union rates of wages and observe the hours of labour and conditions recognised by the trades unions in the place or places where the contract is executed, and that the hours and wages be inserted in and form part of the contract by way of schedule, and that penalties be enforced for any breach of agreement."

The Committee now reported that it was not competent for them to proceed with the tender of Messrs. Simons in consequence of the words they proposed to add being in direct contravention of the standing order of the Council. They therefore recommended:

"That the Bridges Committee be authorised to reconsider the tenders sent in for the construction of the ferry boat, with a view to recommending one for acceptance by the Council."

Mr. Torrance moved, and Dr. Collins seconded, the following amendment:—

"That the Council, having considered the correspondence between the Bridges Committee and Messrs. Simons & Co., instructs the Bridges Committee to complete the contract with the condition attached by Messrs. Simons."

After a long debate, the amendment was carried, on a division, by 67 votes to 39.

A motion to refer the matter back for further consideration and report was rejected, on a show of hands, by a large majority.

Rates of Wages and Hours of Labour.—The Works and Stores Committee presented a report containing a first list of certain trades, with the trade union rates of wages and hours of labour, applicable to works carried out by the Council, and in doing so he announced that the first "job"—the erection of a fire station—undertaken by the Committee would be put in hand on the following day. We will give an analysis of this report in our next.

Proposed New Fire Brigade Stations.—The Fire Brigade Committee recommended that the Council should agree to purchase from the Corporation of London, for the sum of 16,000l., the freehold of the site fronting John Carpenter-street (at the rear of Sion College), in order that a fire station might be erected thereon. The Committee also recommended that, with a view to the erection of a Shoreditch fire station in substitution to the existing one in Old-street, the freehold should be acquired of the vacant piece of land fronting Tabernacle-square and of the premises No. 61, Paul-street, and No. 104, Tabernacle-walk, at the rear thereof. The consideration of these recommendations was adjourned.

Artisans' Dwellings. The Public Health and Housing Committee brought up a long report with reference to the course to be pursued in relation to the erection of working-class dwellings. They submitted the following recommendation:—

"That the rents to be charged for dwellings erected by the Council shall not exceed those ruling in the neighbourhood, and shall be so fixed as to provide a net return of not less than 2 per cent. on the cost of sinking fund for rebuilding and all outgoings, upon the value of the land, subject to the obligation to erect dwellings upon it, plus the cost of building with ordinary foundations, and that all such dwellings shall be so designed that the cost of erection may not exceed a sum which will enable the Council to carry out the foregoing conditions."

The consideration of the report was postponed. After transacting some other business, the Council adjourned.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION: ANNUAL MEETING.

The twenty-sixth annual general meeting of this Institution (and the election of one pensioner), took place on Tuesday evening last at the offices, 21, New Bridge-street, E.C. Mr. Wm. A. Colls (Messrs. Colls & Sons) in the chair, supported by Mr. Colin G. Patrick (retiring President), Mr. Edwin Brooks (Treasurer), and by Messrs. C. E. Roe, C. K. Turpin, J. A. Robson, T. H. Winny, F. S. Oldham, W. D. Gilbert, and other gentlemen. Letters regretting non-attendance were read from Messrs. G. S. Pritchard (Trustee), Mr. H. W. Parker, E. B. Gammon, and others.

The report stated that the total income for the past year amounted to 6861. 0s. 6d. (65s. 13s. of this sum being annual subscriptions, 299s. 18s. 6d. donations, 114l. 2s. 4d. dividends, 17. 11s. 2d. interest on deposit account, and a balance of 4l. 16s. 3d. from dinner account). The expenditure was 445l. 18s. 5d. (including 337l. 10s. paid for pensions, and 20l. for temporary relief cases. Three pensioners were elected during the year. There are now seventeen pensioners on the books, the total elected since the foundation being 35. There is now a vacancy for a builder's clerk's orphan at the Orphan Working School, and the Committee are prepared to receive applications on behalf of children whose friends may wish to place them in nomination for the same. The fourteenth annual dinner was held on March 30, 1892, at the Holborn Restaurant, Mr. Colin G. Patrick presiding, when the sum of 314l. 12s. was announced in response to his earnest appeal. The amount of Stock held by the Institution is now 4,150l., but the Committee greatly desire that this sum should be substantially increased with a view to obtaining a larger income from this reliable source. The report concluded by thanking Mr. Patrick for his practical services in promoting the welfare of the Institution, and acknowledging the support rendered by the master builders, architects, and merchants connected with the building trade.

The President-elect, in moving the adoption of the report, said that although he had met with a slight mishap which made him rather lame, he was yet delighted to be present, and to thank the committee for the honour they had done him in inviting him to become President. He hoped that he should have a successful year. In looking over the accounts, he was struck with the small amount expended in the which it seemed to him would bear improvement; he alluded to the comparatively small number of clerks who at present subscribed, and he hoped to

devote some attention to this matter, with a view to getting a larger number to assist the funds. He concluded by saying he hoped to work well for the Institution, and would propose the first resolution, "That the report and balance-sheet, as read, be adopted and printed, together with the list of subscribers and rules of the Institution."

Mr. C. K. Turpin seconded the motion, which was put and carried unanimously.

Mr. E. C. Roe, in moving a vote of thanks to the retiring officers, said, referring especially to the gentleman who was just going out of office, President (Mr. Colin G. Patrick), that he could not possibly have done more for the Institution than he had done. To be in that room was not always the most pleasant thing, especially in summer, when the cool shade of trees was more refreshing; but Mr. Patrick, as they knew, had often attended, and had in every way fully deserved the thanks of the meeting.

Mr. Patrick, in acknowledging the vote of thanks, referred to the help he had had from the committee. With reference to Mr. W. Colls, the new President, he had known him a long time, and was able to assure him that, in taking up the duties, he would find no trouble at all.

The officers for the ensuing year were then elected, after which Mrs. Martha Marcham was elected to the widow's pension of 20l. per annum.

The proceedings closed with the usual vote of thanks to the chairman.

PROVIDENT INSTITUTION OF BUILDERS' FOREMEN AND CLERKS OF WORKS: ANNUAL DINNER.

The annual dinner of the donors, subscribers, members, and friends of this Institution was held in the Venetian Saloon of the Holborn Restaurant on Saturday evening, February 25, Mr. Thomas F. Rider, F.R.G.S., presiding, and 349 sat down to table. Before proceeding with the toasts, the Chairman said he regretted to announce that the esteemed Governor of the Institution (Mr. George Plucknett, J.P.) was unable to attend, being confined to his house by an attack of gout. He also regretted to announce that Mr. John Burt was unexpectedly prevented from being present.

The loyal toasts having been duly honoured, the Chairman proposed the toast of the evening, "Success to the Provident Institution of Builders' Foremen and Clerks of Works." It was scarcely necessary to say anything in support of so excellent an Institution as that. It had been so long established, was so well known, and was so carefully administered, that it spoke for itself. The Institution was a model to all others, for the economy with which it was conducted. It was a provident institution in the very best sense of the term, because every one who was himself helped by it had embraced the principle of self-help, and must have been a member of the Institution for three years before he would have any claim upon its funds. The master-builders owed a deep debt of gratitude to the foremen and clerks of works, who were also a highly intelligent and able body of men, having important duties to fulfil. He quite agreed with a remark made by one of the speakers at the recent dinner of the Clerks of Works Association—that a clerk of works should be something more than an architect's watch-dog. Given a respectable, responsible builder, and given a foreman who was as desirous, as all foremen ought to be, of doing his duty honestly and faithfully, there ought to be thorough harmony between clerk of works and foreman, and between architect and builder. In conclusion, Mr. Rider made some humorous remarks with reference to the proceedings of the County Council, and gave the toast "The Provident Institution of Builders' Foremen and Clerks of Works," coupled with the name of Mr. F. T. W. Bedford, the secretary.

Mr. Bedford, in replying, said that the Institution had now reached a rather critical age, for it had just turned its fiftieth year. Although its present appearance was very different from that which it presented fifty years ago, it was, happily, in a flourishing condition. During its existence the Institution had afforded relief in the shape of pensions to twenty-seven builders' foremen and clerks of works, and forty-three widows had received pensions. The sum of 7,987l. had been expended on pensions, and 1,600l. in temporary relief. They now spent between 200l. and 250l. a year in pensions.

Mr. G. Groom proposed "The Governor, Trustees, Donors, Honorary Subscribers, and Visitors." They all regretted the absence of Mr. Plucknett, the Governor, but he had much pleasure in coupling with the toast the name of Mr. F. J. Dove, one of the trustees.

Mr. Dove, in replying, said:

Mr. J. Howard Colls, in felicitous terms, proposed "The Architects, Engineers, and Surveyors." Mr. E. B. l'Anson responded for "The Architects," and Mr. W. Strudwick for "The Surveyors." Mr. Stapleton proposed "The Builders," coupled with the name of Mr. Collins, who, in replying at some length, referred to the relations which ought to subsist between masters and men.

Other toasts followed, including "The Chairman." During the evening subscriptions and donations to the amount of 112s. were announced; and since the dinner the Chairman has received 13s. 13s. more (including 10s. from the Builders' Institute), making a total of 125s.

Correspondence.

To the Editor of THE BUILDER.

M. CORROYER'S THEORY OF THE GOTHIC VAULT.

SIR,—M. Corroyer, in his book of 1892, on "Gothic Architecture," tells us that Gothic groining had its origin in the domed churches of Aquitaine, of which St. Front, at Périgueux, was the first example.

This opinion of his is not an idea that has suddenly struck him, but was mentioned in his book on "Romanesque Architecture," published in 1888.

In chapter xii. of the second part of the treatise of 1888, he says, "The pendentives of the cupolas of St. Front, worked normally to the curve in passing from the square plan of the springing of the arches to the circular plan crowning their key stones, are the embryos of the pointed arch (*l'arc ogif*) or pointed groins (*croisilles d'ogives*), according to the very ancient expression and which was still employed in the time of Philibert de L'Orme to describe the diagonal ribs (*arcs diagonaux*) supporting the vaults with the aid of the transverse ribs (*arcs doubleaux*)." *arcs doubleaux*.)

M. Corroyer then goes on to show that the church of St. Vit, the Elder, vaulted with three domes, has on the soffit of each dome eight ribs, the diagonal ribs running down to the starting point of the pendentives; and remarks that it has been stated, though not proved, that these cupolas were built, then pulled down and replaced by the vaults that now exist. He also shows a section of a similar dome with ribs at the Church of Saumur, on the Loire; and, in confirmation of his argument, he points to the domical shape the early groined vaults took, and to the bays being still kept square, when the domes were abandoned and groined vaulting substituted for them.

M. Corroyer has, no doubt, satisfied himself that his theory is right, but he has hardly made his theory more than probable to ordinary readers; and has certainly not made it as unassailable by adverse criticism as a proposition of Euclid.

The architectural profession ought to be, and probably is, grateful to him for his admirable book on Romanesque architecture. The author has certainly contributed his time, and probably his leisure and substance, for the benevolent purpose of enlightening his fellows. Still I respectfully suggest that, if M. Corroyer has the time and inclination, he would add to the debt of gratitude we owe him, by publishing a pamphlet to completely establish his theory.

G. AITCHISON.

We presume that Mr. Aitchison's letter was partly called forth by some remarks in our review of M. Corroyer's "Gothic Architecture" the other day. Since receiving it we have referred to M. Corroyer's work on "Romanesque Architecture," in which we observe that he gives a section of the domed roof at Fontevault, which he dates 1101-1120, and which is a plain dome, and compares with it a section of the nearly similar roof at Saumur, in which the surface of the dome is divided by four ribs, and he seems to argue that this rib treatment shows the development of the ribbed vault from the domical roof. It seems to us that it may very well be the other way about, and that the appearance of the rib was the influence of the northern Gothic vaulting form making itself felt on the domed roof. But there is another question which we should like to ask—not of M. Corroyer, for we know that no French architect will either take the trouble to visit England to inspect our architectural monuments, or accept any statement about them which does not square with his own theories; but we should like to ask our learned friend, Professor Aitchison, if he accepts M. Corroyer's view that Gothic vaulting was developed from the dome churches of the South of France, how does he account for the fact that cross-vaults on the Roman pattern were being built in the aisles of Durham and Norwich, at or probably before the date given by M. Corroyer to the Fontevault roof?—Edn.

*The late M. Ruprich-Robert is the only important exception we remember.

THE ORIENTATION OF CHURCHES.

SIR,—I think I can answer "H. E. T.'s" inquiry in your issue of February 18 (page 135), as to where Wordsworth got his information from. At the sale of the poet's books my father purchased a volume, bearing Wordsworth's name, and in which, on page 123, the following passage is underscored with red ink: "This Church (St. Mary's, York) lyeth towards y^e North Este by North, for on Sancte Marie's Day y^e Sonne thus ryseth." This quotation partly, at least, accounts for Wordsworth's note. The book is "Bartram's Travels of a City Gentelmanne thorough the Shire of Yorke." (London, 1799. No publisher's name.)

JAMES ARDENSTONE.

"BURR v. RIDOUT."

SIR,—Referring to the article which appeared in your issue of the 25th inst. on this case, and your note as to the defendant's obligation to expend 4,000*l.*, perhaps you will allow me to explain that under his agreement with the ground landlord the defendant was not bound to build at the nett cost of 4,000*l.*, but to erect buildings "of the total value of 4,000*l.*" This does not appear very clearly in the report of the case, but I need not point out to your readers the difference in these contracts.

J. A. COLLINS,
Defendant's Solicitor.

5, New Inn, London, W.C.

February 28, 1893.

The Student's Column.

CHEMISTRY.—IX.

Coal and its Valuation.

COAL consists of the remains of vegetation which in the course of many thousands of years, and during many changes of nature, have become altered to their present form.

There are many varieties of coal, and it is by no means uncommon to meet with several kinds in the same mine. Roughly speaking, the value of a coal for heating purposes may be said to depend upon the amount of *fixed* carbon it contains, *i.e.*, the amount of carbon that is not driven off as gas when the coal is heated to redness without being allowed any contact with air or oxygen. For gas-making purposes the value of a coal may be said to depend upon the amount of *volatile* hydrocarbons it contains.

Thus *anthracite*, which contains a very large percentage of fixed carbon, is the best heating coal; but owing to the strong draught of air necessary to maintain it in a proper state of combustion, it is not suitable for use in the ordinary open grate. It is much used for closed stoves and for heating boilers, especially in America, where it is more abundant than in this country. Anthracite is a very hard, shiny coal which burns without flame, and does not soil the fingers when handled.

Steam or smokeless coal somewhat resembles anthracite, but requires less draught to cause it to burn readily. It burns with more or less flame, and does not contain so much fixed carbon as anthracite.

Free-burning Coal.—Under this head may be included most of the numerous classes of house coal. It burns with much flame, and is softer than either anthracite or steam coal, but should not cake together. Much of this kind of coal comes from Yorkshire.

Caking or bituminous coal gives off large volumes of smoke, and cakes together a great deal. It burns with a bright flame. This variety of coal is largely employed for gas manufacture, and is obtained chiefly from Northumberland and Durham.

Cannel or candle coal is very rich in volatile hydrocarbons, and is much used for enriching gas obtained from the cheaper classes of coal. It has a dull, black colour, and a slaty fracture. This variety of coal is closely akin to the *parrot coal* of Scotland and to the *rattlers* of Yorkshire. The coke from this kind of coal is usually almost worthless on account of the large amount of mineral matter or ash it contains.

Lignite is of a brown colour, and is lighter than ordinary coal; it often possesses a fibrous character, and appears more closely akin to peat than to coal. It is, however, largely used as fuel in some parts of the world. In determining the value of coal it is important to know the amount of unburnable ash that it contains, and also, if it is sold by weight, the quantity of moisture or water in it. Thus, two samples of coal supplied for heating purposes yielded the following results:—

Moisture.	Ash.	Fixed Carbon.
(1) 6.02	5.18	58.66
(2) 8.15	23.00	42.15

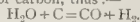
The first is a fairly good sample of coal, and contains only 1.2 cwt. of water and 1 cwt. of ash in the ton of coal; but the second contains 1.6 cwt. of water and 4.6 cwt. of ash in the 20 cwt. of coal, that is to say, considerably more than one quarter of the coal is worse than useless. These are by no means extraordinary samples; worse coals than the second are often palmed off upon the private consumer.

Coal Gas.

Coal gas is obtained by heating coal in retorts at a red heat. The coal is thus decomposed, the fixed carbon and ash remaining in the retort in the form of coke, while the hydrocarbons and other compounds escape in the form of gas up a vertical pipe called the ascension pipe and through a water-seal in the horizontal pipe called the hydraulic main. The gas passes along the hydraulic main into the condensers. Here the hydrocarbons that are liquid or solid at the ordinary temperatures of the air, condense out as tar. The gas then passes into some large towers filled with coke, through which a stream of cold water is constantly descending. The crude gas ascending through these towers, or "scrubbers" as they are called, parts with its ammonia and a considerable quantity of carbonic acid and sulphuretted hydrogen, all of which may be considered as impurities. The solution thus formed is known as "gas liquor," or "ammoniacal gas liquor." The gas next passes through very large iron boxes containing layers of lime, and sometimes also oxide of iron. In these purifiers the remainder of the carbonic acid and sulphuretted hydrogen is removed. Finally, the gas passes through a similar box containing layers of lime, which have previously been saturated with sulphuretted hydrogen. In this box, or "purifier," the bisulphide of carbon is absorbed. The gas is now ready for storing in the gas-holders. It is the spent material from the sulphide purifiers which sometimes constitutes a public nuisance by the evil odour it emits. The following are the most important commercial substances obtained indirectly or directly by the distillation of coal and coal-tar:—Coke, ammonia, ammonium salts, aniline dyes, saccharine, carbonic acid, naphthalene, naphtha, creosote, and benzol.

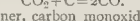
Oxides of Carbon.

Carbon forms two oxides, viz. (1) carbon monoxide, and (2) carbon dioxide, commonly called carbonic acid gas. Carbon monoxide or carbonic oxide, CO, is a colourless and very poisonous gas. It exists in large quantities in water gas, *i.e.*, gas made by decomposing steam by driving it through red hot coke or carbon, thus:—



Carbonic oxide possesses neither smell nor taste, and is therefore all the more dangerous when present in odourless gas supplied for domestic purposes.

Carbon monoxide may be prepared by passing carbon dioxide over red-hot carbon,



In this manner, carbon monoxide is formed in an ordinary coke fire, where the carbon dioxide first formed in the lower part of the fire by the complete oxidation of the carbon by the oxygen of the air, by rising through a further layer of red-hot coke, is converted into carbon monoxide, and may be seen burning with a pale blue flame at the top of the fire.

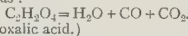
When carbon monoxide burns it forms, of course, carbon dioxide, thus:— $\text{CO} + \text{O} = \text{CO}_2$.

The gas may also be prepared by heating carbon with a limited supply of air.



but is usually obtained by heating oxalic acid with strong sulphuric acid, because it is a more convenient method, and by it a purer product can be obtained.

The reaction which takes place may be expressed thus:—

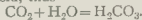


The sulphuric acid abstracts the water, and the carbon dioxide may be separated from the carbon monoxide by passing the mixture through a solution of caustic potash, or soda, which absorbs the carbon dioxide and allows the carbonic oxide to pass through it.

Carbon dioxide, or carbonic anhydride, CO₂, is a colourless gas, but possesses a faintly acid taste and smell. It is found in small quantities in the atmosphere. It is one of the products of the decay of organic substances, and is, therefore, found at the bottom of disused wells in which there is decomposing vegetation or other organic matter. It is evolved in large quantities by vol-

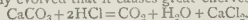
canoes; and in certain caves and valleys, as in the case of the valley of Java, the gas is evolved so rapidly from fissures in the rocks or ground, that it contaminates the air to such an extent that anyone entering the valley is rapidly suffocated.

Carbon dioxide with water is believed to form a true acid, thus—



Hence, it is often called carbonic acid gas.

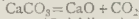
Carbon dioxide is formed by the action of almost any acid upon a carbonate. Thus, if dilute hydrochloric acid is poured upon some fragments of chalk or marble, the gas is so rapidly evolved that it causes great effervescence.



(Chalk or

Marble.)

Carbon dioxide issues in large volumes from lime-kills, where limestone (CaCO_3) is decomposed by heat, thus—

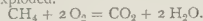


(Quicklime.)

It should be noted here that with the exception of a little difference in purity, the chemical composition of chalk, marble, and other limestones is identically the same. The characteristics which make them of such different values as building-stones are due to physical differences only.

Carbon dioxide is a very heavy gas, and is not a supporter of combustion. Advantage is taken of this latter fact in testing a well as to whether it is safe to descend into it. A lighted candle is lowered to the bottom of the well, and if it is extinguished there is too much CO_2 in the well to render descent safe; if, on the other hand, the candle continues to burn brightly, the well may safely be entered.

The fact of CO_2 being a non-supporter of combustion, is also made use of in many of the patent "fire extinguishers," which contain some substance that will readily give off large quantities of carbon dioxide. Carbon dioxide forms the "choke-damp" of the miner, and is formed when marsh-gas, or "fire-damp," as it is called, is burnt or exploded.



(fire-damp) (choke-damp)

Carbon dioxide is very soluble in water, and the lower the temperature of the water, or the greater the pressure of the gas upon the water, the larger is the volume of the gas dissolved by the water. If water is charged with CO_2 under a great pressure, and the pressure is then diminished, much of the carbon dioxide, which was dissolved under pressure, now escapes so rapidly as to cause brisk effervescence. This property is made use of in the manufacture of effervescing table waters.

The brisk taste of many natural mineral waters is due to carbon dioxide gas, dissolved in the water in a similar manner.

When charcoal or other form of carbon is burnt in excess of oxygen or air, carbon dioxide is formed thus—



If, therefore, a charcoal fire is used in a room without means of ventilation, suffocation ensues. It is believed, however, that the fatal effects produced by charcoal fires have been due more especially to considerable quantities of carbon monoxide being formed by the incomplete combustion of the carbon, or by the subsequent reduction of some of the carbon dioxide by the red-hot charcoal.

If carbon dioxide gas is cooled to 0°C ., and subjected to a pressure of 36 atmospheres, i.e., 540 lbs. on the square inch, the gas condenses to a colourless liquid. If the pressure is then suddenly removed, the liquid immediately returns to the gaseous condition, and by doing so produces great cold. All liquids when changing from a liquid to a gas absorb heat, and consequently produce cold in surrounding bodies. On the other hand, when a gas changes to a liquid, heat is given out. It is a law that change of state always produces change of temperature.

It is only comparatively recently that liquid carbon dioxide has been made use of for refrigeration on a large scale. It is now employed by Messrs. Nelson Brothers at their largest sheep-freezing establishment in New Zealand, where they freeze over 2,000 sheep per day by it.

Experiments. Group 6.

1. Manufacture some carbon monoxide.

Place some crystals of oxalic acid and a little strong sulphuric acid in a test-tube, and heat gently. Apply a light to the mouth of the test-tube, and observe that the CO burns with a pale blue flame, but be careful not to inhale the gas.

2. Prepare carbon dioxide.

Prepare some carbonic anhydride by the action of some dilute hydrochloric acid upon some pure

calcium carbonate just covered with water. The gas may be collected over water as usual, although somewhat freely soluble, but is most conveniently collected as shown in Fig. 11.

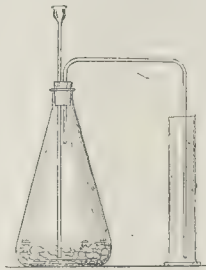


FIG 11

With the gas thus collected prove—

(a) That carbon dioxide is a non-supporter of combustion, by plunging a lighted candle or taper in a jar of the gas, and noting that it is extinguished.

(b) That it is heavier than air, by pouring the gas from one jar into another jar filled with air, and showing by means of a lighted taper that the carbon dioxide is then in the jar previously filled with air; also by pouring the gas, like water, over the flame of a candle and thus extinguishing the candle.

(c) That it precipitates lime from its aqueous solution, by pouring some clear lime-water into a jar of the gas, and observing that it is rendered milky owing to the formation of insoluble carbonate of lime or calcium carbonate.

3. Prove that, by means of an acid, carbon dioxide may be obtained from any of the following substances:—(1) chalk, (2) marble, (3) oyster-shells, (4) pieces of coral, (5) old mortar, (6) all samples of limestones obtainable, (7) white lead.

OBITUARY.

MR. WILLIAM ALLEN BOULNOIS, F.R.I.B.A. — We regret to announce the death on February 22 of Mr. W. A. Boulnois, of Inhurst, Basingstoke, and of No. 6, Waterloo-place, Pall Mall, S.W., the head of the firm of Messrs. Boulnois & Warner, architects. Mr. Boulnois was born in London in the year 1833. Having entered the classes at King's College, then known as the Department of Science applied to the Arts, Mr. Boulnois became a pupil of Mr. S. Smirke, R.A., from 1834 to 1835, and after spending some few years in Italy and on the Continent in the study of his profession Mr. Boulnois commenced in London in 1848, and had an extensive practice. His works are found in the City of London in various blocks of offices and several wharf and factory premises on the river Thames. His practice extended to Sweden, where the Baron Oscar Dickson's house at Gothenburg and another house at Öfersis were built some twenty years since, and to Italy, where the "Villa Clara" at Baveno, Lago Maggiore—the house occupied by her Majesty Queen Victoria—was erected in 1872. Mr. Boulnois' latest public works in London are the Standard Assurance Company's building in King William-street, near Lombard-street, Lord Radstock's Conference Hall, Eccleston-street, Belgrave-square, and the "Great Assembly Hall" in the Mile End-road for Mr. Charrington, seating 5,000 persons, and works at Victoria Docks for Louisa Lady Ashburton. The Mission Hall there being opened by H.R.H. the Duchess of Teck in 1888, the Presbyterian Church at Mentone, France, opened by the late Mr. Spurgeon. Mr. Boulnois also practised as a surveyor in valuation and compensation cases, and was a member of the "Surveyors' Club," established 1792, in addition to his being a Fellow of the Royal Institute of British Architects, and a member of the Council in 1865, serving for some years on the committee of examination charged with the certificates for the qualification for District Surveyors. Mr. Boulnois is succeeded in practice by his nephew, Mr. Alfred E. Warner, A.R.I.B.A., F.S.I., who has been in partnership with his late uncle for some years past. The name of the firm will remain unaltered.

"SOME OLD CHURCHES OF GLAMORGANSHIRE." — A lecture in connexion with the Cardiff Naturalists' Society was given at the Queen-street Public Hall, Cardiff, on the 23rd ult., by Mr. C. B. Fowler, the subject being "A Ramble through some Old Churches of Glamorganshire." Mr. Fowler described the ancient fons of Glamorganshire and Monmouthshire, crosses found in the churchyard, tombs, monumental slabs, windows, doorways, stoups, and other architectural features.

GENERAL BUILDING NEWS.

M'EWAN HALL, EDINBURGH.—The members of the Edinburgh Architectural Association visited, on the 25th ult., the M'Ewan Hall, where they were received by Dr. Anderson, the architect, who showed the party over the building. He explained that he had adopted the form of the Greek theatre, believing that to be the best form for the auditorium. There were two galleries, both alike, the one above the other, and the building was capable of holding three thousand people. The arrangement of the staircases was such that the occupants of the two galleries never came together, and there were a good many entrances and exits. A large skylight and a series of windows close to the roof furnished the principal means of lighting the building, and the air was to be heated by passing over a steam coil. There was a great outer wall, and an inner wall of arches and pillars, the diameter of the building being 144½ ft. To roof such a building was rather a problem, and he had called in the assistance of Mr. Westland of Messrs. Cunningham, Blyth, & Westland. It was to be hoped that before long the great tower would be erected—a tower which would reach to about 280 ft. in height. Behind the platform there was a gallery, where, he understood, there was to be erected an organ. Mr. Westland, at the request of the architect, described the construction of the roof. It was carried on twenty-two ribs, which had to be of peculiar form of construction, because it was impossible to put in any tie-rods. The whole horizontal strain had to be borne by the bracing between the ribs. In connexion with the bracing, at the back of the stage the circle was not completed. If it had been a complete circle the strains would have been easily calculated, and the whole strain had to be carried across the stage by means of a very heavy steel girder, weighing about 6 tons. In order to prevent any horizontal thrust on the walls, every rib was set upon rollers. At the close of the visit Mr. W. W. Robertson proposed a vote of thanks to Dr. Anderson.

NEW COLLIERY VILLAGE IN NORTHUMBRIA.—On the 13th ult. the first stone was laid of a new Northumbrian village which is intended to create primarily for the workmen and their families, many hundreds in number, who are unable to find house room in the extensive colliery village of Ashington. A small freehold estate, in close proximity to the railway station at Ashington, has been purchased. The site is 130 ft. above the sea level, and overlies a bed of freestone. Sites for streets of cottages, terraces, and business premises have been laid out under the direction of Mr. William Glover, architect, of Newcastle, who has also designed a system of sewerage and water supply.

SCHOOLS, BOURNEMOUTH.—St. Andrew's Schools, Malmesbury-park, lately erected under the provisions of the Bournemouth Church School Extension Scheme, were opened by the Bishop of Guildford on the 13th ult. The buildings provide accommodation for 318 children, there being one large room 71 ft. 4 in. by 22 ft., and three classrooms 22 ft. by 23 ft. They are of red brick, and built with ornamental tiling. The floors are laid with wood block paving, and the heating is by hot water pipes, each room having also a Teale grate.—On the same day were opened the St. John's Schools at Boscombe, built also in connexion with the Bournemouth Church School Extension Scheme. In these, accommodation is provided for 277 children, there being two floors with schoolroom 32 ft. by 18 ft., and two class-rooms 15 ft. by 20 ft., the rooms upstairs being the same size. The schools were erected by Messrs. Hoare & Sons, builders, of Bournemouth, the amount of the contract being 1,535*l.* 4*s.* and are finished in a similar manner to the other schools. Both are designed by the same architect, Mr. R. Pinder, of the firm of Pinder & Fogarty, of Bournemouth.

PROPOSED VOLUNTEER DRILL HALL, LEICESTER.—It is proposed to erect a new Volunteer Drill Hall at Leicester, for which plans have been prepared by the County Surveyor (Mr. Beaumont Smith). The building, which is 120 ft. long, 50 ft. wide, and 18 ft. high to the wall plates, will be in character with the adjoining property. It will be provided with proper heating and lighting apparatus, and the floor will be of wood blocks. The lowest tender for the building, exclusive of roof principals, was that of Mr. P. Elliott, of Leicester, for 2,321*l.* 4*s.*, which has been accepted, whilst Messrs. Handyside & Co., of Derby, have secured the contract for the iron work at a cost of 623*l.* 1*s.*

PRIMITIVE METHODIST CHAPEL, STAVELEY, YORKSHIRE.—The Primitive Methodists in the new mining village of Poolsbrook, Staveley, have commenced building a chapel in that place. The chapel will accommodate about 500, and is to cost about 600*l.* Mr. Earle, of Sheffield, is the architect, and Mr. Hoates, of Burton, has the contract. CHURCH HALLS, PAISLEY.—New halls in connexion with St. George's Parish Church, Paisley, have just been completed. The new buildings are placed adjacent to the present church at the east side, leaving a passage between, and are designed in a classic style in keeping with the church. They have a frontage of 60 ft., and a depth of 30 ft., and a length from front to back of 95 ft. The back por-

tion of the buildings connects with the existing Presbytery House. The main hall, which is entered from the passage to George-street, is 70 ft. long, by 27 ft. in breadth, having an open timbered roof. This hall is seated to accommodate about 500 persons as a lecture hall, or nearly 400 as a Sabbath school. In addition to this there is a class-room 19 ft. by 20 ft., and a ladies room 17 ft. by 14 ft. 6 in., with lavatory attached; also general lavatories, which are entered from the north porch fronting Brown's. The main hall is furnished with pitch pine wainscoting all round, 4 ft. height. The principal timbers of the roof, which are stained and varnished, are exposed. The platform is placed in the centre of the east wall. The heating is by hot-water pipes fitted into brick channels beneath the floor. The designs were prepared by Mr. James Donald, architect, Paisley, and the following tradesmen were the contractors for the work:—Mason James Hugh Houston; brick work, Robert Morton; joiner work, Cochran & Keith; plumber work, R. G. Young; plaster and granolithic work, D. T. Hutcheson; slater work, Thomas Kilpatrick; painter work, Cowan & Stewart; heating, James Boyd & Sons; iron work, Andrew Sproul & Sons; glazier work, Robert Kirk, all of Paisley; lighting, James McEne & Sons; pipe-laying, Messrs. Ward & Ward, both of Glasgow; and, Messrs. Duff & Henderson were the mensurers.

FOREIGN AND COLONIAL.

FRANCE.—In the church of the Forges-les-Bains, near Rambouillet, some tombstones of considerable interest have been found, dating from the tenth century. According to the inscriptions on them they came from the burial places of the first lords of Forges, Odet and Claude de Bailion. The "Commission des Monuments Historiques" is undertaking the complete repair of the fine tower of the church of Bouguival which was threatened with ruin. The church is one of the most interesting ancient monuments in the neighbourhood of Paris.—A statue to Max Séguin, the engineer who is claimed as having invented the tubular boiler for locomotives, is to be erected on the Pont de l'Europe, above the cut, on the Chemin-de-fer de l'Ouest near the Gare St. Lazare.—It is stated that the Dutch Protestants recently converted at Lourdes have contributed 3 million francs to the completion of the parish church of Lourdes, which has been at a standstill for fifteen years.—Mr. Alfred Boucher, the sculptor, has offered to the museum at Dijon the full-size model of his fine figure "La Terre" which was published in the *Builder* in 1891, and gained its author the "Grand Médaille" of the Salon of that year.—Lyons has now a new railway station in the Quartier de la Guillotière, the most populous part of the town.—M. Roger Ballu, as delegate of the department of public instruction, has officially opened the exhibition at Lyons Fine Art Society, in the Place Bellecour. Among the works exhibited are pictures by MM. Detaille, J. P. Laurens, and Tony Robert Fleury.—The town of Valence-sur-Rhône has opened a competition for a monument to the memory of Emile Augier. The committee has chosen fourteen artists for a limited competition, as well as the local sculptors and architects who have received medals at the Salon. A sum of 60,000 francs is to be expended on the monument.—It is announced that at Cabauzon (Gers), on the banks of the Uby brook, some workmen trenching have brought to light a good many capitals and bases of columns of the Roman epoch. The Department of Fine Arts has made a grant of money towards the continuance of the excavations.—At Saint-Quentin the exhibition of the designs for a commemorative monument of the siege of the town in 1557 has just been opened. Seven designs have been sent in, by MM. Cordonnier, Doublemard, Croisy, Deloye, Hiolien, Thomissen, and Puech.—The Duc de Parme, nephew and heir of the Comte de Chambord, is about to carry out extensive work in the restoration and beautifying of the Château de Chambray. A decree of the President of the Republic has been issued authorising the erection of a new bridge over the Seine at Paris, between the bridge of Grenelle and that of the Point du Jour. The cost is estimated at 2,300,000 francs.

MISCELLANEOUS.

A CORRECTION.—By a printer's error which escaped notice, the name of "H. Hill" was referred to in the review of Mr. Burdett's book on Hospitals as one of those from whom he had received assistance; the actual reference was to Mr. Henry Hall.

A SWANSEA ARCHITECT'S CLAIM.—At the Swansea County Court on the 24th ult., before his Honour Judge Gwilym Williams, the hearing of an action brought by Mr. Edward Bath, architect, against Mr. Jenkins, the Captain of the Llangland Bay, was resumed. The plaintiff claimed 96*l.* for professional services (plans, specifications, and bills of quantities), and defendant counterclaimed for 100*l.* alleging negligence.—Mr. Jackson, instructed by Messrs. Davis & Ingram, was for the plaintiff; and Mr. David Lewis, instructed by Mr. Leyson, for the defence.—After hearing further

evidence his Honour, in giving judgment, said that the question he had to decide was what were proper charges to be made by an architect of Mr. Bath's reputation. The evidence carried the conviction to his mind that the charges made by Mr. Bath were proper under the circumstances. Therefore he gave judgment for plaintiff for 88*l.* 6*s.* 8*d.*—*South Wales Daily News.*

ELECTRIC LIGHTING.—Craig House, Edinburgh, a large private lunatic asylum, is to be lighted by Messrs. Ernest Scott & Mountain, of Newcastle-on-Tyne. The installation will consist of—two Lancashire boilers 25 ft. long by 7 ft. 6 in. diameter; four horizontal compound engines, each capable of giving 60 h.p.; four Tynes compound-wound dynamos, each capable of running 400-16 c.p. lamps, and between 1,300 and 1,400 incandescent lamps and fittings. The same firm are about to carry out electric light installations at the Co-operative Wholesale Society's premises at Newcastle (this installation consisting of three Crossley gas-engines of 25 nominal h.p., four 3-400 light dynamos and about 1,200-16 c.p. lamps), at Mr. John Dickenson's engine works, at Sunderland, and at Messrs. Chadwick & Sons' new spinning-mills at Bolton, and at Riga, Russia.

RENDLE'S PATENT "INVINCIBLE" GLAZING.—We understand that this method of glazing has been selected by the Great Eastern Railway Company for the roofs of the extension of Liverpool-street terminus, London. The area of the glazing amounts to about 100,000 sq. ft. super. The same system has also been selected, by the architect, for the skylight over the National Portrait Gallery, Trafalgar-square. In each case the glass is laid in copper bars, and is the latest improved system of Messrs. W. E. Rendle & Co.

SOCIETY OF ARTS.—Professor Chandler Roberts-Austen will commence a course of three "Cantor Lectures on 'Alloys,' at the Society of Arts, on Monday next, March 6, at five o'clock. The remaining lectures will be given on the two following Monday afternoons, at the same hour.

THE HOME IRON TRADE.—Business in the iron and steel and allied industries is very unsatisfactory. Both crude and finished iron are in limited inquiry, and it would seem that prices have not yet quite touched bottom. A satisfactory feature, however, is the renewed activity in the tinplate branch. The steel trade generally is depressed. Shipbuilders and engineers report few new orders to hand. The coal trade is somewhat irregular.—*Iron.*

THE RESTORATION OF EAST PRINCES-STREET GARDENS, EDINBURGH.—According to the *Scottsman*, a vigorous beginning has been made with the restoration of the East Princes-street Gardens. The slices of garden ground on each side required for railway purposes are now permanently appropriated, and the walls dividing the garden from the railway solidly built. To screen the railway as much as possible from view, an earthen mound, nearly as high as the top of the railings, will be raised just inside the retaining wall, and along it trees of good size will be planted. At the foot of this screen a narrow walk will be carried along the length of the gardens from east to west. A similar screen will be raised on the south side of the railway. The work at present in progress will cost nearly 1,500*l.*

TRADE FESTIVITY.—On Friday, the 24th ult., Messrs. E. Houghton & Son, builders and contractors, of Stroud Green, entertained about forty of their staff and principal workmen to dinner and a social evening, at Wortley Hall, Finsbury Park, Mr. W. Houghton occupying the chair. In responding to a toast to "The Firm," the chairman remarked that "growth" was a very suitable motto for the coming year, and thought one of the tendencies of the day to be guarded against was the restlessness and over haste in which men sought to obtain the end in view, and which very often led to mischief instead of success.

ASPHALTE PAVING, CAMBERWELL.—The footways in front of the Crystal Palace, to the extent of several thousand yards, are being relaid by the Camberwell Vestry with Limmer's asphalt.

MEETINGS.

FRIDAY, MARCH 3.
Royal Academy of Arts.—Professor J. H. Middleton, M.A., on "Michelangelo," II. 8 p.m.
Royal Institution.—Mr. George Simonds on "Sculpture considered apart from Architecture," 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor A. Wynter Blyth on "Diseases of Animals in relation to Meat Supply; Characteristics of Vegetables, Fish, &c., unfit for Food," 8 p.m.

SATURDAY, MARCH 4.
Incorporated Association of Municipal and County Engineers.—Metropolitan Meeting: Visits to (1) Streatham Electric Tramways; (2) River-wall in course of construction at Fulham; (3) Stabling and Jarrah-wood paving, Fulham; and (4) Electric Lighting Works, St. Pancras.

MONDAY, MARCH 6.
Royal Academy of Arts.—Professor J. H. Middleton, M.A., on "Michelangelo," III. 8 p.m.
Society of Engineers.—Mr. P. E. Pilditch on "Displacement Practice, particularly as affected by some recent decisions," 8 p.m.

Society of Arts (Cantor Lectures).—Professor W. Chandler Roberts-Austen on "Alloys," I. 5 p.m.
Society of Engineers.—Mr. E. G. Mawbey on "The Leicester Main Drainage, &c., and the Construction and Testing of the Sewage Pumping Engines and Boilers," 7.30 p.m.

People's Palace Technical Schools.—Distribution of Prizes by the Archbishop of Canterbury. 8 p.m.
Liverpool Architectural Society.—Mr. C. B. Alward on "Venice," 6.30 p.m.

Leeds and Yorkshire Architectural Society.—Exhibition of Architectural Drawings. 7.30 p.m.

TUESDAY, MARCH 7.
Institution of Civil Engineers.—Mr. W. Pitt on "Plant for Harbour and Sea-works," 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. Shirley F. Murphy on "Infectious Diseases and Methods of Disinfection," 8 p.m.

Manchester Society of Architects.—Mr. G. H. Wilmshurst on "Stray Thoughts on Competitions." Glasgow Architectural Association.—Annual Business Meeting. 8 p.m.

WEDNESDAY, MARCH 8.
Architects' Benevolent Society.—Annual General Meeting. 5 p.m.

Carpenters' Hall, London Wall.—Professor Banister Fletcher on "The Italian Renaissance, as Exemplified in St. Peter's at Rome, the Palaces, &c., at Florence and Venice," 8 p.m. (Admission free).

Sanitary Institute.—Mr. H. P. Boulnois on "The Housing of the Working Classes," 8 p.m.

Liverpool Engineering Society.—Professor H. S. Hele-Shaw on "The Graphical Method of Solving Engineering Problems," 8 p.m.

THURSDAY, MARCH 9.
Institution of Electrical Engineers.—Resumed discussion on Mr. W. M. Mordey's paper on "Testing Alternators," 8 p.m.

Society of Antiquaries.—8.30 p.m.

FRIDAY, MARCH 10.
Architectural Association.—Mr. G. H. Fellowes Pryne on "Screens: their Treatment and Symbolism," 7 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. Charles D. Barker on "Methods adopted in Constructing the Glasgow Central Railway Works—Bridgerton and Trongate Contracts," 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. F. J. Sykes on "General Powers and duties of Inspectors of Nuisances," 8 p.m.

SATURDAY, MARCH 11.
Architectural Association.—Visit to the New Synagogue, Dennington Park-road, West Hampstead, by permission of the architect, Mr. Delissa Joseph. 3 p.m.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

2,348.—DISINFECTING APPARATUS: *M. Sefer*.—This invention relates to the attachment of a chamber containing any known disinfectant to the flush-pipe of the cistern used for flushing closets, drains, urinals, &c. The chamber containing the disinfectant is attached either inside a cistern or on the pipe outside at the most convenient place, but is preferably attached to the flush-pipe or syphon apparatus inside a small flush-tank, which is in general use in water-closets. This chamber has a small hole, or holes, in it, so as to allow the water when passing down the pipes to penetrate the chamber, and draw out sufficient of the disinfectant to colour or deodorise the water which is being discharged. When it is attached to the pipe, a hole, or holes, are made in the same, and the chamber connected thereto, so that the water has free access to the disinfectant. By this invention it is claimed that a very small quantity of the disinfectant is sufficient for the purpose required.

4,088.—BUILDING STONE CONNECTIONS: *G. Leicht*.—This patent relates to a device for securing together stones, plates, or slabs in such a manner, that when the rectangular blocks or plates are laid upright upon each other in two or more courses they form solid and durable walls. For this purpose specially formed metallic clamps are employed, one or more of which are applied to the top, bottom, and side of each block, or wherever the block has to be connected with adjoining blocks. Each of these clamps consists of two ordinary rectangular shaped clamps placed back to back, and out of line with each other, the clear width of each clamp being equal to the horizontal width of the block or plate, one side serving to grip the edge of one stone, while the other side serves to grip the adjoining stone. The two sides of each clamp are made of one piece, or rigidly fastened together to form practically one piece.

4,929.—HEATING APPARATUS: *E. R. Starmer*.—This invention relates to an improved method and apparatus for heating rooms, intended more especially for intercepting a great portion of the heat which now escapes up the chimney of open fire-places, and utilizing such heat for warming the air in the room in which the fire is, or other room or rooms of the building. It consists in the employment of hollow structures adapted, when heated, to cause a circulation of air through them, by drawing in air at one or more inlet openings at or near the bottom of the structure, and discharging such air after it has been warmed by contact with the interior surface of the structure through one or more outlet openings at or near the top of the structure. These structures may be placed in the fire-place behind and below the fire, or just above the fire, or in the chimney.

5,209.—FIRE-PROOF FLOORS: *R. Astley*.—The object of this invention is to construct fire-proof floors in such a manner as to provide efficient protection in case of fire to the joists and girders supporting them, which joists or girders being made of iron or steel are very apt to give way by bending when heated to any great extent. The invention provides a number of joists of iron, or other suitable metal, about 2 ft. apart. Between the joists are placed lintels of fire-clay, or other fire-proof material, of 1 cross section. These lintels are placed with their flanges horizontal, to form a flat ceiling, the upright web being curved to allow of the flanges, preferably curved, sheet metal, or other suitable material, preferably incombustible, being placed over them. On the tiles or other material is placed a layer of concrete, flush with or covering the top of the joists, thus forming an arch springing from joist to joist without the aid of temporary centring. Slots are cut in both ends of the lintels, to allow the flange of the same to pass under the bottom flange of joists and girders, and prevent the same from fire. The underside of the flange of the lintels is grooved to receive ceiling plaster.

NEW APPLICATIONS FOR LETTERS PATENT.

February 13.—3,737, H. White, Stench Trap for Drains, Sewers, &c.—3,148, B. Rowntree, Shades or Blinds for Slipping Roofs of Greenhouses, Conservatories, &c.—3,161, Marsden, Window-fastener.—3,195, F. Romblia, Veneer Drying Apparatus.—3,198, E. Stokes and others, Smoke-Cure Chimney-pot.

boards &c.—760, A. Calmeur, Window Frame Fastening
—240, W. Green, Hydraulic Main Cook—790, E. P.
Heating Stoves, Fire-places, or Grates—718, W. Simpson,
Gum Brushes—374, R. Yorke, Pipe for Conveying
Water—230, J. H. B. Smith, Paints—230, J. H. B. Smith,
Non-discoloring Paints—872, G. Farr, Safety Window-shut-
tles—150, C. Atlee, Wind-fan Fasteners—1,753, F. Carr
and W. Davidson, Revolving Fire-grate—1,169, H. Gale,
Fire-bricks—230, J. H. B. Smith, Fire-bricks—230, J. H. B. Smith,
Wyand and L. Schramm, Tool for Smoky Chimneys,
applicable also for Ventilating Purposes—1,379, C.
Pickles, Stoves or grates, &c.—2,240, H. Lake, Appliance
for Drawing Turbidity from Water—2,241, H. Lake,
House Saw Benches—3,227, J. Lumley, Instrument for
Marking or Striking out the Mould of Stair Handrails—
2,241, C. Hancock, Steamers and Water Pipes—2,493,
J. H. B. Smith, Fire-bricks—2,493, J. H. B. Smith, Fire-
Distemper, Whitelash, and other Brushes.

CONTRACTS—Continued

Public Appointments, pp. xxiv. and xxv.

(Open to Opposition for Two Months.)

735^l. [*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; v. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

TIMBES

DAGENHAM (Essex).—For alterations and additions to the Becontree Heath School, for the School Board for Dagenham, Messrs. F. Becham, architect, 75, Fincham Road, E.C. 1, and Messrs. W. C. Quantities by Messrs. Goodman & Simpson.—

W. C. Quantities	£ 2,845 10	o	Hammond & Son	2,845 10	o
Flowing & Davis	1,574 15	o	W. Watson	2,630 9	o
Lorden & Son	2,538 0	o	Thos Bruby	2,974 10	o
John Carter	2,475 0	o	Jas Webb	2,974 10	o
Ernest West	2,367 0	o			

EASTBOURNE. For alterations and additions to house, Langneyville, Eastbourne, for Mr. J. Fenton-Jones, J.P., Mr. J. W. A. Finch, architect, 76, Finsbury Pavement, E.C. 1.—

By Messrs. J. P. Quantities, £ 725 10. By Backhurst accepted.—£ 715 10. (House of Eastbourne.)

ERTH.—For the erection of a cottage, additional wards, &c., for infectious diseases hospital, Helveland, for the Local Board, Mr. H. G. Meles, architect, 10, St. John's Street, E.C. 1.—

G. Meles	£ 1,000 0	o	H. T. H. Walden	238 0	o
o Stinckand			C. Cadet	869 0	o
John Carter	935 15	o	H. G. Meles	704 18	6
J. Stonehouse	910 0	o			

* Accepted.

GUILDFORD. For the erection of new Wesleyan Chapel and school, Messrs. F. Becham, architect, 75, Fincham Road, E.C. Quantities by Messrs. Northcroft, Son & Neighbour, 57, Charing St., Ellis.—

S. Ellis	£ 1,790	o	K. Rogers	£ 1,964	o
P. C. May	644	o	o Bettini & Son	5,380	o
W. C. Quantities	1,790	o	W. C. Quantities	1,790	o
Young & Lonsdale	6	o	C. App & Son	5,370	o
Holloway Bros.	1,113	o	o R. W. Thind Bras.	5,150	o
W. C. Quantities	1,790	o	W. C. Quantities	1,790	o
Harris & Son	5,790	o	A. A. Gale*	4,117	o
K. Wood	544	o			

* Accepted.

KENDAL.—Accepted for the erection of twelve dwelling-houses at the Hill, for the Co-operative Society, Mr. John Hutton, architect, 10, St. John's Street, E.C. 1.—

By Messrs. J. P. Quantities, £ 1,505 0 o.

Buttlers.—L. Hill & Dixon, Kendal.—£ 1,505 0 o.

Slater, Jas. Bailey, Penrith—£ 716 4 0.

Mitcham, Nelson Bros., Kendal—536 0 o.

Plasterers.—Lyon & Nicholson.

Sum 9 6 6

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 12 noon on Thursdays.*]

John Morris ..	£1,257 0	William Jones Hughes,	
James Hughes & Ltd		Associates*	£500
wards	71 0	James Morris	380 1

*Accepted

Joiner.—J. Nicholas Pringle, Eglington, Alnwick	98	17	6
Slater.—Thomas Miller, Glanton, R.S.O.	25	10	0
Plumbers.—Wilkin & Dickman, Glanton, R.S.O.	5	3	11

AMLWCH (Anglesey).—For building new manse at Amlwch
Mr. Richard Davies, architect.—
J. Roberts & Theo. Patchard. Thomas Griffith £955
Owen Thomas, Esq.

dwelling-house at Aspatna, for Mr. John Longcake. Mr. Thomas Stephenson, architect.—
Maxwell & Toppin £250 10 0

BEGELLEY (Wales).—Accepted for the extension of a Wesleyan chapel, at Stepas le
J. Preece James, Haverfordwest £237 10 0

BISHOPS CASTLE (Salop).—For the construction of a concrete service reservoir, &c., for the Clun Union Sanitary Authority. M.

BRENTFORD For paying part of market site at Kew Bridge with pitchings supplied, for the Brentford Local Board. Mr J H Strachan, Engineer and Surveyor.

A black and white photograph of a large, multi-story building with a prominent central tower and many windows, likely a government or institutional building.

CARDIFF.—For building new hotel at Cathays, Cardiff, for Messrs. Brain & Gottwaltz. Messrs. J. P. Jones, Richards, & Budgen, architects. Quantities by architects:—
E. T. Hatherly £ 2,787 0 0 Jones & Co. £ 3,248 0 0

W. Thomas & Co.	3,589	0	C. C. Dunn	3,343	8
H. Gibbon	3,430	0	Newby & Co.	3,329	18
Jones Bro.	3,400	0	D. Davies	3,319	0
G. H. Hodgkinson	3,399	19	W. Symonds	3,290	0
J. Allan	3,398	0	D. J. Davies	3,285	0
A. Berridge	3,358	10	R. Uphan, Cardiff	3,169	0
J. Hopkins	3,353	0			

*Accepted.

DAGENHAM (Essex).—For alterations and additions to the Beacontree Heath Schools, for the School Board for Dagenham. Messrs. Wigg, Oliver, & Hudson, architects, 80, Leman-street, E.

McCormick & Sons..	£2,846	19	0	Hammond & Son ..	£2,302	18	
Dowsing & Davis ..	2,547	15	0	W. Watson	2,289	0	0
Lorden & Son	2,538	0	0	Thos Bruby	2,274	18	4
John Gozzitt	2,405	0	0	Ias Webb	2,100		

EASTBOURNE. For alterations and additions to house, Langney-road, Eastbourne for Mr. I. Fenton-Jones, I.P. Mr.

W. A. Finch, architect, 76, Finsbury Pavement, E.C. :—
J. Peerless £725 | W. Backhurst (accepted) .. £715
(Both of Eastbourne).

ERITH.—For the erection of a cottage, additional wards, &c., for infectious diseases hospital, Belvedere, for the Local Board. Mr. Harold Hurd, architect:—

G. Moles	£1,000 0 0	T. H. Walden	£800 0 0
Strickland &		C. Catlett	800 0 0
		G. H. Gossard, Estimator	— 0 0

GUILDFORD. -For the erection of new Wesleyan Chapel and schools. Mr F Roseham architect 35, Finsbury Pavement E.C.

S. Ellis	£ 750 0	K. Nierke	£ 5 104 0
P. C. May	6 14 0	Bottrell & Son	5 350 0
Higlett & Hammond ..	6 23 0	Mugger	5 333 0

Young & Lonsdale	6 2 6	Capp & Son	5 3 0	10
Holloway Bros.....	6 11 0	Rowlind Bros.	5 15 0	0
Mitchell Bros.....	5 8 5	Dowles	5 10 0	0
Harris & Son.....	5 7 0	A. A. Gale.....	4 7 7	0
R. Wood	5 4 0			

* Accepted.

KENDAL.—Accepted for the erection of twelve dwelling-houses at the Lound, for the Co-operative Society. Mr. John Hutton, architect, Kendal. Quantities by architect:—
Builders.—Hill & Dixon, Kendal....£1,025 0 0.

Slater, -Jas. Bailey, Penrith	174	10	4
Joiners, -Nelson Bros., Kendal	950	0	0
Plasterers, -Lyon & Nicholson, Kendal	205	8	6
1 number, 1000 and Water, and			£2,658 19 4

<i>Smith's Work</i> —Lawrence Airey,	
Kendal	222 10 0
<i>Painter and Glazier</i> —Thos. Wil-	
man, Kendal	81 10 6

KESWICK—For the extension of the sewer in Penrith-road, for the Local Board. Mr. W. Hodgson, surveyor, 3, Stanger-street, Keswick.

Saunders & Wilkin-son	£229 8 6	John Hunter, Mary-port (accepted)	£216 16
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LLANELLY.—For the erection and completion of six shops and club premises, Murray-street, Llanelly, for Mr. Gwilym Evans, Messrs. J. Buckley Wilson, and Glendinning Moxham, architects, Swansea.

G. Mercer.....	£3,899	7	D. C. Jones & Co.	£3,230	0
J. D. Williams.....	3,765	0	J. P. Jones.....	3,200	0
Thomas Watkins & Co.	3,693	0	Gustavus Bros., Swan-		
Dd. Jenkins	3,350	0	sea (accepted)	3,170	0

LONDON.—For engineering work, consisting of boilers, laundry and kitchen fittings, hot water supply apparatus, and other work at the New Infirmary, High-street, Lewisham, for the Guardians of the Poor of Lewisham Union. Messrs. A. & C. Harston, Architects, 25, London, E.C. 4, street 1, E. —

Wenham & Waters	£5.137	J. & F. May.....	£3.800
W. J. Fraser & Co.....	4.180	Berry & Co.	3.438
Bradford & Co.	4.111	Benham & Son, Wigmore-	
Summerscales & Co.....	4.130	street, W.* ..	3.215
J. Fraser & Son.....	4.110		

*Accepted.

LONDON.—For rebuilding Nos. 3A, Wimpole-street, and 24, Wigmore-street, W., for Messrs. J. T. Bedford & Co. Mr. C. H. Worley, architect. Quantities by Mr. R. C. Gleed.—
J. Edgar,

Simpson & Son	6,680	Holloway, Bros.....	6,188
T. Boyce	6,580	Lawrance & Sons	6,175
G. H. & A. Bywaters ...	6,490		

LONDON.—For erecting the new wharves of the Mercantile Marine Board, Well-street, E. Messrs. Wigg, Oliver, & Hudson, architects, 80, Leaman-street, E., and 7, Bedford-row, W.C. Quantities by Messrs. C. Stanger & Son

T. Little	£9,393	M Patrick & Son	£8,544
Garlick & Horton (Ld.)	128	I. & H. Cocks	8,511

F. & F. J. Wood	9,250	W. Sharbour	8,461
Jas. Brown, Son, & Blom- field	8,017	J. O. Richardson	8,359
J. Sparks & Son	8,888	J. Bentley	8,351
Hearle & Farrow	8,741	W. Gladding, Byfield Works, Baker's new, E.*	8,306

LONDON.—For the erection of a chrysanthemum-house at Finsbury Park, for the London County Council. Mr. Thomas Blashill, Architect

Marshall & Co.....	£1,800	15	0	E. Houghton & Son	£1,027	0	0
W. D. Tucker	1,306	19	0	N. Lidstone	1,025	0	0
W. J. Lugg and Renkle & Co.....	1,280	0	0	W. Parham	998	0	0
Jackson & Co.	1,200	0	0	J. Galbraith & Son	993	3	2
				W. Wells	981	0	0
				F. Tinsley	980	0	0

Reed, Blight & Co.,	E. Fragg	980	0	0
Limited	J. McCormick &			
F. & F. J. Wood	Sons	978	0	0
J. Inwood	C. Godbolt	959	0	0
W. H. Lascelles & Co.				

LONDON.—For the erection of public conveniences, cart-shed, bathie, &c., at the Ladywell Recreation Ground, Lewisham, for the London County Council. Mr. Thomas Blashill, Architect.—
J. Watt.....£774 10 | J. Inwood£641 0
A. W. D.

LONDON.—For alterations and additions to St. Mark's Schools, Whitechapel, E Messrs. Wigg, Oliver, & Hudson, architects, 80,

Leman-street, E., and 7, Bedford-row, W.C. Quantities by Mr.
F. G. W. Buss:—
G. E. Weston£1,616 13 4 | J. Sparks & Son.....£1,495 0 0

LONDON. — For sanitary and decorative work to 97, Highgate New Park, for Mr. A. Herring. Mr. E. J. Harrison, architect:—
Coombs £252 0 | E. Houghton & Son* .. £161 0
Sturm 187 0 | Gardiner & Hazel 159 12
* Accepted.



The Builder.

VOL. LXIV. NO. 2614.

MARCH 11, 1893.

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Church of St. Peter, Abbeydale, Sharrow, Sheffield.—Mr. J. Norton, Architect	Double-Page Photo-Litho.
"Glangwma," near Carnarvon: Entrance Front.—Messrs. Douglas & Fordham, Architects	Double-Page Ink-Photo.
Garden Front, "Glangwma," near Carnarvon	Double-Page Ink-Photo.
Design for a Railway Terminus.—By Mr. James S. Stewart	Double-Page Ink-Photo.

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The Disaster at Sandgate.



THE terrible disaster which has almost reduced the little town of Sandgate to ruins is closely connected with the subject of "foundations," and we need, therefore, make no apology for instituting an inquiry into the matter. Newspaper "science," like newspaper "architecture," is generally very inaccurate, and the causes of the calamity, as given by the daily press, form no exception to the rule, as will be seen in the sequel.

It was reported that on Saturday evening last a great subsidence of land took place, whereby the majority of the buildings in the town were more or less damaged, and the gas and water mains were disturbed. Houses had slipped away from each other, leaving gaping sections between, whilst the walls of other edifices bulged out, and were on the verge of toppling down; great rifts appeared in the walls and in the ground at every turn. One of the groynes on the shore had broken up, and along the foreshore, not far from low-water mark, there was a distinct upheaval of the sea-bed. During a single tide a ridge about four to five feet in height was formed. The area affected extends for about half a mile from east to west, and about five hundred yards inland from the sea line, where the ground rises irregularly until it reaches the plain upon which Shorncliffe Camp stands. The most marked effects of the subsidence were manifested in the grounds attached to the mansion known as "Encombe." There, the devastation caused by the earth movements on Saturday was augmented (as in other places) by the disturbances which took place on Sunday and succeeding days. Immense cracks and chasms appeared in the grounds in every direction, and the drive up to the house was cut up into a series of steps,

Altogether about one hundred houses were wrecked or damaged in the town: Truly a terrible disaster, and in which the inhabitants have our entire sympathy.

But it is remarkable that so simple a phenomenon should be so woefully misinterpreted. Thus we read in the *Standard* of Monday last, that a general impression prevails in the neighbourhood that the calamity has to some extent been brought about by the explosions caused in blowing up the *Bevernue* last year, and before that of the steam-ship *Calypso*, both of which vessels were wrecked just off shore; and as substantiating this "theory" it is said that some of the damage is where the vibrations caused by the explosions were most felt. A public notoriety writing to the same and other papers also connects the disaster with the blowing up of the first-mentioned vessel, and says that the ruin "has been caused, not by any mysterious natural disturbance, but by the foolhardiness of a Government department," and he trusts that the authorities will "be made responsible for the damage that has resulted therefrom"—a species of writing puerile in the extreme. But he may be excused for uttering such nonsense on the grounds of undue excitement, seeing that his own house was involved in the general ruin. A public meeting, however, has been held in the town, when resolutions were passed endorsing these foolish sentiments.

Another account by the same paper's own correspondent as to the probable cause of the calamity is, if anything, rather worse than the preceding, because it savours of a smattering of the truth, and being clothed in a semblance of scientific language, is all the more misleadings. "Sandgate," says the correspondent, "is built upon the Greensand, which rests upon the blue Gault. The same geological characteristics are present throughout the district." This will be news to geologists—we have always been under the impression that the Gault was situated at a higher level in the geological scale than the particular bed of the Lower Greensand upon the talus of which the pleasant town of Sandgate is built. Perhaps the writer had

his mind's eye on the Upper Greensand and the Gault at the Warren, Folkestone—at which latter place considerable landslips have recently occurred. The remark that the Greensand at Sandgate "on being surcharged with water becomes of the nature of quicksand; hence its liability to slip or subside," although somewhat involved, is substantially correct.

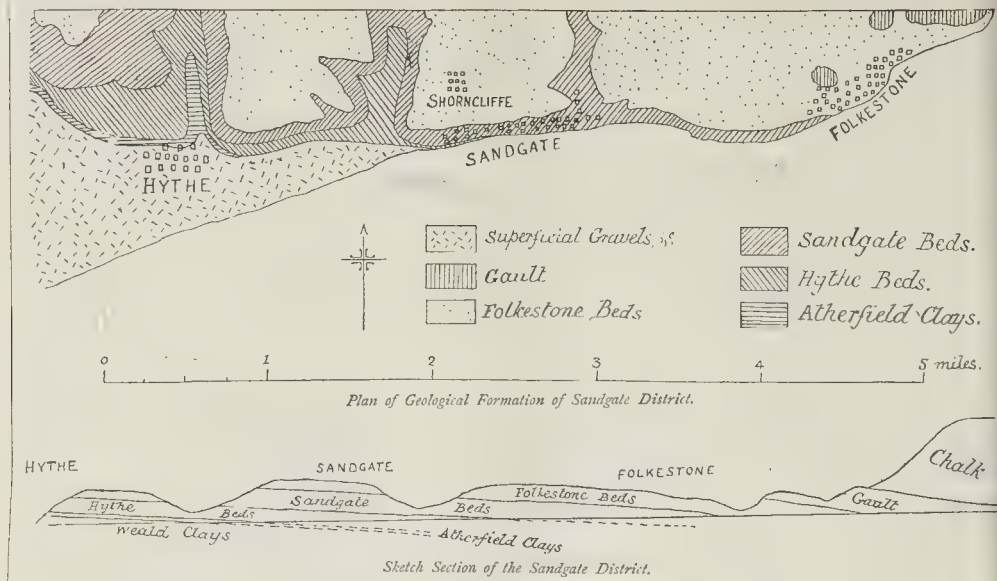
A geological consideration of the scene of the disturbance tends to throw material light on the subject, and in offering the following observations, we would direct the reader's attention first of all, to the accompanying sketch map (based on the Government Geological Survey) and section. As will be seen, the following geological divisions, in descending order, are present in the area:—

1. Gault (at Folkestone).
2. Folkestone beds.
3. Sandgate beds.
4. Hythe beds.
5. Atherfield Clays.
6. Weald Clays. (Crops out near Hythe, not shown on map.)

1. *Gault*.—This formation is composed mainly of a fine blue clay, and from its treacherous nature is known generally as the "blue slipper." It does not affect our present inquiry, being found on the Lees at Folkestone, and more to the eastward. It is well developed at the Warren, where nearly the whole of the cliff is made of it.

2. *Folkestone Beds*.—These consist of light-coloured, false-bedded sands, sometimes very coarse, with irregular layers of concretionary siliceous limestone. They are well-developed in the cliffs to the east and west of Folkestone, and rise gradually in the cliff going west of the town towards Sandgate. At the latter place they form the upper portion of the cliffs, which, as before stated, are here some distance inland from the seashore. Speaking in general terms, the base of the cliff on the Lower Sandgate road, between Folkestone and Sandgate, is occupied by a small undercliff, formed by the slipping of the sands above the more argillaceous beds beneath, and springs are frequently thrown out along the line of junc-

Lower Greensand



tion between the sand and the clay. It will be observed that Shorncliffe camp stands on the Folkestone beds.

3. *Sandgate Beds*.—This formation is characteristic of the place. It may be described as a series of dark clayey sands and clays, the dark colour being mainly due to the presence of the mineral glauconite. Exposures in the vicinity indicate that beds of clay a foot or two in thickness alternate with thin beds of clayey sand, and that the formation is of a wet nature. A great portion of Sandgate is built on the slopes and low ground of this formation, which is practically a wide talus extending from the inland cliffs to the shore. A portion of the talus might be formed of fallen Folkestone beds, but of this we have no evidence. The lower western part of the town is partially erected on the

4. *Hythe Beds*.—These are well developed, as the name indicates, in the vicinity of the neighbouring town of Hythe, and consist of thin alternating beds of limestone (Kentish Rag) and sand, rather argillaceous in character. The formation has been traced from Hythe to Sandgate, and was visible at that part of the town opposite Shorncliffe. It passes underneath Sandgate, but at such little depth that it has been reached in shallow diggings along the main road running parallel with the sea, and can be seen further eastward towards Folkestone at low water.

5. *Atherfield Clays*.—This formation, to which particular attention may be drawn, is seen at the lowest tides opposite Shorncliffe Battery, nearly in front of the Beach Rocks Convalescent Home, and also extends under the town. Lithologically it may be described as a mass of fine silty clay. It is noteworthy that strong springs are generally thrown out at its junction with the Hythe beds above, and the surface of the clay is so slippery that, in the inland cliffs near Hythe, the ragstone of the last-mentioned formation has fallen away, covering up the clay. The Atherfield clay freely absorbs water, and then becomes very treacherous.

6. *Weald Clays*.—These stiff clays can also be seen under the Atherfield clays, opposite Shorncliffe Battery, at the lowest tides, and they extend under Sandgate.

The whole of the beds in the area under consideration, from the Gault to the Weald clays inclusive, dip slightly to the N.E., though in places they are almost horizontal. The amount of inclination at Sandgate must

be very little, though the survey map indicates a dip inland.

Recapitulating, we find that the town is partially built on a talus, or undercliff of broad extent composed of a mixture of alternating sands and clays of a treacherous nature, holding, in wet seasons, a considerable quantity of water; and that this, which is very thin, rests on a formation of bands of limestone and clayey sand, upon which a portion of the town to the westward is also built.

But the fundamental point is that the town and the two formations upon which it stands are resting on a slippery clay (the Atherfield), and that a species of lubrication is formed by the channels of underground water between that clay and the beds above. Our opinion, then, is that the disaster at Sandgate is merely a landslip, caused, primarily, by the slipping of the Hythe and broken-up Sandgate beds over the Atherfield clays. The effect of the slip has been materially aggravated by the treacherous nature of the Sandgate beds, which, immediately the landslip began, commenced to break up, and thus formed the cracks and fissures in the ground alluded to. It is highly probable that the greatest part of the mischief done has been caused by this independent movement of the Sandgate beds. There can be little doubt also that the initial movement was brought about, not only by the breaking away of the beds along the points of junction between the Hythe and Atherfield formations, due to the wearing action of the underground channels of water alluded to, but by the scouring of the wind and tides, which at that point is very strong. This action of the sea has cleared the fore-shore of much of its protecting gravel and shingle, in spite of the groynes which have been constructed to arrest it, and the denudation of the beds generally.

On Tuesday last, Mr. Walton, Local Government Inspector, held an inquiry in Sandgate, and he arrived at the conclusion that it was necessary to have proper surface water and storm drains constructed for the purpose of carrying off the subsoil water. The sea-wall should also be provided with more weep-holes. If these works were carried out under the direction of an expert, he believed that no more damage would ensue. There can be no doubt that this would minimise the effects of any future slip, but for our own part we fear, from the geological

structure of the ground, that it will never again be safe to build upon the site of the disaster.

RECENT WORK AT SILCHESTER.

IT will be within the memory of many of our readers that in the early part of 1890, a systematic effort was made by the Society of Antiquaries to complete the exploration of the Roman City of Silchester, Hants, begun by the late Rev. J. G. Joyce, F.S.A., many years before.

The scheme received the sanction of the Duke of Wellington, the owner of the site, and of Mr. Cooper, the tenant. An influential committee was formed, and, aided by public subscriptions, the work was begun, and carried on with great success through the period of the year during which the ground could be spared from agricultural use. The site, it may be remembered, consists of a deserted area, enclosed within massive walls which describe an irregular octagon about 2,700 ft. from west to east, by about 2,350 ft. from north to south. A farm house, the Rectory, and the Parish Church of Silchester are situated at the east end, these being the only buildings within the area. Beyond the rough core of the city walls no buildings were visible above ground. When the fields are grown with corn, distinct bands of different tint can be discerned in the colour of the crop, marking the positions of the streets, which crossed one another at right angles with great regularity. In nearly the centre some high mounds of excavated earth mark the position of the great Forum of the city, with its attendant basilica; and elsewhere are a few other indications of previous exploration: a series of baths, now greatly damaged by frost, several hypocausts of peculiar form, and the foundations of a many-sided building, appearing at first sight to be of circular form, being well known to visitors. Nor must the temporarily wooden museum be overlooked, wherein are contained many of the articles found during the early excavations.

At the close of 1890 the results of the work completed up to then was reported to the Society of Antiquaries, followed by a public exhibition of the objects discovered. This took place again in 1892. The third exhibition is now open to the public. In the rooms of the Society of Antiquaries,

Burlington House, may now be inspected an admirable collection of ancient Roman articles of various kinds and descriptions, all of which have been found during the past year in the works of exploration now brought to a conclusion for the season.

Before describing the objects laid out for inspection, it may be well briefly to relate what was accomplished by the explorers in the two previous years, as well as the results of the past year's work.

An area to the north of the Forum, bounded by lines of four of the streets, having been marked out, was systematically explored. On the west side, a house with a hypocaust had already been found by Mr. Joyce. Another, of larger size, was speedily met with, having remains of tessellated pavements, and many pits, dug probably as cess-pools originally, in which many objects of interest had been thrown. Tools and other articles in iron rewarded the explorers, and much valuable evidence was obtained of the planning of the space of ground laid open. At the eastern end of the city two quadrangular buildings were traced, in line with the Parish Church, and which extend partially beneath the churchyard, showing by their parallelism with the existing fabric, that the latter is likely to be standing on some Roman foundations connected with them. They have been called temples, but beyond the peculiarity of their forms, no distinctive features existed to determine their use. The north, the south, and the west gates were cleared of rubbish which had previously in part covered them, and their exact ground plan was determined. Two more squares bounded by lines of streets, to the west of the Forum, were also cleared of their covering of earth, and traces of buildings discovered. It has to be noted that all the foundations laid bare around the Forum are exactly at right angles to their contiguous lines of street, and with one another.*

The work of the past year has been to examine the spaces more exactly abutting upon the Forum on the north, east, and south, the labour of which was not a little increased, from the fact that it involved the partial moving of some of the mass of earth banked up around by the first explorers. To the north, a great many pits were discovered, which have yielded a number of interesting specimens of pottery, some in good condition, but the remains of buildings have been scanty. To the east, the space proved to be destitute of walls. Here, probably, was an open space utilised as a market, facing as it does the main entrance to the Forum. At some level below the surface, a puzzling layer of oyster shells was met with, evidently deposited at an early time. They extend over a considerable area, and their presence in such a prominent position in the city cannot be accounted for by some hypotheses which have been put forward.

It is, however, on the south side that the most important antiquarian discovery of the year has been made. A small building, consisting of a central nave, ending in an apse, almost, but not quite, a semicircle, two side aisles, a porch, or narthex extending the whole width of the building, and two chambers at the end of each aisle, slightly projecting from its face, was discovered. This church-like arrangement at once commanded attention.† On Thursday last week Mr. St. John Hope and Mr. G. E. Fox, F.S.A., the two gentlemen in whose hands has been the execution, to a great degree, of the works of exploration, and who have so successfully conducted them, concluded the reading of their description of the discoveries, in which the finding of the church occupied, naturally, a prominent place. It was pointed out that, in line with the entrance was a rough pavement of flints, in the centre of which was a platform 4 ft. 6 in. square, of red brick, placed probably to receive a lavatory for the use of the faithful before

entrance. Beside it is a pit, as if for the reception of overflow water. At the back of the apse, still in line with the axis, is a well from which probably the water was drawn. The walls of the building are roughly formed of flint, with angles on the south side only of red bricks, not differing from the walls of other buildings which have been laid bare, and which latter were plastered inside, and most probably outside also. Fragments of plaster, coloured in temper, have been met with inside the church. The nave has a flooring of red tessellated pavement, of ordinary kind, which still remains over a great part of its area. A portion still exists in the porch. The apse is paved in like manner, it being there in good condition, not worn, as if it had been covered with a mat during use. In line with the beginning of the apse, but still in the nave, is a square of ornamental pavement formed of a border of diagonal squares alternately red and grey, seven in number on each side, counting the angles twice over, enclosed within lines of black. The space thus enclosed is made up of a complicated pattern of small black and white squares, which form an effective design.

The communion table must have stood here; and that it was of wood is apparent from the fact that there is no sign of anything having been fixed here. The conspicuous pattern, while all the rest of the floor is plain, indicates the intention for it to mark an important position. One of the readers spoke of there being some slight signs of constructive building upon it, but if so, this must have been some later work, since it is clear that at the first, at least, the whole of the pattern was intended to be seen, and not to be hidden by anything being built above it.

There is no distinction of level between the floor of the nave and that of the apse. Both are on a level, without any intervening step. The lecturers, and the speakers who followed afterwards in the ensuing discussion, used commendable moderation with respect to this curious building being a church. It was admitted by all that there was no certain proof, although the general opinion of the meeting appeared to be all but unanimous in favour of its having been one. The objection of one member, that no cross or other emblem had been met with, is, in fact, likely to favour the belief, for the building may be earlier than the use of emblems. But the fanciful may readily trace a cross as the basis of the pattern in the pavement if they so please. It stands with its entrance to the east, and the apse to the west, thus reversing the usual order of things. This orientation would, however, enable the celebrant, but not the people, to look east. But in doing so, standing in the apse, he would have had to face the congregation. Some of the speakers made much of the orientation. But a reference to the carefully-prepared plan of the city, exhibited with the antiquities, and which shows the position of every building discovered, indicates that the orientation may possibly be accidental. The building is set square with all the others contiguous to it, and since these are placed east and west, it follows that the church is in the same direction. It may be that its position in relation to the east is intentional, but it may be that the entrance was placed to the east rather than otherwise, in order that it might gain the advantage of direct approach from a main road. It is but fair, however, to say that there is sufficient space all round the church to have enabled the entrance to be in any direction. It is to be regretted that the axis of the city so exactly coincides with the cardinal points as to leave this question with a certain amount of doubt. The foundations go through all the openings, as is usual in Roman buildings, and there is no trace left as to whether the nave was divided from the aisles by columns or piers.

Of the articles exhibited, an admirable model of the church demands our first notice. It is the work, we understand, of Mr. Fox, who has evidently devoted

great pains to its production, and who may be congratulated on the success of his performance. At a glance, all the curious points of the building can be taken in and studied. This is all the more welcome since the excavations at Silchester have been covered in, to protect the remains from frost. The rough construction, the floor levels, the parts of the pavement that remain, with the furrows that deep ploughing have made upon it, are all traceable, while the conspicuous pattern of the square marking the space for the table of the Holy Eucharist is at once apparent in relation to its surroundings.

The large meeting-room of the Society of Antiquaries is wholly occupied by the articles found, the smaller ones only being in cases.

Here is one of the large capitals of the columns of the Basilica, without question the best evidence yet met with in Britain of what Romano-British work was like. It belongs to a range of columns which must have been about 30 ft. high. The design approaches that of the Corinthian order, but the volutes are absent, their place being taken by a peculiar curve to the angular branch of foliage, which must be seen to be understood.

There are bases of large size and elegant design, evidently worked on a lathe, fragments of foreign marbles, portions of shafts, and of other architectural members. A curious capital, of very Byzantine form, of small size demands attention. It is square above, circular below, with some neatly-turned mouldings as its necking. The cases contain specimens of window-glass, well-flattened, and of many cups and bowls for domestic use. The pottery consists of dark purple ware from the New Forest, brown ware with patterns laid on in slip from Northamptonshire, many examples of light brown and red colour of local manufacture, and there are a great many examples of the bright, red-glazed Samian ware. The patterns and forms are of no small beauty, and the large extent and generally perfect condition of the collection adds considerably to its interest. In almost every example, however, the hand of a careful repairer may be observed. Of the objects in metal, a curious screw of wrought iron demands careful attention; its form, with a sharp point at the end of its well-defined worm, being similar, according to one of the speakers, to that of a recent patent.

By the courtesy of the Society of Antiquaries, the exhibition has been open to the public since Monday last, and it is to continue so for one week longer from Monday next. Admission may be obtained on presentation of the visitor's address card.

The whole of the objects found will be placed, by the liberality of the Duke of Wellington, in the Reading Museum, where already the discoveries of former years are preserved, a separate room being reserved for the architectural remains.

Works will be resumed again in May, when they will be carried on as far as public subscription may admit. A reference to the map shows that the deserted site of this city is likely to become a second Pompeii in its interesting results, and it is greatly to be hoped that public response to the Committee's appeal for funds may be so ample as to enable the work to be undertaken with spirit. Subscriptions may be paid to the treasurer of the fund, Mr. F. G. Hilton Price, 17, Collingham Gardens, South Kensington. Visitors to the site may do well to remember that it is about three and a half miles from the Strathfield Mortimer station, on the line from Reading to Basingstoke. The country is pretty, and the road easy to find, if progress be made at starting along the south side of Mortimer Church. Luncheon must be secured at Mortimer, since the traveller will find no hostelry of any kind at Silchester.

PROFESSOR AITCHISON'S LECTURES.—We regret that we have been obliged at the last moment to postpone till our next issue Professor Aitchison's sixth and concluding Royal Academy lecture.

* For notes of some of the previous excavations, see the *Builder* for January 10, 1891, and January 15, 1892.

† For a ground plan, see the *Builder*, June 18, 1892, and for some other particulars July 30, 1892.

NOTES.

THE Meissonier exhibition at Paris occupies the whole of the rooms in the well-known gallery in the Rue de Sèze, and includes 1,468 works of different kinds, pictures, studies, water-colours, pen and crayon drawings, and wax models; also the etchings executed by the painter between 1835 and 1858, and sold at small prices, in the days previous to his fame. These latter are collected in the vestibule. Among them may be particularly remarked the illustrations made for the "Nouveau Magasin des Enfants." The large room on the first floor presents a curious effect to the eye owing to the large collection of very small pictures, finished with that extreme minuteness which formed the special characteristic of Meissonier's painting. Along with these are a number of sketches and studies of the most varied interest. Among the works exhibited are "The Battle of Jena," which has the place of honour, "Napoleon I. and His Staff," "1814," "The Battle of Solferino," "Le Lecteur," "Le Jouer de Flute," "Un Noble Vénitien," and many other well-known works, also some portraits, notably those of Dr. Guyon and of Alexandre Dumas *filis*. Perhaps even more interest is excited by the studies, in which we see the painter at work and penetrate his manner of developing his subjects; and, in some instances, they are superior in force and vigour to the finished works. The remarkable head of Napoléon I. appears, of course, over and over again among the paintings and studies, and we have also the equestrian figure in wax from which "1814" was painted. There are many other wax models of horses galloping, executed with remarkable anatomical knowledge. Among the miscellaneous works is a remarkable little nude study executed with extraordinary care. The last room contains the very large water-colour of the charge of the Cuirassiers which has been exhibited in London. The collection for the first time enables one to appreciate Meissonier's work as a whole, and one may sum it up as exhibiting an incomparable analytical power, the work of an eye which seems to see and a hand to reproduce everything with the certainty and precision of a photograph, but with a result which for the most part leaves our feeling entirely untouched. In the preface to the catalogue his faithful friend M. Dumas piously veils the defects of the painter, his irascible character and his extraordinary vanity; an amiable indulgence on the part of the biographer, though it is hardly without a smile that those who knew Meissonier can read of him as a man remarkable for the gentleness and modesty of his nature.

THE *Berliner Philologische Wochenschrift* for March 4 announces the discovery of yet another "beehive" tomb at Mycenæ. This makes eight in all. The newly-discovered tomb lies in the space between the Acropolis and the so-called tomb of Clytemnestra, which Mdme. Schliemann began to excavate. The *dromos* of the new tomb is cut for the most part direct out of the rock, and faced with a wall made of small stones. Its breadth is 5.7 metres. The façade of the *stomion* is built of carefully-hewn stones. The *Wochenschrift* also calls attention to some additions that have recently been made—as regards Mycenæ—to the very valuable collection of photographs of ancient sites and details of ancient buildings, &c., made by the German Institute at Athens. A photograph of the small north gate is now available, as well as of a rock grave of somewhat peculiar structure, with a *dromos* whose walls incline inwards. The photographs now include nearly all the important archaeological sites; they are taken, of course, for scientific rather than artistic purposes, and they are obtainable, our readers may care to know, at the moderate prices of 80, 60, and 40 pfennigs, according to size (*i.e.*, about 10d., 8d., 5d. each). The full catalogue is given in the

"Jahrbuch" of the Institute, vi, p. 74, and the photographs are to be had from the First Secretary, 1, Pheidiasstrasse, Athens.

IT is satisfactory that the Committee of the House of Commons has passed the preamble of the Bill of the London County Council by which the garden of Lincoln's Inn Fields is to be open to the public. Practically there was no valid objection to the proposals of the Council. The Committee was told that the occupants of the Casual Ward of the Strand Union would sleep in the gardens waiting for the ward to be opened; that no respectable children could use the gardens in the future, and so forth. But, as the Committee stated, the bye-laws would be strict. In a word, the only grounds of objection were reasons for taking care that the bye-laws were efficient, and the gardens placed under the charge of competent attendants. Not only will the public generally benefit by the opening of these gardens, but we venture to assert that the very persons who have tried to prevent their use by the public will find that they can be used with much greater comfort and without hindrance or annoyance when they are a complete open space.

THE third of the Carpenters' Hall lectures for 1893 was delivered on Wednesday last by Professor Banister Fletcher, on the Italian Renaissance. The Professor commenced his remarks by broadly describing the most characteristic features of the Renaissance, and pointing out the divergence from the lines and principles which governed the Gothic style. Windows, doors, roofs, vaults, were touched upon *seriatim*, and attention directed to the crowning feature of the Renaissance, viz., the dome. The materials and their influence, with that of locality, upon the designs were also referred to. Stained glass and the lavish use of painted decoration on internal surfaces and the influence on the buildings of architects who were also sculptors were noticed, and reference made to Donatello, Ghiberti, and their works. The Professor then dealt more particularly with the three great schools of Italian Renaissance at Florence, Venice, and Rome, and gave, with dates, short sketches of the leading architects and their works, which included some of the noted palaces. The peculiarities of the social and other conditions of the different localities, and their influence upon the plan of the building, led to a reference to the petty warfare of the Florentine nobles, and the construction of the palaces to serve to some extent as castles also. Again, the conditions of Venice, which were influenced not only by a commercial spirit, but also by the governing line of the canal, upon which the buildings mostly abutted, were pointed out, as well as the more peaceful aspect of Rome, the seat of a settled Government and surrounded on all sides by remnants of antiquity which could not fail to influence the Renaissance features in their development. Needless to say, a careful description of St. Peter's was part of the professor's scheme, and the work of Michelangelo and Raphael was carefully described. The lecture was illustrated by a large number of framed photographs and drawings to which attention was directed during the course of the lecture and which were illuminated by a movable lime-light. We would point out, however, that in a large hall such as this, crowded in every part, this means of illustration is almost useless, as only the first few rows of the audience could distinguish the features of the Professor, or hear the remarks of the Professor, no doubt valuable and interesting. With facilities such as exist for the procuring of lantern slides from existing photographs, it seems to be a pity to neglect this means of illustration, which gives to a large and crowded audience equal facilities for seeing the whole of the examples selected by the lecturer.

IT is not often that the public has the pleasure (?) of perusing a correspondence on architectural details in the columns of a daily newspaper. But that is what the readers of the *Manchester Guardian*, or some of them, have enjoyed for the past month and more. The correspondence arose respecting an article by Mr. Reginald Blomfield on the restoration of Manchester Cathedral. This article appeared in the *Guardian* on January 31 this year, and like all Mr. Blomfield's writings, was clear and effective. In it he took Mr. Crowther, the architect of the restoration, to task for some of the work, and compared it, to Mr. Crowther's disadvantage, with the beautiful church of St. Augustine, at Pendlebury, designed by Mr. Bodley. Amid much sound criticism, Mr. Blomfield unfortunately made certain careless statements, which have evidently gone a long way towards nullifying the good his article might have effected. A statement that the diamond-shaped panes in some of the windows were not "an eighth of the proper size," provoked the reply from Mr. Frank P. Oakley that the actual size of the lozenges is 4 in. high and 3 in. wide—"these dimensions multiplied by eight would make the quarries 2 ft. 8 in. high by 2 ft. wide. The widths of the window-lights are, in the south porch, 12½ in., and in the north porch, 15 in. Even if Mr. Blomfield should say he meant that the area of each quarry should be eight times as large, and he certainly did not say so originally, this would make each quarry about 11 in. by 8½ in." Other statements about cinquefoil heads, four-centred arches, &c., have also brought forth replies which show the danger of making hasty criticisms. "A Manchester Architect," writing in support of Mr. Blomfield, puts the most favourable construction possible upon the article, maintaining that "the force of Mr. Blomfield's contention is not materially weakened by the comparatively slight inaccuracies—if such they be—in some matters of detail. The general scope and gist of his argument is the main thing for which we have to thank him, as being candid, intelligent criticism." It is a pity, however, that Mr. Blomfield was not a little more careful about his "facts." If the correspondence have no other effect, it will at least show to the public the care which architects, who are worthy of the name, bestow on such apparent trifles as the size of quarries of glass, variation in the size of foils, and the like. People in general have only a hazy idea of the thought which goes to the designing of good architecture.

TWO more mill-chimneys have collapsed, one on Thursday, last week, at St. Helens, and another on Saturday evening at Widnes. The former is said to have been over 300 ft. high, and to have collapsed right to the foundations,—one man being injured and damage estimated at 8,000 being done to property. The one at Widnes was only 90 ft. high, and was being repaired at the time the upper part of the chimney gave way,—two men being killed. Both chimneys appertained to chemical works, and in both, apparently, the brickwork had been eaten into by the acids and gases emitted from the works. Here, at any rate, there seems to be an ascertainable cause for the disasters. It is to be hoped that inquiries into the two cases will settle this point beyond dispute—namely, is ordinary brickwork gradually destroyed by the fumes from chemical works; and if so, how soon? Architects and engineers would then know whether some other material than brickwork must be used in such a situation, and the owners of brick chimneys might perhaps be induced (or compelled) to make periodical inspections of them from base to coping to ascertain their condition. It is certainly not creditable to the owners of chimneys, or to their architects or engineers, that there should be so many failures in this class of work.

IN two papers recently read before the Institution of Civil Engineers in Ireland, by Mr. John P. Griffith, on "Portland Cement," the writer deals with the paramount importance of fine grinding, the absolute need of using sufficient water to ensure the complete hydration of the cement, and also the necessity of making concrete exposed to the action of sea-water impermeable. He considers the effect of the flow of sea-water through Portland cement concrete to be identical with the effect of sea-water on lime mortar, and that more injury may be caused in this way than by the presence of magnesia in the cement. Cement should be very finely ground, not alone as making a more economical cement, but also a safer and more reliable cement. Germany is remarkable for the fineness of some of its cements, and the author considers the time has come when we may reasonably ask for finer cement than is generally sold in the English market. As regards failures due to the presence of free lime, produced by the cracking of the cement, the author argues that it is difficult to understand how free lime could escape immediate hydration when gauged with what appears to the eye a sufficiency of water. It is a mistake to assume that a cement was good, merely because it was very finely ground, for a soft under-burned cement could be more readily pulverised than a well-burned cement. Fineness is always attainable, while inherent merit may not be. It is interesting and important to note that the adoption of standard tests in Germany has not in any way retarded improvement in the manufacture.

AMONGST purely political Bills, smaller ones which are passing quietly through Parliament are apt to be overlooked. We doubt if anyone has noticed that a Bill to prohibit the use of barbed wire by the side of roads has already passed the second reading in the House of Commons and got into Committee. There can be very little doubt that it will become law this session. The use of barbed wire by the side of roads has become far too common; it is especially noticeable in the neighbourhood of watering places, where proprietors, instead of putting up a substantial and permanent fence, run strands of barbed wire from tree to tree or post to post. It is hurtful to man and beast, without, in many instances, forming an effective fence, since, if it is placed a certain distance from the ground, it is possible to pass under it. It also encourages untidiness and the non-repair of hedges and banks, and in the long run it is doubtful if it is really economical, since it cannot take the place of a permanent and effective barrier.

OUR contemporary, the *Westminster Gazette*, recently published some interviews with oculists, in which the increase of weak and imperfect sight was strongly commented on, as well as the need for precaution in the schools all over the country. There is no doubt that sufficient care is not given by school authorities to the need for good light, more especially good artificial light. Some time since we called attention to this point in regard to the public schools, and we are bound to say that it is rather in the case of the higher grade schools that most fault is to be found. In the elementary schools the inspectors are careful to point out defects in the lighting of the schools, and it has also to be borne in mind that most of the work in the elementary schools is done in daylight. In such schools it is rather the form of desks that can only be criticised. But in the higher grade schools much work is done by artificial light, and there is no Government inspection. The necessity for outside criticism is therefore very apparent.

THE Manchester Corporation proposes to build a smallpox hospital at Withington, a place about three or four miles south-

ward from the centre of the city, and, naturally enough, the people of Withington do not want the hospital. They have tried by petition, by correspondence in the newspapers, by questions in the House of Commons, and by no fewer than three motions for an injunction, to restrain the Corporation from carrying their proposal into effect, but their efforts have all been in vain. Last week Mr. Justice Chitty, in the Chancery Division, gave judgment on the third motion for an injunction. The plaintiffs' chief contention was that the hospital would prove a public nuisance and danger to health. The judge, however, ruled that the plaintiffs had failed to show that the apprehended danger would infallibly ensue; he was, moreover, of opinion that the Court should exercise great caution before using a power which might tend to close many a well-ordered hospital. The motion was therefore dismissed, and an injunction refused. The judgment probably will not be received graciously in Withington, but we do not see what other result the motion could have had. Had it been successful, small-pox hospitals, and presumably other hospitals for infectious diseases, could not have been erected, except at such distances from habitations as would have rendered them inconvenient, and would have multiplied the danger from infection in another way by increasing the distance which patients would have to travel. At the same time, persons responsible for the erection of such hospitals should leave no stone unturned to render them as isolated and as perfect in sanitation and arrangement as circumstances will allow. Public safety demands that they should do no less.

ON March 29, 1862, we printed three views to illustrate our account of the discovery of some remains of St. Anne's Chapel in the Temple. They were found at a depth of about 6 ft. below the present pavement opposite Lamb-building, in excavating for a drain from new chambers in Churchyard-court. It is stated that the authorities now contemplate the removal of Lamb-building between the church and the Inner Temple Treasurer's office, in addition to pulling down the west side of Hare-court (Inner Temple) which stands between Middle Temple-lane and the block known as Dr. Johnson's Buildings, that has replaced the row in which Charles Lamb, Burke, and Dr. Johnson had chambers. Hare-court was named after Sir Nicolas Hare, Master of the Rolls, who was buried in Temple Church in 1557. It is often spoken of as being the oldest portion of the two Inns: but it appears that the fire which broke out in Pump-court on Sunday, January 26, 1678-9, destroyed most, if not all, of Hare-court, together with Elm (rebuilt after the designs of Mr. St. Aubyn, architect, in 1880), Vine, Brick (in part) courts, and the Cloisters. It has some good brick doorways, a successor to the pump mentioned by Garth in his "Dispensary," and three trees, which remind us of Charles Lamb's description of his rooms at No. 4, Inner Temple-lane, when writing to Manning in China. Some houses in the rear, at the upper end of Middle Temple-lane, are much older, having been built in 1630, as we read in the "History and Antiquities of the Four Inns of Court," 1780, extracted (by John Rayner) from Dugdale's "Origines," 1666-80. In Mr. C. P. Johnson's volume (1888) upon the early writings of Thackeray is a letter, dated December 16, 1831, written by Thackeray at Mr. Taprell's chambers in Hare-court, when reading for the bar; in January, 1833, he was at 5, Essex-court. William Jones, the Oriental scholar, and the late Mr. J. D. Benjamin, Q.C., had chambers in Lamb-building—a block frequently pointed out as the scene of many episodes in "Pendennis"; but Thackeray places Warrington's and Arthur's chambers in "Lamb-court." Illustrations of Dr. Johnson's rooms at 1, Inner Temple-lane, the doorway, staircase, &c., will be found

in the *Builder* for September 12, 1857, and the Archer collection, British Museum.*

AT Addison Works, near Uxbridge-road Station, Messrs. Wm. Woollams & Co. show for a few days their exhibit which has been prepared for the Chicago Exhibition. This consists of an oblong stand of four bays, each bay having three sides fitted with dado filling and frieze, the work of various designers, amongst whom Messrs. T. W. Hay, G. F. Catchpole, C. F. A. Voysey, S. Godfrey, and Owen W. Davis's familiar work appears. Miss Louisa Aumonier is also represented by some designs, which, though carefully produced, lack distinctive character, and the formal treatment of natural forms which marks the most successful wall-papers. Messrs. Woollams appear to be making efforts to introduce the flock papers which were condemned some years ago as insanitary owing to their dirt-holding qualities. From the point of design and colouring Mr. Davis's dado of embossed flocks on lacquered gold ground with a modelled effect in low relief produces a good effect; but the best piece of design is that of Mr. C. F. A. Voysey in variegated flocks with flat treatment. It is a bold and free piece of work, and the colour is good. Mr. Catchpole's work adjoining is also creditable. We think that the appearance of the exhibits would have been much enhanced had a little more attention been paid to the design of the stand. The proportions are bad and the details bald.

MESSRS. BELHAM & CO., of Buckingham Palace-road, have been exhibiting their work for the window to be erected in St. Margaret's Church, Westminster, by members of the House of Commons, as a memorial of the late Right Hon. W. H. Smith, which has been designed by Mr. John P. Seddon. The subjects were suggested by the Ven. Archdeacon Farrar, and are thus described:—In the central light the figure of our Lord as the Light of the World, with right hand raised to bless, and with emblems of the Powers of Darkness under His feet, following the conception of the statute of Le Beau Dieu, of Amiens Cathedral. In the light on the left hand is the figure of the Centurion Cornelius kneeling in prayer, and in that to the right Nathaniel is seated in contemplation beneath the fig-tree. Predella pictures are below in smaller panels, on the left King David playing the harp, in the centre Moses bearing the tables of the Commandments, and on the right Nehemiah superintending the building of the walls of Jerusalem. The Predella pictures only were on view at the time of our inspection, the rest of the work being incomplete, so that criticism of the work as a whole must be reserved. The work has been executed in Messrs. Belham's varied antique glass, which gives in small pieces glass with beautiful variety of tone and veins of colour. Great care has evidently been exercised in making the best possible use of these qualities, and the arrangement of colours is satisfactory. The leading has also been judiciously introduced, and in only one or two instances does its introduction jar with the design. The cartoons and paintings on the glass are by Mr. H. G. Murray from sketches and studies of the principal figures by Miss Maud Seddon. We shall look forward to shortly seeing the complete work in its place in St. Margaret's.

THE lecture delivered by Mr. Geo. Simonds on Friday evening, last week, at the Royal Institution, on "Sculpture apart from Archaeology," was an interesting exposition of the methods employed by sculptors in the carrying out of their work. The process of *cire perdue* casting was explained and illustrated by diagrams, and the

* Thackeray was admitted of the Middle Temple in 1831. Mr. Milton, of the Inner Temple Treasury, has kindly ascertained for us that Mr. W. Taprell's chambers in Hare-court were at No. 1, three-pair, west.

old method of "pointing" and the modern more perfect and convenient instrument for the same purpose were described and illustrated practically. The lecturer also made some remarks on the æsthetic conditions of sculpture, especially in regard to the distinction between the treatment suitable to marble as compared with that suitable to bronze. The lecture, which attracted a crowded audience, was further illustrated by a number of lime-light illustrations of sculpture.

THE Curator-in-chief of the Royal Museums at Berlin, Dr. Schoene, is about to retire from office, on account of certain differences of opinion with the authorities to whom he is responsible. His resignation will be a great loss to Berlin, as his indefatigable energy and ability have done wonders for the development of the various collections of the capital. The new *Kunstgewerbe* and the Ethnological Museum Buildings have been erected during his tenure of office, but he has unfortunately not seen even the laying of the foundation stones of either of the three new buildings he intended for the so-called "Museum Island."

INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS:

METROPOLITAN MEETING.

A LARGELY-ATTENDED metropolitan meeting of this Association was held on Saturday last, principally for the purpose of making a round of visits to some public and semi-public works recently completed or now in progress.

Proceeding by train from Victoria to Streatham Hill Station, the party, numbering some fifty or sixty members, and headed by the President, Mr. J. Cartwright, Borough Surveyor and Engineer, Bury, first of all visited the new Power station of the Brixton Cable Tramways, where they were received by the Engineer, Mr. W. N. Colam, who explained the working of the system.

Leaving Streatham Hill by cable-car for Brixton, which was *en fete* on account of the opening of the new Tate Library by the Prince of Wales, the party were conveyed in breaks, *via* Acre-lane, Clapham Common, Wandsworth, and Putney Bridge, to Fulham, where, under the guidance of Mr. J. P. Norrington, the Surveyor to the Vestry of Fulham, they inspected the new river-wall in course of construction in front of the open spaces, about to be dedicated to the public, known as "Bishop's Meadow" and "West Meadow," lying between the river-bank and the moat surrounding Bishop of London's palace. In a shed on the works the visitors were entertained at luncheon, and subsequently

Mr. Norrington read a paper on the new river-wall. He said:—

"Fulham, owing to the rapid increase in its population, which was 42,895 in 1881, 91,640 in 1891, and is now estimated at 97,000, is greatly in need of open spaces, and this Vestry has just recently laid out one of 9 acres at the corner of Fulham Palace-road and Crown-road, and is now proceeding with the works you are viewing, and of which the following is a description.

This embankment is being constructed by the Vestry of the parish for the purpose of reclaiming a portion of the foreshore and forming a boundary along the River Thames, of about 12 acres or rods 35 perches of land, which it is intended to lay out as a park and recreation ground. The park will consist of the following pieces of land:—

Bishop's Meadow, area 5 acres, 0 rods, 11 perches, river frontage, 1,435 ft., abuts at the rear upon the garden and grounds of the Bishop's Palace. The freehold of this meadow was conveyed to the Fulham District Board in 1884 by the Bishop of London (Bishop Jackson) and the Ecclesiastical Commissioners, the covenants requiring that the said meadow should be properly fenced, laid out, planted; but no building should be erected thereon, and that it should be kept and maintained as an open space for the public.

The Fulham Vestry, on the dissolution of the Fulham District Board, became responsible to the Ecclesiastical Commissioners for the carrying out of the conditions embodied in the conveyance.

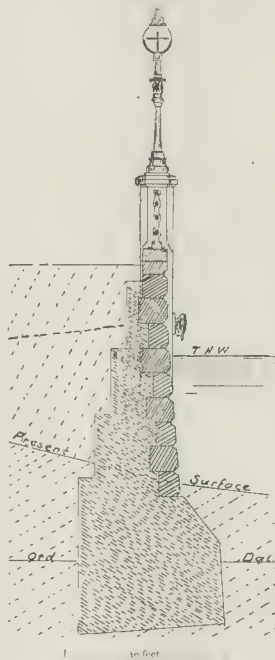
West Meadow, adjoining Bishop's Meadow, consists of 7 acres, 0 rods, 20 perches, with a

frontage to the Thames of 327 ft., forming, together with the frontage of the Bishop's Meadow, an uninterrupted promenade of 1,762 ft. facing the River Thames. This meadow has also an important frontage in the Fulham Palace-road of 240 ft., and a further frontage in Bishop's-avenue of 1,465 ft. The Ecclesiastical Commissioners have agreed to convey the freehold of this meadow either to the Fulham Vestry or the London County Council, for a nominal sum, on condition that it be kept as a public recreation ground, and for no other purpose.

This land was not properly protected from the action of the river, and there is no doubt that the frontage of the Bishop's Meadow especially has been considerably washed away. Partly, therefore, with the intention of reclaiming the area properly belonging to the piece of land, also of forming a boundary, and further of complying with the terms of the Metropolis Management Amendment Act, 1879 (Thames River Prevention of Floods), the Vestry decided on erecting the retaining wall and embankment which is now in progress.

Only one scheme has been laid before the Vestry before the present one was determined on, that proposal being a very similar embankment wall of concrete faced with brickwork. The question of cost has exerted a very strong influence over the action of the Vestry, granite, stone, brick, and concrete facings having each in turn been considered.

The present scheme consists of the erection of a concrete wall 9 ft. wide at the base, diminishing by steps to 18 in. at the coping, the foundations being on London clay at a depth varying from 4 ft. 6 in. to 7 ft. below datum. This wall is



faced from 4 ft. above datum with concrete blocks 3 ft. long by 18 in. high by 1 ft. 9 in. broad, and 1 ft. 3 in. deep in alternate courses. Two courses of face blocks have first been laid and the concrete backing filled in behind.

The embankment will have two approaches from the river, each 30 ft. wide, formed by a slope with steps at top.

The following clauses extracted from the Specification describe the principal materials and method of construction:—

Ballast.—The ballast to be used is to be Thames ballast, perfectly clean and free from loam or dirt, and the proportion of sand to stones is to be to the satisfaction of the Engineer. All stones which will not pass through a 2-in. ring to be broken up to a suitable size.

Sand.—The sand to be pit or Thames sand, sharp and free from loam or clay, and, if necessary, to be washed.

Cement.—The cement is to be the best Portland cement of a specific gravity of 3.1, weighing at least 112 lbs. to an imperial struck bushel, and to be ground so that when sifted in a silk sieve with seventy-six meshes per inch lineal, there shall not be a residue of more than 15 per cent. It will be tested by Adie's testing machine, and after seven days' immersion in water must be capable of sustaining a breaking weight of 420 lbs. per square inch of sectional breaking area. Sufficient cement for twenty-one days' use is to be stored on or near the works twenty-one days before the commencement of the work, and an equal quantity is to remain stored during the progress of the work until only sufficient work remains to be completed to use up the cement stored. The cement will in all cases be tested by the Engineer, and the average taken of at least five tests, and any cement rejected by him is to be at once removed from the work by and at the expense of the contractor, without any question being raised. All cement when brought upon the works is to be supplied in a store provided for the purpose, and not to be stored to a greater depth than 18 in.

Concrete.—All the concrete not otherwise specified is to consist of one-sixth part of cement and five-sixths parts of Thames ballast (the parts being ascertained by careful measurements of their volumes in proper measures), twice turned over and thoroughly mixed in a dry state on a timber stage not less than 10 ft. by 10 ft. for half a cubic yard of concrete; water is then to be added (through a rose if required), and the whole again twice turned over until the concrete is well saturated with water and a proper consistency is obtained. If any concrete commences to set before the workmen are ready to use it, it is to be used thereafter except as ballast. The instructions of the clerk of the works as to the quantity of water to be used are to be carefully carried out.

Clean water.—The contractor must have a supply of clean water laid on to the works from a water company, as no Thames water will be allowed to be used.

Concrete Blocks.—The concrete for the blocks used for this work, except that for the faces of them hereinafter specified, is to be composed of 1 part of Portland cement to 5 parts of Thames ballast, sifted through a sieve of 1½ in. mesh, mixed as described above. The face of the blocks, and for a depth of 6 in. from the face, is to be formed of Portland cement concrete in the proportions of 1 of cement to 3 of Thames ballast, sifted through a sieve of ½ in. mesh, mixed as above described. The blocks are to be made in moulds of the sizes shown on the drawings. They are not to be taken from the moulds until seven days after they are made, and care must be taken to preserve the arrises. Great care is to be taken that the two layers of concrete do not mix; at the same time the blocks must be so constructed that the combination of the two layers into the one block is perfect. The moulds for the entire face of the blocks and for the chamfered edges of same are of planed and well oiled American white wood, and the blocks are to be so moulded that the face will be slightly bevelled to correspond with the batter of the wall, although the bed of the blocks will be horizontal. A dovetailed shaped groove is to be formed on each side of each block, so that cement can be run in, forming a dowel. The blocks, when formed, shall not be used until 21 days after being taken from the moulds, and shall be so stacked that the air can pass freely around them.

Cement Grout.—The cement grout is to be made of one part of cement and one part of sand (the parts being ascertained by measurement of the volume in proper measures), thoroughly mixed together in a dry state on a timber stage, and made as previously described for the concrete.

Cement Mortar.—The cement mortar is to be composed of one-fourth part of cement and three-fourths parts of clean sharp sand, mixed on a timber stage as previously described for the concrete, and used while fresh.

Copings and Piers.—The stone for copings and piers is to be hard Cornish granite of the best quality, axed on face.

Timber.—All the timber used, either as part of the work or in the construction, is to be good and sound of its respective kinds. It is to be straight and well seasoned, free from sap, shakes, large or loose knots, or other defects. Any timber used for piles is to be sound Baltic fir.

Iron.—All wrought iron to be of the very best description, and capable of bearing a tensile strain of 20 tons on the square inch.

Cast Iron.—All cast iron to be of the very best description of tough grey iron, sound and free from blow-holes or other imperfections; the castings to be clean and not to have any sharp angles.

Embankment Wall.—The embankment-wall is to be constructed of the concrete as already specified; while the concrete is being placed in the cutting a machine is to be constantly kept trimming same. The concrete below the level of the facing blocks is to be placed in layers of not more than 2 ft. in thickness at a time, and a V-shaped grip 12 in. wide at top by 12 in. deep is to be left or formed in the middle, so as to form a key to the next layer. Each layer of blocks, when laid, must be as soon as possible backed up by the full thickness of the concrete wall.

ORIGINALITY AND INDIVIDUALITY
IN ART.*

ART is no ART, as the old Latin tag tells us, unless she conceal herself to some purpose; she cannot, as her semblance so often does, plume and preen her feathers for our delight; we soon weary of seeing beauty attire herself. But there is a higher perfection than successful self-effacement, and that is sublime unconsciousness of the existence of an audience. "Suppose the Venus of Medici," said Diderot, "before you, and tell me if her nudity would offend you; but put on her feet a pair of dainty embroidered shoes; fasten to her knee with a rose-coloured garter a clinging white stocking, and the whole difference between the decent and the indecent will be apparent to you at once. It is the difference between the woman whose charms one sees and the one who displays them." The highest art, to my mind, is neither that which courts display, nor that which wears a veil, but that which, like another Eve before the fall, knows no need of one, whose beauty is there without reserve, patent to all men if they have eyes to see, and so perfect in the harmony of all its parts that to know it familiarly is to light upon a fresh charm every day.

There is an old German story, of which there are many variants, of a certain charlatan who professed the highest skill in fresco painting, and his art had this peculiar feature, which, of course, enhanced its monetary value, that it was invisible except to the eye of wisdom. Commissioned by some Royal Highness to decorate the walls of a saloon, the pseudo-painter went on interminably pawing the air with his brush: of course, neither king nor courtier could see what did not exist, but they were not the less lavish with their praise, and if a suspicion ever entered the mind of any one of them, he had not the strength of mind to speak out, and run the risk of labelling himself uncultivated. The point of the fable is obvious enough, if not to our present purpose, but I think we may take the thief's qualification of his work as a scathing sarcasm on public taste, and the behaviour of the king and his court as an equally bitter commentary on the power of fashion, and the hollowness of much apparent appreciation. The highest art after all, appeals to a comparatively small circle. Its beauties are as invisible to the uneducated eye as the frescoes of Owlenglass to his patron. Its very harmoniousness and unity give it a reticence unappreciable to those whose eyes are focussed for the brilliant and the garish; but, as I have already said, it is only a matter of time. No really great work has ever lacked recognition in the end, and if a man is to reach his highest level of production, it must be by working in accordance with the promptings of his conscience, and not by grasping at the shadow of popularity.

I pass on now to those, and they are not a few, who, in an exaggerated reliance on their own fertility of invention, are not content with simply being unlike other people, but spend their lives in the effort to be unlike themselves, who discard what circumstances suggest, or even what convenience dictates, merely because the solution bears a near resemblance to one already arrived at, of whose style you can predicate nothing with certainty, so successfully do they mask their predilections, so sedulously so they cultivate variety. Such instability, combined as it frequently is with great talent, seems to me perfectly inexcusable, not less so than a corresponding degree of moral irresponsibility would be. Just as you can assert with confidence the action of a friend, whose character is known to you, under given circumstances, so you ought to be able to recognise the artistic touch, the individual impress, of one with whose work you are familiar.

Cornelius O'Dowd said years ago that no man of really commanding intellect or strong character was ever to be looked for among those adepts at foreign languages who make them their own in so real a sense that their ideas, their way of looking at things, become those of the people whose language they are speaking, for that is what intimate converse with a language means; such a power of adaptability shows consummate cleverness, but is something quite different from genius, both intellectually and morally. "Capacity rather relates to the quantity of knowledge; genius to its quality. Capacity is power over given ideas or combinations of ideas; genius is the power over those which are not given,"† and as with language, the power of absorbing various different styles, of straying without predilection over the

whole field of design, and grasping all the little distinctive tricks and turns, which answer to the idioms of a language, is not a thing to aspire to, nor is it the mark of greatness in its possessor. Genius cannot be commanded, of course: in its intellectual aspect it offers a bare precipice of rock, the top of which no one can reach except on the wings of a divine imagination, but in so far as it is a moral quality we may and ought at least to gain its outworks.

If a man has any moral backbone, what he is once, he is always: this is not the negation of freewill, since you cannot predicate either freewill or necessity of a non-moral, irresponsible being, nor is the recognition of a man's hall-mark on his work any sign of limitation in his powers: rather it denotes that he has a definite character and settled convictions—in other words, a style of his own: failing this impress his work may be original in a certain sense, but to the higher quality of individuality it can have no possible claim.

It is said that a judge must be told twice what you want him to understand, a special jury three times, a common jury six times, and I think, generally speaking, our attention bears directing with some persistency to what is good and worthy of being remembered, to some form in which its creator finds his most complete expression. It is satisfying to see the growth of the idea in the designer's brain, the process of evolution: this is how Nature works, step by step, rung by rung up the ladder of perfection, and Art in its natural state—as it grows, not as it is manufactured—is in strict analogy with Nature's processes. The history of our own Art can be read in wood and stone, the embellishment of the traditional, the birth of a new inspiration from the ashes of an old one. But turn for a minute to contemporary work, to one of the most interesting and distinctive careers of our day, that of the late Mr. H. H. Richardson, of Boston. There was a man who once satisfied that he had struck a happy vein, a fitting medium for self-realisation—and he was, like all artistic natures, sensitive and hard to satisfy—was not afraid of working out, of filling afresh to-day from yesterday's well of inspiration, of playing new variations on an air which was already in the hands of the public, and yet I think I shall be only expressing the general opinion when I say that it would be difficult to find anything more instructive for the tyro in design, or much more delightful for anyone, than the series of libraries and railway stations, so obviously fathered by one man and yet so distinct from one another, for which he was responsible. Mere originality, as such, is simply swallowed up in the strong individuality of a man who, like a true artist, spent himself in the pursuit of perfection.

Production is always a pleasure, but the more complete the self-expression the higher and purer it is, though some never allow themselves the opportunity of making the discovery. Such a mode of work as Richardson's, turning neither to right or left, but advancing steadily along the road which his taste marked out for him, is not only the most moral in itself, but it is that which promotes most highly the welfare of art at large.

If a man arranges his wares like a tradesman to suit the taste of the moment, or if he is perversely determined to fly in the face of his own special talent, if he is for ever turning down byways in the mere restless craving for variety, or the desire to impress his public with a versatility which they do not suspect, he will be selfishly sacrificing his art to himself, and will have no one but himself to blame if his vogue quickly passes. To do a popular piece of work rather than a good one is to offer up the future on the altar of the present, to eat up your capital instead of living on the interest. You will make a greater show at the moment, but you will not cut up so well in the event.

The game of Art is like the game of cricket: the cricketer may keep his own average or his analysis in his mind's eye, of course, but, primarily, he has to play for his side, and may be called upon to make a sacrifice. Unselfishness in both cases is little less to be cultivated than actual skill, and the true artist will be ready to sink himself in the spirit which is the mark of true sportsmanship.

If, then, I am not disposed to deduct one jot from my esteem of a man who turns again with fresh zest to his own imaginings, I am no more inclined to quarrel with those in whom lies the power—the sign and seal this of greatness—to make everything their own on which their hand falls. I say boldly that the great artist cannot plagiarize from his insignificant brother, however

* A paper by Mr. Arthur Edmund Street, F.R.I.B.A., read before the Architectural Association on Friday, Feb. 24. (Concluded from p. 177.)
† Hazlitt.

Face Blocks.—The face blocks to be laid as shown on drawing; every alternate course of blocks to be bonded back 1 ft. 9 in. into the wall.

Laying Blocks.—The blocks to be laid and bedded in cement mortar with a joint not more than 1 in. thickness and pointed in neat cement.

Grouting of Joints.—Each vertical joint to be grouted with liquid grout, and the dovetail-shaped spaces to be filled in solid with cement grout.

Wing Walls of Steps.—The blocks for the wing walls of steps to be formed in purposely made moulds to radius of curve.

Protection of Concrete.—Before the rise of each tide over the work, and whenever the work is left, the concrete will have to be protected by covering it with tarpaulins, and before putting on the next layer of concrete the concrete is to be well scraped and thoroughly cleaned to the satisfaction of the Engineer; special attention will be required to this point.

Coping Stones.—The coping stones to be as per detailed drawing, not less than 6 ft. in length, and to break joint in every case in a satisfactory manner with the upper course of the blocks of wall. Each stone to be doweled together and to be set and joined in cement mortar.

Weep-Holes.—Provide and build in through river wall, where required, weep-holes of 4-in. stone-ware, socket-jointed pipes built and bedded in concrete.

Tide Valves.—Provide and fix at the outer end of each of the above-mentioned pipes a 4-in. galvanised iron tide valve. The iron flap and face to have turned and watertight faces. These tide valves are to be sunk in the face of the concrete blocks so as to protect them.

Drain Back of Wall.—Provide and lay at the back of wall along the entire length 4 in. socket-jointed drain pipes laid with dry joints and leading to weep holes already provided.

Mooring Rings.—Provide and fix at each pier an ornamental circular cast iron plate with mooring ring attached, as per sketch; also provide and fix in front wall, where shown on drawings, bolts and eyes for mooring chain. Each mooring ring to have an 1½ in. rod 1½ ft. long taken to rest of wall, with hook and eye and plate to be embedded in concrete.

Life chain.—Provide along the whole length of front wall a galvanised iron life chain made of ½-in. iron, passed through mooring rings in front of piers and fixed with shut links to each of the eyes in the front wall provided for same.

Fence.—Provide and fix along the whole length of front embankment wall, a fence consisting of cast iron uprights about 7 ft. 6 in. apart, as per detail drawing, with four longitudinal bars of wrought iron tubing 2 in. diameter. Every joint shall be made in the column of the upright, and where they abut against piers they are to be let in and leaded.

Standards.—The cast iron uprights or standards shall have a flange at the bottom with four holes to receive ½-in. Lewis bolts and bolt same to coping.

The batter of the face of the wall is 1 in 12, except the 3 top courses, which are laid upright to receive fence coping.

In excavating, the top layer was found to be Thames mud full of small shells to above 3 ft. above datum; the next layer consisted of about 18 in. of a hard blue clayey substance; beneath that was a layer of from 4 ft. to 7 ft. of Thames ballast, and beneath that the blue clay on which the foundation rests.

It was found that the faces of the blocks when first made were full of small holes, owing to the air imprisoned in the process of filling the moulds, and they have all been rubbed with fine grit stone and trowelled over with a little fine sifted neat cement. Only sufficient cement has been used so as to fill up the holes, and no additional face has been put on the blocks.

Great care has been taken to have very good cement. Over 200 tests have been made during the progress of the work, and the results given are from an average of six tests of briquettes immersed seven days in water. The results vary from 140 lbs. to 650 lbs., and the average tests throughout the work equal 559 lbs. per square inch of sectional breaking area. These tests have all been made by forcing the cement into the moulds in as dry a condition as possible.

The amount of the contract is 12,800£, and the work is being carried out by Mr. Joseph Mears, of Crabtree Wharf, Fulham, in a very satisfactory way. Mr. J. A. Webb has acted as the clerk of works throughout.

Mr. Norington subsequently read an interesting paper on "The Use of the Western Australian Woods, Karri and Jarrah, for Wood Paving," and a shorter paper on the new stables for the Fulham Vestry in Munster-road, which were subsequently visited. Discussion followed on the reading of the papers.

The members afterwards drove to St. Pancras, where, under the guidance of Professor Robinson, the engineer, they inspected the electric lighting station belonging to the Vestry of that parish. We are compelled, for want of space, to postpone further notes of the day's proceedings.

largely he may draw on him for material. The medium of expression is a matter of comparatively small importance, but it is quite as possible to be original in the treatment of an old theme as in striking out a new one. D'Ariagnan existed in real life before Dumas made a demi-rod of him; Handel laid violent hands on a thirteenth century French air, and transformed it into the "Harmonious Blacksmith." Yet who would be so absurd as to give two thoughts to its origin? There may be some who in the spirit of Carlyle's Dryasdust follow up the mighty river of Shakespeare's creations to a fountain head in Plutarch, or tax Burns with having founded his "Cotter's Saturday Night" on Ferguson, or his Epistles on Ramsay, but to what purpose are such criticisms unless it is to show to what pettinesses the critic's craft at times obliges him to descend? So far as regards the subject of their animadversions they may be summarily put aside. To put the warm breath of life into Pygmalion's cold marble, that is what genius does to the subject matter which it usurps. How little the strong man feels the indignity of borrowing may be instanced by Richardson's proceedings in the case of his design for Trinity Church, Boston. Mrs. van Rensselaer in her interesting account of him tells us how he cast about for some time in vain, for a motif for the central tower of the church, till he happened to come across a photograph of the lantern of the old cathedral of Salamanca. He saw his opportunity at once, and, bold as he was in presuming to treat so fine a conception as his raw material, he justified his action by the result. His own impress is nowhere more perceptible than it is in that tower, and yet it is still Salamanca, just as Salamanca is at once itself and Vendôme.

The author of the Bible in Spain has given us in his delightful book, "Lavengro," a view of the other side of the question, in his representation of the author whose mania for what he understands as originality leads him to distrust the very breezes for fear they should whisper something which the inspiration has already suggested, and so make it valueless. He cribs, cabins, and confines himself in the attempt to say nothing which has ever been hinted at before. His imagination chafes at the bit, but he curbs it in remorselessly, and if he did not succeed in turning a mettled courser into a common hack, it was because the scales fell from his eyes before it was too late. This is the reductio ad absurdum of the foolish purism which has its foundation in selfishness, and is as little to be admired as are the arts of the plagiarist.

But the master mind will turn men to its own purpose as readily as their ideas. It has been said, I believe, that if Bach had devoted every minute of his time to composition, he could hardly have produced the volume of work, which not only is his in name, but is indisputably so in character. Everyone knows, again, though no one can quite understand the manner of it, that the elder Dumas was the presiding genius, in every sense of the word, of a colossal literary manufactory, the Vulcan in an intellectual smithy, from which a stupendous amount of work, good, bad, and indifferent, was turned out, in which much was very good, little was wholly bad, and all was individual. He had his detractors of course, gentlemen whose superior sharpness enabled them to credit the various ghosts with most of the merit of the work, but such a contention was absurd on the face of it: the books which I hope many of us have found time to read are the work of one man, whoever he was, and the mediocrity of even the best of his workmen,—such as M. Maquet,—when left to their own devices shows that that man was Dumas. It is an old, old story, a serial that will run till the crack of Doom. Perugino's saintly Madonnas and adoring attendants, in which the personal equation seems to go for so much, were turned out by the gross, as Professor Symonds has told us. But, to revert once again to Richardson, whose manner of work is, after all, more immediately interesting to us, nothing could illustrate more completely what I have said than his practice. This is not the occasion to discuss whether his attitude towards those he employed was generally better for their artistic training than the more usual one or not, but so suggestive was he, so subtly did he work on his assistants by hint and criticism, rather than by direct illustration of his meaning or his wishes, that they appear themselves hardly to be able to tell us how they were made to carry out his ideas; yet he was in his way as individual as Dumas, and his death has displayed little less cruelly than that of the great novelist, how paramount that influence was which was kept so consistently in the background, how

veritably the divine spark which illumined his work was in him and in no one else.

I suppose I need not trouble myself to sound a note of warning. It is obvious enough that so masterful an appropriation of other people's goods is not for all; indeed it is for very few. Most of us are fitted by nature to play the part of the tool in the master-hand rather than that of the master-hand itself, and if we meddle with other men's work in the ambition of absorbing it and making it our own, we shall probably find that it is too strong for us, and that, instead of the dog wagging the tail, the tail is wagging the dog. To foster copyism for a moment is fatal, for, if we do so, we may find that, like another Frankenstein, we have reared a monster too strong to subdue.

I conclude by addressing a few words to the younger among my audience. You will have gathered, and, indeed, it hardly needs the telling, that originality in the highest sense of the word, or individuality—for the two are practically synonymous—is not a thing which can be commanded. But the humblest of us have something to express, which may be of interest without shaking the foundations of the world, and if we have not the power or the will to approach our work freshly, to rely frankly on our own inspiration, or the results of our own thought, then architecture was not meant for us, nor we for architecture. Mere bookwork, mere accurate reproduction and formal arrangement of traditional forms is hardly worthy of the name of architecture: it is a mechanical process, devoid of all vitality, and can give no real pleasure to the producer any more than to the consumer. But, taking it for granted that your natural endowments are not so limited as this, I ask you to try to approach your problem as if it had never been solved before. Do not think of precedent for the moment, either to adhere to it slavishly which is folly, or to outrage it which is insanity, but consider the special circumstances in which you are placed, without reflecting that they are usual enough, the requirements which you are bound to fulfil, and the effects you are going to produce, in pure unshackled self-reliance. Your training will stop you short of, the commission of an absurdity, your intelligence will tell you when the general consensus of opinion has laid down certain laws either for the provision of comfort, or for the satisfaction of taste, which are, so to speak, immutable and must be abided by, but it will tell you, in the same breath, that tradition is not everything; that the brain of humanity is busy devising fresh tools for your hand every day; that there is such a thing as running in a groove from a simple unquestioning acceptance of things as they are, when the circumstances which dictated the particular course may have long changed. It reminds me of the story of the sentry whose charge was a grass plot in the neighbourhood of the Winter Palace at St. Petersburg. One day the Emperor, who had seen a sentry on duty there a thousand times without giving it a second thought, happened to ask what particular duty the man was fulfilling, or why he was there. No one knew, till the oldest inhabitant, or even perhaps some musty record, revealed the fact that a reign or two previous a soldier had been placed there one day to prevent a crocus from being picked. We must assume that the crocus had died in the interval, but still officialism clung heroically to tradition, and that is exactly what the less imaginative minds among us are in danger of doing. Think everything out and accept nothing without question. Originality, believe me, is not necessarily spontaneous in character; it lies just as much in thinking out as in rapid conception, in labour as in impulse, and it must belong to the essential form of your work, be really part and parcel of it, not be thrown over it at the last moment like drapery over a lay figure.

If the question is put why have you done so and so, a sound reason should always be forthcoming. This is a somewhat severe test, but a genuine one, and is more likely to be passed successfully if your originality starts with the first thought you give your subject, coexists with its first formulation, and consists not so much in the treatment of a feature as in its presence. I say, think everything out for yourselves. To ignore tradition is like sitting down to write on a well-known subject without having made yourself master of the literature which bears on it, but if our education to-day bears fruit, the young designer will carry much of the lore of his subject in his brain in a more portable and infinitely more useful form than that of books, because it has passed out of the sphere of the mechanical into that of the instinctive. Perhaps I may illustrate the value of

looking at things with a fresh eye by a short quotation from some remarks made by Mr. W. B. Richmond before the Art-worker's guild a year or two ago.

"Why do you architects," he said, "in all, or most, instances make the windows of every sitting-room in a London street to come down to the ground, or nearly so? I have often looked up at that dark strip of wall above the three windows of a London drawing-room, and on the wall between the windows, where, usually, a looking-glass is placed because nothing else would be visible; and I have wondered why someone does not make one long window the whole width of the room, right up to the cornice, and about 5 ft. from the ground divided by three brick piers, on which might be placed, on the inside, beaten metal-work after the design of a pilaster: the same treatment might be adopted for a dining-room, and would be especially valuable in a library,"—and so forth.

I suppose Mr. Richmond hardly intends to make architects responsible for the ordinary London house, and I do not mention the particular suggestion as being quite novel; but it serves to indicate the frame of mind in which the most time-honoured situation, treated a thousand times in the same way, should still be approached on the thousand and first occasion.

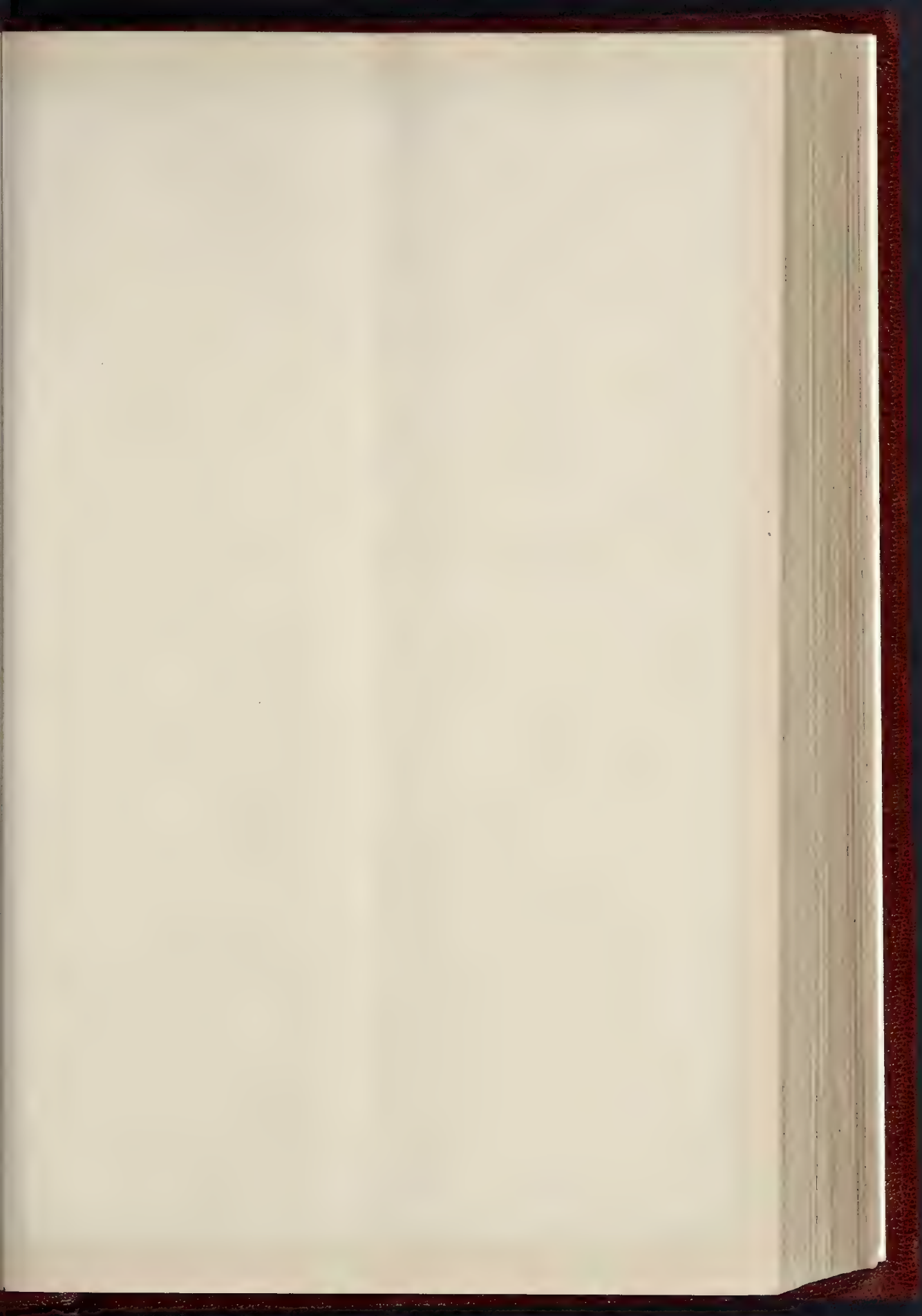
The late Master of Trinity College, Cambridge, once said, in his quietly sarcastic way, "We are all liable to be mistaken at times, even the youngest of us." To be cocksure is, indeed, the happy privilege of youth, as are enthusiasm and many other pleasant qualities in which chill old age would be only too glad to participate, but I ask you to remember that even amongst the most highly-gifted, or perhaps I should say, especially among the highly gifted, during the period in which the artistic character is being formed, self-reliance should be tempered with self-restraint; eccentricities may be perpetrated under a sudden impulse which please their author at the time because they express his mood, but when one is older and wiser, or at least more circumspect, it is pleasanter not to have the indiscretions of an ill-disciplined youth standing there in all the durability of brick and stone to point an unflattering finger of derision at one.

In the discussion which followed,

The Chairman (Mr. H. O. Cresswell, President), said he was sure they were all highly indebted to Mr. Street for his excellent paper, which followed very admirably the paper which they had at their previous meeting by Mr. Tait. He thought that the Association was to be congratulated on having obtained two such papers in succession.

Mr. Walter Millard said he had much pleasure in proposing a very hearty vote of thanks to Mr. Street for his able paper, which, although full of suggestiveness, was somewhat difficult to discuss. He took it that one object of Mr. Street's in reading the paper was to impress upon them that the man who knew most could best afford to try to be original, and was the most likely to be so; and therefore that students should prime themselves first by study, and acquire knowledge before they troubled themselves about being original, or anything else. With regard to Richardson, of whom mention had been made in the paper, he (the speaker) remembered hearing Mr. Hunt (on whom it was proposed to confer the Institute Gold Medal this year) say of Richardson that original as his work was, and great as was the influence which he exercised, we ought not to forget that he based it all on the sound training which he went through in the schools at Paris, and that but for that training he could not have done what he did. To merely try and follow Richardson's example without such a training, without laying such a foundation, would lead to nothing but folly. He therefore thought the lesson of Mr. Street's paper might be summed up to students somewhat in these words: "Garner up knowledge, nurse your enthusiasm, and then you may give reins to your imagination."

Mr. Sydney Vacher said he should be glad to second the vote of thanks to Mr. Street. He could not forget, when he heard Mr. Street so justly laud the originality of the masterly work of the late Mr. Richardson, that we in England had fresh in our memories the loss of an equally great and even more original genius, viz., George Edmund Street, R.A., to whom all students specially owed so much. He was delighted to hear Mr. Street say that the student of architecture, or of any art, should have his own ideal, and should not work down to the level of the public opinion of his day. If any artist, it seemed to him, was to do good work, he





Medal of Merit, Soane Medalion Competition R I B A 1893



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By MR JAMES S STEWART

must aim at doing better work to-day than he did yesterday, and better work in the future than he did to-day. He had been delighted with the way in which Mr. Street put things; many things that he (the speaker) had often thought about came before him in a new light, especially that of working for one's ideal. He would say to the young architect, "Please yourself in regard to your design. Beware of deliberately copying other men's work, or the work of the old men. Look on your work as a whole. Try to make your work give the pleasure to your eye that you derive from the contemplation of the old work." It seemed to him that the only way in which they could do that was when they saw a beautiful piece of good old work, or of good modern work, to study and analyse it and see what there was in it which gave them the pleasure they derived from its contemplation.

Mr. Leonard Stokes, in supporting the motion, said there were only two points, out of the many with which Mr. Street had dealt, to which he wished to refer. Firstly, the striving after originality for the sake of originality, which Mr. Street rightly condemned; and, secondly, archaeology as compared with what might be called the living art of architecture. He thought that nothing could be more pernicious to a young man than striving to do something original, simply and solely for the sake of having it original; for it was nearly always sure to be bad. That was a point which he thought might be emphasised with advantage, because inattention to it was very often visible in the work of young men, who either made painful efforts to be original, or went to the other extreme and mistook archaeology for architecture. He would not say that a good deal of archaeology was not architecture, but it was the architecture of the past; and to allow archaeology to take the place of architecture in the present day was more or less absurd. Anybody—any mason, for the sake of argument—could reproduce a part or the whole of a parish church, but he would not be an architect. Even if the man who did that sort of thing called himself an architect he would not be an architect, but only a copyist, like the mason. He was not desirous of deprecating the study of what had been done in the past; far from it, for he thought that the architect who studied in that way, and found out that old buildings took their particular forms in order to meet certain requirements, would be less likely to slavishly reproduce those buildings in the present day when other requirements had to be served. The problems of the present day were eminently practical. The most common requirement put before the architect was the provision of a given amount of accommodation for a given sum of money, and the architect who wanted to do that would not do it by copying an old parish church, for example; but if he would face the new conditions, and produce a building which provided a large amount of accommodation, at a reasonable rate, he would have produced a work of art, however plain and poverty-stricken it might be thought to be by the British public. The British public might exclaim: "What an ugly building! It has no ornament." Being quite ignorant of the fact that if an architect solved the problem put before him, and erected a building of good proportions, without ornament, it might be, and probably would be, a thing of beauty. He had very great pleasure in expressing his thanks to Mr. Street for the excellent paper which he had given them.

Mr. E. W. Mountford, in supporting the motion, said, with regard to the question of individuality, he was thinking, while Mr. Street was reading his paper, of a gentleman who was generally acknowledged to be a leading man in the art of architecture. He supposed that gentleman had erected buildings in almost every modern style, and yet each one of those buildings was marked by an individuality of its own which it was impossible to mistake. He did not say that it was possible for every man to do that, but the gentleman to whom he referred had set his own particular mark on the various styles in which he had worked. Probably it might have been better for most members of the architectural art or profession if he had confined himself more to one style, because many other men had tried to imitate his mastery of the various kinds of architecture that he had worked in, and they had merely copied the outside, without getting any of the individuality which marked his buildings.

Mr. Edmund Woodthorpe, in supporting the vote of thanks to Mr. Street, said he was afraid he must confess that he hardly believed in individuality at all in art. It was true that there were men, who could perhaps be counted on the fingers of one's hands, of whose buildings we

could really say when we saw them: This is by So-and-so, and that is by So-and-so. He had always considered the greatest English architect was Sir Christopher Wren, but it had always seemed to him (the speaker) that every bit of detail which was seen in Wren's work existed almost the same before his time. The originality of Wren's works was shown in their composition, and not in their detail. He did not think that any building that he had ever seen equalled St. Paul's as a composition. He thought it was possible that much better effects would be obtained if the architects of to-day were simply to keep to one style alone; but did the architect of the present day ever get a chance of keeping to one style? Did anyone of them know as young men what their first chance might be? It might be to erect a hospital, a school, or a prison, and it was obviously their duty to make the building suitable to the object for which it was erected. Now some styles were not adapted to every class of building. He should very much like to witness that unselfish spirit amongst architects which Mr. Street spoke of, but he had never known any great architect who ever absolutely refused to execute a large work because he thought he was not capable of it, or because it was not in the style in which he usually worked.

Mr. Francis Hooper having said a few words in support of the motion,

The President, in putting the motion, said that Mr. Street, in his very useful paper had pointed out that there were a Scylla and a Charybdis in architecture as in other walks of life. Architects had to avoid, on the one hand, straining after originality, and on the other hand, they had to avoid plagiarism, or what Mr. Stokes called archaeology pure and simple. Unnecessary straining after originality was a thing of which we had seen a great deal lately, and he thought the results of it very often spoke for themselves. Mr. Street spoke in his paper of "individuality," which in his (the President's) opinion, was a better word than "originality," and he had shown that individuality did not at all imply that a man might not draw his inspiration from work that had gone before. He thought the example of Richardson was a case in point. The late Mr. Street also, in the new Law Courts and other buildings, had shown that while he worked in a particular style he was able to impress his own strong individuality upon it.

The vote of thanks having been heartily agreed to, Mr. Street briefly replied, and the meeting terminated.

COMPETITIONS.

PARISH CHURCH, NAIRN.—A meeting of the congregation of the Parish Church, Nairn, was held on Monday last, when a report was submitted by the Building Committee stating that eleven sets of plans had been submitted to the competition for the new parish church, and that they unanimously recommended that the plan under the motto "Fido" should be adopted. This was agreed to unanimously, and it was then found that the successful design was by Mr. John Starforth, architect, Edinburgh. The design shows a church in Early Gothic style, with square tower at entrance, and provides accommodation for 1,200 worshippers. The estimated cost is 6,000*l*.

MODEL LODGING HOUSES, NEWCASTLE.—Mr. Charles Barry, the assessor in the competition for model lodging houses in Newcastle, has just given his award. In the competition for the Model Lodging House for Men he has placed first the plans sent in by Messrs. Marshall & Dick, of Newcastle; while for the Model Lodging House for Women, the plans sent in by Mr. Gibson Kyle, also of Newcastle, were selected. A third portion of the City Council's new departure consists in the erection of single-room tenements, and for the building required the assessor has in this case also selected Mr. Gibson Kyle's designs.

ALTAR CROSS, ST. JOHN'S COLLEGE, CAMBRIDGE.—A large altar cross in wrought silver has been presented to St. John's College, Cambridge, designed by Mr. Temple Moore, and executed by Messrs. Carrington & Co., of London. The cross is in fourteenth century Gothic style, the shaft and arms embossed with diaper, with the emblems of the four Evangelists in relief on circular medallions at the ends of the arms. The design would have been better if some of the detail in the shape of projecting points arranged in star-like fashion around the bosses had been omitted and the outline kept quieter and simpler; the rest of the work is good.

ARCHITECTURAL SOCIETIES.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—On Monday evening last a large number of the members of the Leeds and Yorkshire Architectural Society attended at the Law Institute, Albion-place, to inspect the students' drawings which recently carried off the prizes given by the Royal Institute of British Architects, London.

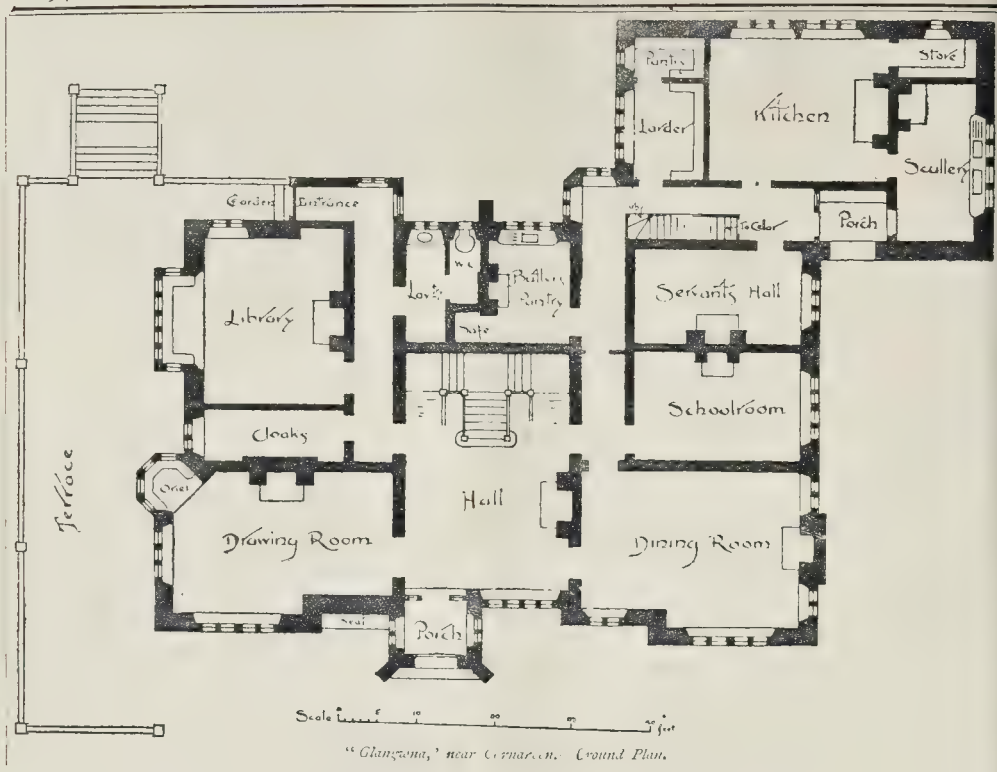
GLASGOW ARCHITECTURAL ASSOCIATION.—The annual supper of this Association was held in the Grand Hotel on the 28th ult., Mr. T. L. Watson, F.R.I.B.A., presiding. In the earlier part of the evening the drawings and sketches submitted for the Association prizes were exhibited, and the result was announced later on by the chairman; the first prize of five guineas being awarded to Mr. John Stewart, and the second prize of three guineas to Mr. John G. Gillespie. The usual toasts were proposed and responded to.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—On Wednesday, March 1, Mr. Allan Wyon, F.S.A., in the chair, it was announced that the annual congress, to be held this year at Winchester, would commence on July 31. Mr. Thos. Blashill exhibited a large square of sandstone, cut from an Egyptian column inscribed with hieroglyphics, which has been found in a back garden of a house, in Trafalgar-square, Brompton. He exhibited also a lady's shoe, *temp.* Queen Anne, with the toe filled solidly with cotton wool. It has been found during the recent repairs of Lauderdale House, Highgate. Mr. Earle Way described many curious pieces of pottery from Pompeii, and Mr. Langdon made an interesting communication with respect to further works of research at the Pile Village recently found near Glastonbury. Several examples of the burnt clay which formed the floorings, and of black pottery, were exhibited. Mr. Cecil Davis described a collection of trade labels of the seventeenth century by the Flemish engraver De Bry, collected by the late Sir C. Price. Dr. Fairbank exhibited a rubbing of the fine brass of Lord Thos. Camoys and his wife, ob. 1419, preserved in Trotton Church, Sussex. Admiral Tremlett sent for exhibition a series of drawings made by him, of prehistoric stone carvings in Brittany. The first paper was by the Rev. J. Cave-Browne, on Leeds Priory, Kent. After having referred to its foundation in 1119, he traced the history and rendered a list of the priors from ancient documents. The remains are very scanty, but there is reason for belief that a great number of architectural features are still extant beneath the present ground level. The second paper was on "Pemberton's Parlour," by Mr. T. Cann Hughes. This fabric was one of the towers of the walls of Chester, mainly rebuilt in the beginning of the eighteenth century, and which recently fell, leaving only a portion of its front standing. A letter was read from the Mayor of Chester, reporting the intention of the Corporation to preserve the whole of the standing portions of the tower, and to rebuild the remainder exactly as before.

DISPOSAL OF TOWN REFUSE, EDINBURGH.—A sub-committee of the Convention of Royal and Parliamentary Burghs charged with the consideration of the question of the disposal of town refuse have issued a report on the subject. The report says that the Corporation of Edinburgh had exhausted all reasonable modes of inquiry as to the disposal of city refuse, and the committee entirely concurred in the result arrived at in the report of the committee of the Corporation that the best possible means of dealing with such refuse was by means of destructors. In communities of 150,000 inhabitants under the old system an expense of 16,000*l*. per annum was incurred in the disposal of its refuse. A complete destructor could accomplish this at a cost of 5,000*l*. Smaller burghs could equally well dispose of the refuse by this means at a proportionate cost. After careful consideration and investigation of the various systems, the Town Council of the city of Edinburgh had adopted that of Messrs. Manlove, Alliott & Co. (Limited), of Nottingham, and instructed them to erect a ten-cell destructor, fume cremator, boilers, engines, &c.

THE ENGLISH IRON TRADE.—Quietness still reigns in the English iron market. Few alterations in prices are noted, but Cleveland and Scotch pig are somewhat lower on the week. Finished iron is dull, and there is not so much doing in tin-plates. The steel trade generally is depressed. Shipbuilders and engineers report no improvement. The coal trade is dull.—*Iron.*



Illustrations.

CHURCH OF ST. PETER, ABBEYDALE, SHEFFIELD.

THIS church is designed to accommodate 750 persons, at a cost of 6,000*l.*, without the tower and spire, and will occupy a striking position on the south-west side of the city.

The ground falls rapidly from west to east, and advantage has been taken of this feature to provide a large parish-room, in addition to the ministers, and choir vestries under the east end.

The church consists on the ground-floor of a nave 91 ft. long and 26 ft. wide, north and south aisles, with outer and inner porches at west end of each aisle, the baptistery being in a projecting bay between them, chancel 40 ft. long, with morning chapel 25 ft. by 15 ft. on the north, and organ chamber of similar dimensions on the south side.

The height from floor to ridge will be 55 ft., and the whole of the roofs will have an inner curved ceiling of pitch pine, that to chancel being groined.

The floors under the seats are to be boarded, and the passages are to be of cement concrete very finely surfaced.

Local stone will be used for walling and dressings, Monks Park Bath stone for nave, arcade, and chancel arches, and green Westmoreland slates as roof covering.

The foundation-stone will be placed at the east end, on a date to suit the convenience of the Princess Mary of Teck, who has promised to perform the ceremony of laying the stone.

Building operations are about to be proceeded with under the superintendence of Mr. Joseph Norton, architect, Sheffield, his plans having been selected in open competition, Mr. Ewan Christian being the assessor.

The perspective from which our illustration is taken has been drawn since the competition was decided.

"GLANGWNA," NEAR CARNARVON.

This residence is being built on the well-wooded estate of Mr. J. E. Greaves, Lord-

Lieutenant of Carnarvonshire, about two miles from Carnarvon on the Beddgelert road.

It will supersede an uninteresting cemented house, which will be pulled down when the new building is completed. The site being an elevated, one, there will be a fine view of the surrounding country from the terrace, which faces the little river Sciout, running in the valley below.

Anglesey limestone is being used for the walling, and the dressed work is from the Graig Quarry, near Denbigh. The timber framing is of well seasoned Baltic oak, supplied by Messrs. Tealby & Co., of Hill, and the roof will be covered with small slates.

The interior will be chiefly fitted up in oak, the principal feature being an open timbered roof with lantern light over the hall.

All is being carried out by the estate workmen, from the designs and under the superintendence of Messrs. Douglas & Fordham, architects, Chester.

DESIGN FOR A RAILWAY TERMINUS.

This design, by Mr. James S. Stewart, was submitted in competition for the Soane Medallion, for which it was placed second, receiving a Medal of Merit and ten guineas.

The design is simple and centralised in plan, though we think the general waiting-room should have more direct communication with the train platform. The front has the merit of simplicity and dignity of effect, and of looking like a railway terminus; it could not well be taken for anything else—which cannot be said of all railway station fronts.

SOCIETY OF ENGINEERS:

THE LEICESTER MAIN DRAINAGE WORKS.

At a meeting of the Society of Engineers, held at the Town Hall, Westminster, on Monday evening last, Mr. William Andrew McIntosh Valon, I.P., President, in the chair, a paper on "The Leicester Main Drainage, &c., and the Construction and Testing of the Sewage Pumping Engines and Boilers," was read by Mr. E. G. Mawbey, Borough Engineer.

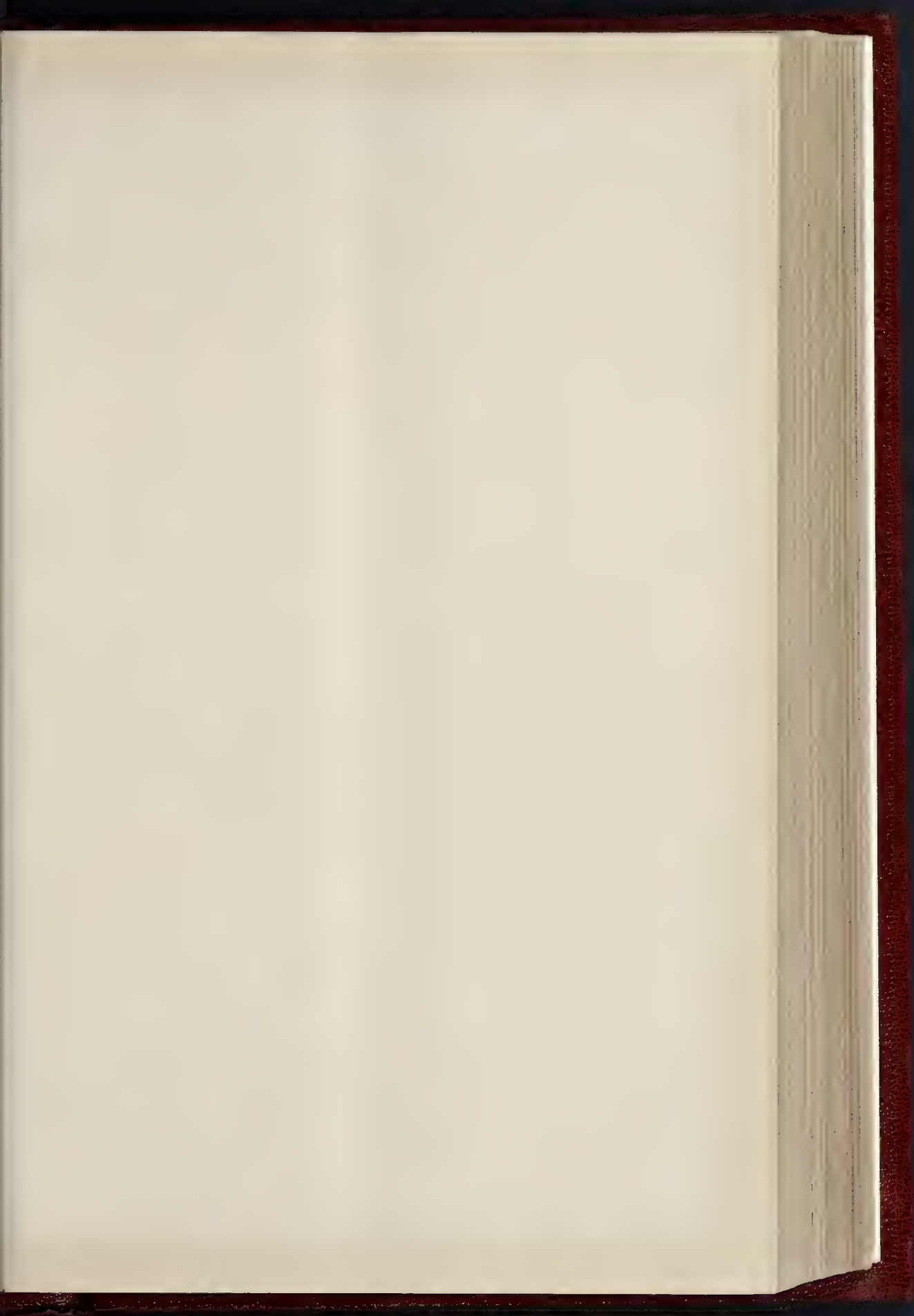
The author having referred to the great pros-

perity which Leicester had enjoyed for many years past, and the rapid increase of the population, said that in the year 1891 an Act of Parliament was obtained for the extension of the borough boundaries, for which scheme he was the Engineer. The population was now 180,000; and the area 8,534½ acres; the rateable value being about 650,000*l.* Both the Gas and Water undertakings belong to the Corporation, and Mr. Alfred Colson, M.Inst.C.E., is Engineer and Manager of the Gas Department; and Mr. Frederick Griffith, M.Inst.C.E., Engineer and Manager of the Water Department.

The Corporation has recently finished floods prevention works which have cost 352,000*l.* The drainage area (above Leicester) of the river which had been improved is 147 square miles. The new flood channel will carry off 400,000 cubic ft. of water per minute; or 1½ in. of rainfall in 24 hours. The length of the principal weir constructed was 500 ft. These works were for the most part designed and carried out by the late Mr. Joseph Gordon, M.Inst.C.E., and Mr. F. Griffith, M.Inst.C.E., but were completed, and the new West Bridge designed, by the author.

The flooding of the town, which in times past had been disastrous, was now entirely prevented within the boundaries of the old borough. The author stated that storm outfall works designed by himself were now being carried out, and that the contracts let amount to 71,447*l.* The main culvert is 8 ft. in diameter, and about 3½ miles long, and would carry off about 70,000,000 gallons of water in 24 hours from the built-upon area of the extended borough.

About ten miles of new main intercepting brick sewers and storm outlets were being constructed in the borough; these were designed by the late Mr. Gordon, and would, when completed, have cost about 105,000*l.* The size of the two main trunk sewers are 7 ft. 3 in. by 6 ft. 3 in., and 5 ft. 3 in. by 3 ft. 6 in. respectively. Nearly one-third of these works were executed under Mr. Gordon's personal direction, and the carrying out of the remainder, together with the preparation of the working drawings for rather more than half of these works, have devolved upon the author as the chief Engineer. A further loan of 13,400*l.* has recently been sanctioned for additional sewerage works in the added areas according to the plans

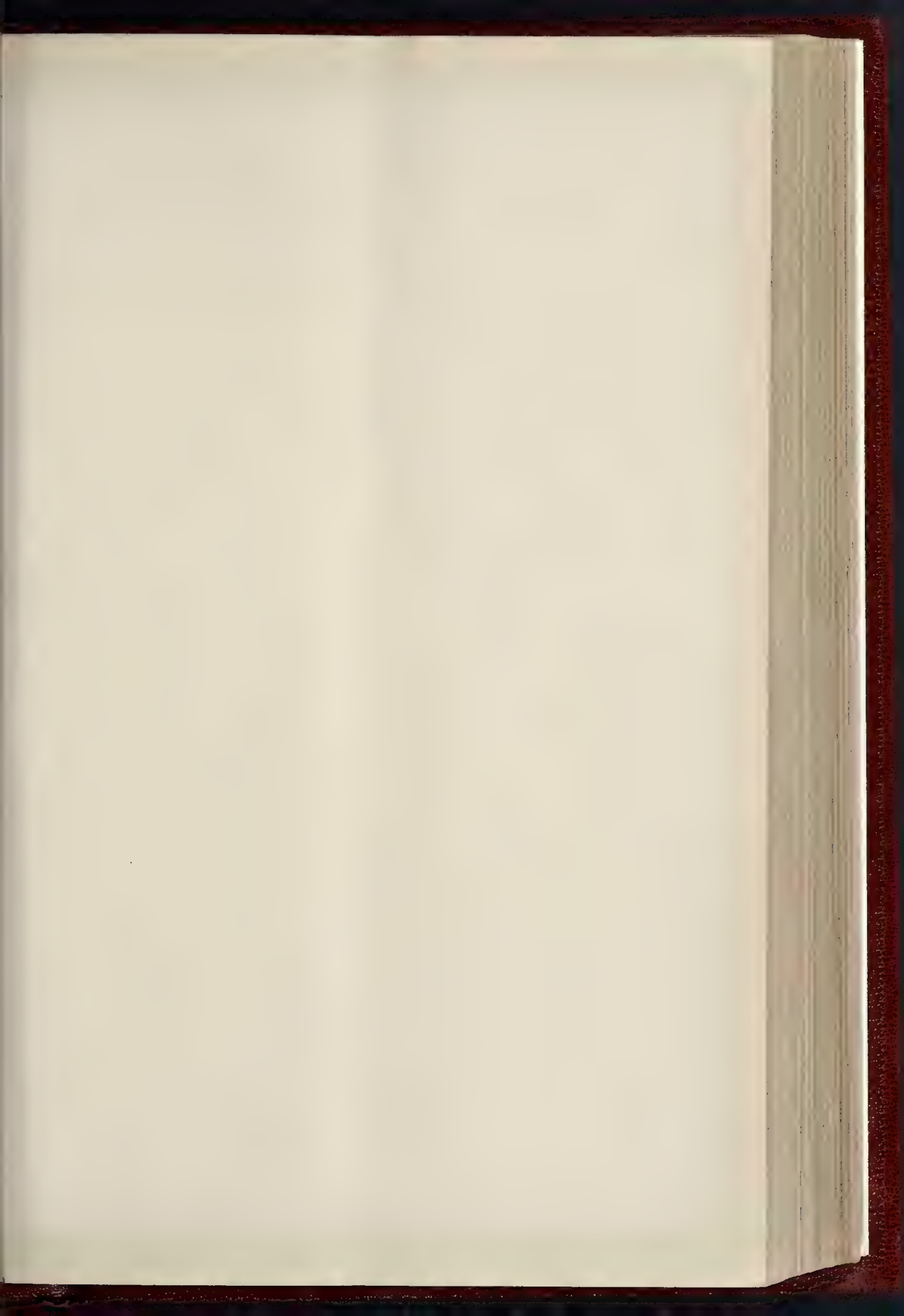




"GLANGWNA" NEAR CARNARVON: ENT

[illegible]

By Messrs DOUGLAS & FORDHAM, ARCHITECTS.





"GLANGWNA," NEAR CARNARVON GAR



of the author. The sewage is treated on the system of broad irrigation. The total area of the farm is 1,700 acres, about 1,400 of which will be available for sewage, and are now being laid out and managed under the author's advice and direction. The total expenditure at present (exclusive of land) sanctioned was £58,900.

The author gave a detailed description of the four independent rotative compound condensing beam-engines, and the eight double-flued Lancashire steel boilers, each 30 ft. by 7 ft., working at 80 lbs. pressure per square inch, for pumping sewage from the Leicester sewers to the Beaumont Leys Sewage Farm through two 33-in. cast-iron rising mains for a distance of about one and a half miles, and to a net height of 163'66 ft., which, together with the engine and boiler-houses, workshops, and manager's house, cost £54,970. The engines and boilers were designed by the late Mr. Joseph Gordon, M. Inst. C.E., assisted by Mr. T. E. Laing, Assoc. M. Inst. C.E., and Messrs. Gimson & Co., of Leicester, were the makers. The manufacture and erection being done under the author's personal supervision as successor to Mr. Gordon when that gentleman was appointed Chief Engineer to the London County Council. Mr. Stockdale Harrison, F.R.I.B.A., of Leicester, designed the buildings.

The total cost of carrying out the schemes mentioned would be nearly two-thirds of a million sterling.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon last at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

"Dumping Ground" at Brixton.—Mr. Hubbard presented memorials bearing 100 signatures from residents in Acre-lane, Branksome-road, Cornwall-road, and Lyham-road, Brixton, describing a piece of land, known as "Loat's Land," ten acres in extent, as a "dumping ground," totally unfit for building purposes, and praying the Council to prevent houses being built upon it, and to acquire the land for allotment purposes.

Finance.—The Report of the Finance Committee contained the following paragraph:—

"We have to report that Mr. H. Lloyd Roberts, the Auditor appointed by the Local Government Board to audit the accounts of the Council for the year ended 31st March, 1892, completed his audit on the 18th, and gave his certificate on the 22nd of February, 1893. The report states the indebtedness of the Council on account of Stock and loans to be 29,487,575. 7s. 3d. There should, however, be taken into account, as a set-off against that sum, the outstanding amounts of loans to local authorities, 9,776,600. 11s. 5d., the value of surplus lands, estimated at 2,289,610. 10s., and other assets of the Consolidated Loans Fund, 220,287. 1s. 7d., reducing the Council's indebtedness to 17,261,047. 4s. 3d. Adding to this amount the overdrawn balance on 31st March, 1892, of the General Capital Account, 553,354. 7s. 11d. (since provided for by further issue of Stock), the net debt of the Council, on 31st March, 1892, is 17,814,401. 12s. 2d., as shown in the tables which accompanied the Money Bill of 1892."

The Royal Commission on the Proposed Unification of London.—The Chairman read a letter from Mr. H. H. Fowler, President of the Local Government Board, stating that the Government proposed to nominate Sir Thomas Farrer as the representative of the Council on the Royal Commission which is to be appointed to consider the conditions under which the amalgamation of the City and the County of London can be effected, and asking whether Sir Thomas Farrer's nomination would meet with the approbation of the Council.

After some discussion, it was resolved to inform the Local Government Board that the Council approved of the nomination of Sir Thomas Farrer to serve on the Commission.

Widening of Blomfield-street.—The Improvements Committee presented a report on the subject of an application by the City Commissioners of Sewers for a contribution to the cost of widening Blomfield-street, City, and recommending that the Council should contribute, on the usual conditions, one half of the net cost of the improvement, such contribution not to exceed the sum of 7,650.

The recommendation was agreed to, after the discussion and defeat of a hostile amendment.

Rates of Wages and Hours of Work.—The consideration of the adjourned report of the Works and Stores Committee on rates of wages and hours of labour was again postponed. We nevertheless give here those portions of the report

which concern the building trades. The Committee reported as follows:—

"In accordance with the resolution of the Council of 16th December, 1892, we have been in communication with the trades unions in London and also with the employers of labour. We submit herewith a first list of certain trades with the wages and hours of labour, which has been based on the rates of wages and hours of labour recognised and in practice now being obtained by trade unions in London. We recommend—

"That the Council do not pay less than the following rates of wages, and observe the following hours of labour, in works which are in the nature of construction or manufacture, and that all contractors in the London district, as specified in the resolution of the Council of 16th December last, be required to pay wages at rates not less and to observe hours of labour not greater than the rates and hours set out in this list; and that they form part of the Standing Orders of the Council and be open at all times to public inspection:—

Rate of pay per hour.	Hours of Labour per Week.				Rate of Pay for Overtime.					
	Summer	Winter—14 weeks after first Monday in November.		Week-days (except Saturdays).	Saturdays.					
		Three weeks at beginning and three weeks at end.	Eight middle weeks.		Until 8 p.m.	8 p.m. until 10 p.m.	After 10 p.m.	Until 4 p.m.	After 4 p.m. and Sundays, Xmas Day and Good Friday.	
BUILDING TRADES.										
Carpenters	8d.	50	47	44½	Time and a quarter.	Time and a half.	Double time.	Time and a half.	Double time.	
Joiners	9d.									
Bricklayers	9d.									
Bricklayers (cutting and setting gauged work)	10d.									
Plasterers	9d.									
Masons	9d.									
Masons (fixing)	10d.									
Masons (granite work)	10d.									
Painters and Glaziers	8d.									
Smiths, fitters, &c.	8d. 192									
Labourers and navvies	6d.	47	44½	42	—	5 p.m. to 11 p.m. Time and a half.	11 p.m. to 7 a.m. Double time.	7 a.m. to 5 p.m. Time and a half.	5 p.m. to 7 a.m. Monday. Double time.	
Plumbers	10d.									
Lath-renders										
(Piece-work Prices as per trade list.)										
Timbermen	7 to 7½	50	47	44½	Time and a quarter.	Time and a half.	Double time.	Time and a half.	Double time.	
Scaffolders	7									
Paviors	9									
Slaters	9									
Hot-water engineers	9d.									
Zinc workers	9d.									
Coppers	9d.									
Bell-hangers	9d.									
Paper-hangers	9									
Plumbers' mates	6d.									
Painters' labourers	6d.									
French polishers	8									
Steam Sawyers	9d.									
Machinists (Joiners)	10d.									
Carmen (one horse)	25s. per week									
Carmen (two horses)	27s.									
Rate of pay per hour.										
Hours of Labour.		Rate of Pay for Overtime.								
Scotch derrick drivers ..	8d.	As arranged	Not less than time and a quarter when engines are working.							
Steam navy and grab drivers ..	8d.									
Drivers of steam cranes and travellers	7d.									
Locomotive drivers ..	7d. to 8d.									
Stationary and portable drivers	7d.									
Portable crane drivers ..	7d.									
Traction engine and road roller drivers	7d.									

Proposed Re-erection of the Burlington House Colonnade in Battersea Park.—The report of the Parks and Open Spaces Committee contained the following paragraph:—

"On 22nd November, 1892, we reported that our attention had for some time past been given to the desirableness of dealing with a number of stones which were lying in Battersea Park, and which formed the colonnade of Burlington House, removed from Piccadilly to make way for the Royal Academy buildings. These stones were deposited in the Park before it came under the control of the Council, and, in fact, were put there by Her Majesty's Office of Works, which then had control of the Park. We find that to erect the stones as a ruin would cost 1,600l., and if the missing portions were replaced and the structure made to serve the purposes of a shelter, the cost would be 3,000l. Under these circumstances we think that H.M. Office of Works should be asked to make a contribution towards the cost of erecting the stones. We may add that we have received suggestions as to their re-erection from the Council's Architect, from Sir Frederic Leighton, R.A., and from Mr. William Robinson, a gardening expert. We now recommend—

"That the Council do apply to H.M. Commissioners of Works for a contribution of 1,000l. towards the cost of erecting the stones."

The consideration of this recommendation was postponed.

General Works, Repairs, &c.—The Works and Stores Committee reported as follows:—

"In accordance with the reference from the Council of 22nd November, 1892, we have had under consideration the contracts for general works and repairs. The Council on the 15th of November, 1892, entrusted the contracts for general works and repairs under the Engineer, in A and B districts to

Messrs. Mowlem & Co., and in B and C districts to Messrs. Williams, Son, and Wallington until 30th June, 1893; the contracts for general works and repairs under the Architect in No. 1 and No. 2 districts to Messrs. G. S. S. Williams & Son, and in No. 3 and No. 4 districts to Messrs. Arthur & Co.; and the contract for the erection of hoardings, fans, and shoring to Messrs. William Brass & Son until 31st May, 1893. This was an extension for six months of the then existing arrangements at somewhat increased contract prices, pending the organisation of the Works Department. We have now to report that this Committee is prepared to take up the works covered by these contracts at the dates mentioned and to execute them by the Council's own staff. We recommend—

"That the Works and Stores Committee be authorised to carry out all work hitherto entrusted to the contractors for general works and repairs, &c., from the date of the termination of the following contracts:—

(a) Contracts for general works and repairs under the Engineer, in districts A, B, C and D.

(b) Contracts for general works and repairs under the Architect, &c., in districts numbered 1, 2, 3 and 4.

(c) Contract for the erection of hoardings, fans, and shoring."

The recommendation was unanimously agreed to, without discussion.

The East London Water Bill.—The Council, after some discussion, agreed, by a majority of 32

on a division (61 to 29) to oppose the second reading of this Bill, on the ground that it is conceived in a spirit inimical to the interests of the ratepayers.

After transacting other business, the Council adjourned at 7 o'clock until Friday, the 10th inst., at 3 o'clock, this special meeting being resolved on in order, if possible, to clear the paper of business, which is in a very congested state.

ARCHITECTS' BENEVOLENT SOCIETY.

The annual general meeting of the subscribers and donors to the funds of this Society was held on Wednesday afternoon last, in the Council-room of the Royal Institute of British Architects, Mr. J. Macvicar Anderson, President of the Institute and President of the Society, in the chair.

The annual report of the Council, read by the Hon. Secretary, Mr. William H. White, was as follows:—

"It is with considerable satisfaction that the Council of the Architects' Benevolent Society are able to congratulate the Society on its continued stability and usefulness. Although the amount received from donations was small compared with several previous years, they have been enabled to increase the invested capital, owing to a careful distribution of grants, and also to the fact that arrears amounting to some 36*l.* have been received by the Hon. Treasurer. This increase to the capital has been effected without diminishing the good done by the Society, for the amount expended in 1892 in relief was 419*l.* as against 399*l.* in 1891. It is earnestly hoped that those successful members of the profession who do not at present contribute to the funds of the Society may realise that there are many of their less fortunate brethren who, through afflictions, are unable to follow their profession, and that there exist widows and orphans of many who have left—in a large measure unprovided for—little or nothing for their families. Great is the need, and the Council have no hesitation in maintaining that it is the duty of all members of the profession to add at least their mite to the funds of the only Benevolent Society which exists for the exclusive assistance of architects and their widows and orphans in necessitous circumstances.

Seven meetings have been held by the Council during the past official year. Three pensions of 20*l.* each have been paid, and the sum of 359*l.* has been distributed among twenty-one persons. It has been the aim of the Council—it is hoped with a certain amount of success—to afford adequate relief to the really deserving applicants, and not to expend the funds entrusted to them in a larger number of small, and therefore frequently less useful, gifts. The subscriptions received for 1892 amounted to 303*l.*—a slight diminution from those in 1891, when they reached the sum of 309*l.* The arrears for 1891, however, paid in answer to a special appeal, were 364*l.* 15*s.* 0*d.* making, with subscriptions paid in advance for 1893, a total of 345*l.* 7*s.* 6*d.*, as against 313*l.* 17*s.* 0*d.* in the previous year. The donations, as before mentioned, show a falling off during the year, being only 28*l.* as against 57*l.* in 1891. The chief contributions were from Messrs. N. S. Joseph, J. G. Finch Noyes, C. J. Shoppe, the Leicester and Leicestershire Society of Architects, and the Nottingham Architectural Society. The Architectural Association and the Royal Institute of the Architects of Ireland continue their subscriptions of ten guineas and three guineas respectively.

With reference to the capital of the Society, the Council are gratified to state that, although still some 1,600*l.* short of the 10,000*l.* so earnestly desired by many, it was increased on December 31 last by the purchase of 100*l.* Caledonian Railway 4 per cent. Debenture Stock, making, at cost price, a total of 8,340*l.*, as against 8,242*l.* on the previous December. The present market value is 9,250*l.* While mentioning this subject, your Council cannot but refer with deep regret to the loss the Society has sustained by the death of Mr. John Gibson, a regular subscriber and frequent donor since the year 1851. Mr. Gibson, who on several occasions during the forty-two years of his connection with the Society served on the Council, showed the interest he continued to take in its welfare by a most generous bequest of 500*l.*, free of duty, which will be forthwith invested as an addition to capital. Such thought for the needs of those in distress and such proof of confidence in the judicious distribution of the Society's funds are worthy of much gratitude and deserving of emulation.

The Council have further to record with great regret the decease of Mr. W. A. Boulnois, also a subscriber for nearly forty years, and many times an active member of Council between the years 1860 and 1881; of Mr. R. A. Hill, a subscriber since 1839; of Mr. R. J. Johnson, who first contributed in 1877; of Mr. Joseph Peacock, a subscriber from 1859; and of Mr. J. Goldicut Turner, for some twenty years a subscriber, and the Hon. Secretary of the Society from 1876 to 1880.

The balance-sheet and income account for the year ended December 31, 1892, duly audited by Mr. John Hebb and Mr. Percival Currey, are herewith submitted.

With reference to the income account it may be of interest to note that although the income of the Society is now some 600*l.* per annum, with a corresponding expenditure, the expenses for the past seven years or more have never exceeded 61*l.* per annum, and for several years were considerably under that sum. As an instance of the present economical working of the Society in comparison with past years, it may be stated that from 1862 to 1880, with an income ranging from 170*l.* to 300*l.* per annum, the expenses averaged 75*l.* It is, however, considered advisable to endeavour further to increase the income of the Society, and to extend the field of its beneficent actions by making its existence and objects more widely known both to the profession and the public. This will naturally lead to increased expenses, but not, it is anticipated, out of proportion with the increased good which would be thereby effected. As an instance of this, the Council have advertised in the professional journals the fact that a pension of 20*l.* is vacant. Applications for this pension must be sent to the Assistant Secretary on or before the 28th inst., and the election will take place next April.

The following gentlemen, having served three years, retire by rotation from the Council, namely:—Mr. Wm. Emerson, Mr. Henry L. Florence, Mr. Thomas M. Rickman, F.S.A., Mr. Aston Webb, and Mr. Henry Cowell Boyes. To fill the vacancies caused by these retirements, the Council have the pleasure to nominate Mr. Arthur Ashbridge, Mr. Thomas Blashill, Mr. J. Henry Christian, Mr. Percival Currey, and Mr. Sydney Smirke, all of whom have consented to serve if elected.

The Hon. Treasurer, Mr. Arthur Cates, read the statement of accounts and balance-sheet.

The Chairman, in moving the adoption of the report and accounts, said that on the whole they were very satisfactory. The Society was in a very stable position. It was, however, greatly to be desired that a very much larger number of the members of the profession should extend their help to this, the only benevolent society connected with the profession. The Council were taking steps to bring the claims of the Society more prominently to the attention of the profession, and he hoped the results would be satisfactory.

Mr. Kidner seconded the motion, which was agreed to.

Mr. Grellier proposed, and Mr. John Cotton seconded, a vote of thanks to the out-going members of the Council, Messrs. W. Emerson, H. L. Florence, T. M. Rickman, Aston Webb, and H. C. Boyes. This was heartily accorded, and Mr. Emerson said a few words in reply.

The chairman next moved that Messrs. A. Ashbridge, T. Blashill, J. H. Christian, P. Currey, and Sydney Smirke, be elected to serve on the Council for the ensuing year.

Mr. W. Hilton Nash seconded the motion, which was agreed to.

On the motion of Mr. George Scamell, seconded by Mr. H. H. Collins, cordial thanks were voted to the hon. treasurer, Mr. Arthur Cates, for his services to the Society, and he was unanimously re-elected treasurer.

Mr. Cates briefly expressed his acknowledgments.

The Chairman, in moving a vote of thanks to Mr. William H. White, the hon. sec., referred in complimentary terms to the way in which Mr. Verity, the assistant-secretary, performed his duties.

Mr. Thomas Harris seconded the motion, which was agreed to. Mr. White, in replying, heartily endorsing the remarks of the chairman as to Mr. Verity.

On the motion of Mr. W. Hilton Nash, seconded by Mr. Frederick Chancellor, a vote of thanks to the retiring auditors, Mr. John Hebb and Mr. Percival Currey, was agreed to; and, on the motion of Mr. R. Herbert Carpenter, seconded by Mr. Scamell, Mr. W. Kidner and Mr. W. Grellier were elected auditors for the current year.

On the motion of Mr. F. Chancellor, seconded by Mr. Arthur Cates, a vote of thanks was accorded to the Royal Institute of British Architects for affording office accommodation for the Society; and a vote of thanks to the Chairman, moved by Mr. C. J. Shoppe, and seconded by Mr. Aston Webb, brought the proceedings to a close.

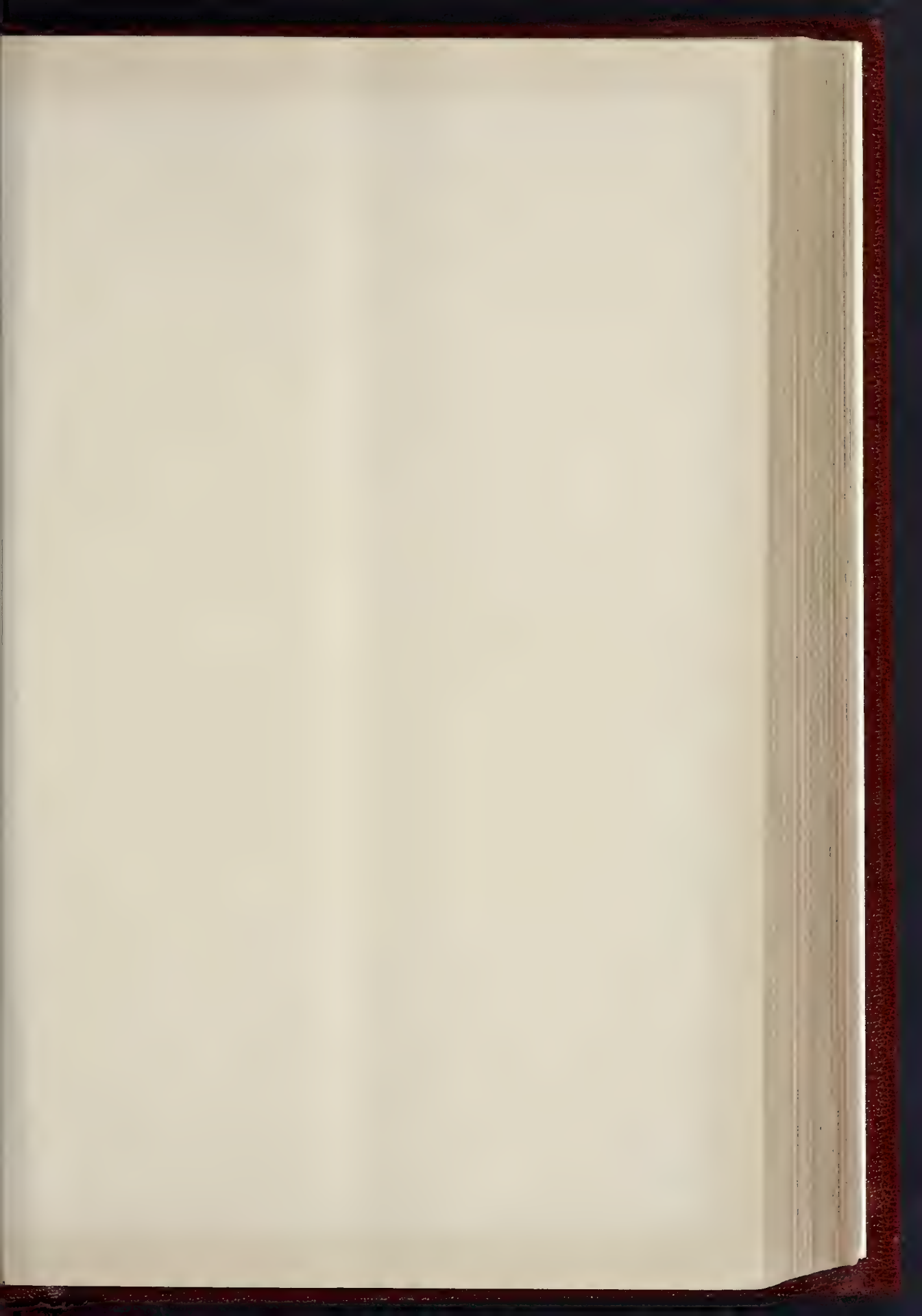
NEW PUBLIC LIBRARY AT BRITTON.—The new free library at Britton, the gift of Mr. Tate was formally opened by the Prince of Wales on Saturday last. Mr. S. R. J. Smith is the architect, and Messrs. F. and H. F. Higgs are the builders.

LIVERPOOL ENGINEERING SOCIETY.—The ninth ordinary meeting of the Liverpool Engineering Society was held on the 22nd ult. at the Royal Institution, Colquitt-street, when a paper was read by Mr. George Farren upon "Forces used by engineers considered as velocities."

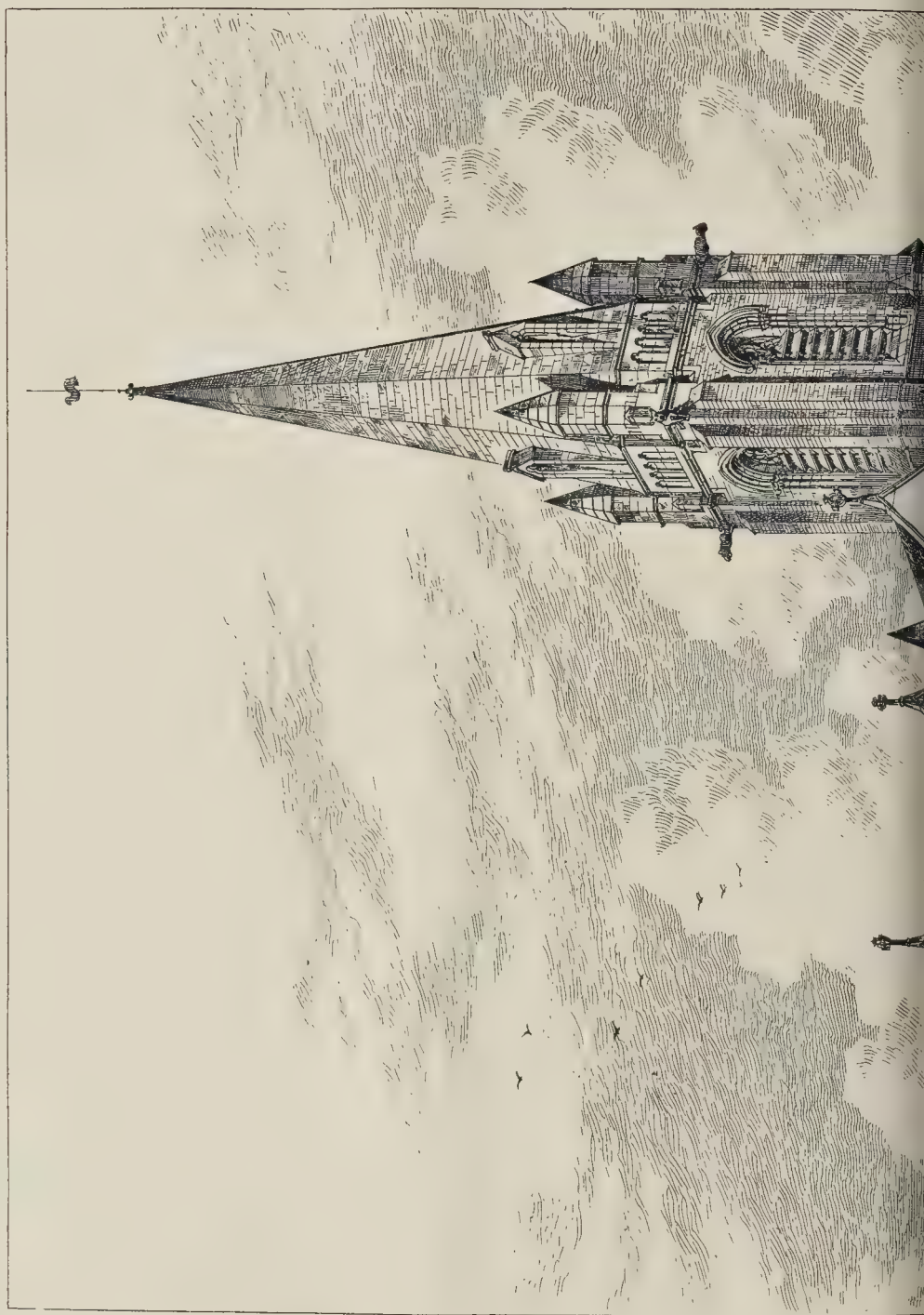
SANITARY INSPECTORS' ASSOCIATION.

At the March meeting of this Association, held at Carpenters' Hall, London Wall, on Saturday evening last, March 4, Dr. B. W. Richardson in the chair, a paper on "The Future of Sanitation" was read by Dr. Louis C. Parkes, D. P. H., Medical Officer of Health for Chelsea Board, &c., there being a full attendance of the members of the Association and visitors. He said that the great strides made in the knowledge of the principles of sanitation, and in the application of that knowledge to matters of health and everyday life, which constituted the science of hygiene, were made apparent by the Health Statistics regularly issued from the Registrar-General's Department. The reduction of the death-rate due to various classes of diseases, particularly those of the zymotic class, was significant and eloquent. The decrease has been steady and continuous during the last thirty years, keeping pace with great regularity with the increased attention paid to sanitary matters, and the decrease would go on in the future as it had done in the past, when the principle of the compulsory notification of diseases of an infectious character, isolation, and disinfection, were extended to a Public Health Act applying to the whole kingdom, like that which was in force in London. Side by side with the sanitary improvements which were making the existence of typhoid and the filth diseases more and more difficult, the conditions of life in the great centres of population were becoming more unfavourable another direction through overcrowding. There was a perceptible death rate from various disorders, and as a set off to the diminishing death-rate in other diseases, there was a diminishing birth-rate. In sixteen years the birth-rate had fallen from 36.3 per 1,000 to 30.2, a fact the significance of which could hardly be over-estimated. Evidently the mean age was being raised in England, and we were approaching France, where the births and deaths were nearly identical. The vitiation of the atmosphere in crowded cities promoted the development of miasmatic poisoning, by which the shattered nervous system of the victims of overcrowding were easily overpowered. Outbreaks of disease which would not be very formidable in the pure air and healthy surroundings by the workmen of rural districts enabled them to successfully combat such attacks, were very fatal in the families of working men who had deserted their healthy occupations in the country to further crowd our overcrowded towns, and to render harder still the hard life of the town workmen by throwing them out of employment. It might be hoped to expect ever to be able to render the air of the mighty Babylon of London, with its four and a half millions of people, as pure as the atmosphere of the surrounding country, but much might be done to arrest the rapid deterioration which was taking place. They were rooting out rookeries and slums, and at the same time they were building under the name of "home blocks," huge piles of buildings from 70 ft. to 90 ft. high, surrounded by streets so narrow as to effectually shut out the sunlight and free-air currents from the majority of the rooms contained in them. The hygiene of the future would require from the municipal authorities greater attention to the width of the streets and to the height of the houses, which should be limited in all cases where the width of the streets was limited. The water supply must be taken over by the municipalities and the sources which were purest and freest from organic impurities must be found; "the supply of wholesome meat must be more effectively controlled, and the question of the sanitary arrangements in slaughter-houses, which at present scarcely existed, must be dealt with. The removal of refuse was another question the municipal sanitarian of the future would be called upon to effectively deal with, for there could be no doubt that the accumulation of large masses of household refuse was injurious to the health of all the inhabitants of the surrounding district. Something would have to be done to mitigate the smoke nuisance in London, in order to attenuate the density of its hideous yellow fogs. Open spaces and playgrounds must be multiplied, and the good example set by the London County Council in liberally supplying the apparatus for gymnastics and recreation in the parks under their control, must be imitated by the authorities of every parish, until—and he hoped it would be in a not distant future—no parish could be found in the metropolis unprovided with its own properly equipped recreation ground. Among questions of not less importance were the means to be adopted for diminishing the consumption of alcoholic liquors. He would like to see the adoption of the principle of Local Option and the management by the State of all the liquor shops. The regulations dealing with factories and workshops and with dangerous trades must be made more effective, and, above all, the housing of the working classes in towns must be dealt with. With all these necessary improvements to be pushed on and brought into effective operation, he was convinced there was a great future for sanitation, and a great future for the Sanitary Inspector.

The address was warmly acclaimed, and a vote of thanks, proposed by Dr. Richardson and seconded by Mr. H. Alexander, chairman of the Council, was cordially adopted.



THE BUILDER, MARCH 11, 1893.





Ch. of St. Peter
Abbotsdale, Sharrold
Sheffield, Yorkshire.
view from Abbotsdale Road.

J. Norton
Architect
Sheffield

PHOTO & THE ENGRAVER & CO. 48, 5 EAST WARDING STREET, SHEFFIELD, LANE. E.C.

Books.

Excursions in Greece to recently explored sites of classical Greece: Mycenæ, Tiryns, Dodona, Delos, Athens, Olympia, Eleusis, Epidaurus, Tanagra. A popular account of the results of recent excavations. By CHARLES DIEHL, translated by EMMA R. PERKINS, with an introduction by REGINALD STUART POOLE, LL.D., with nine plans and forty-one illustrations. London: Grevel & Co. 1893.

THIIS is the third book on recent excavations in Greece which has appeared within the last three years. We cannot say, however, that it is superfluous. Professor Percy Gardner's admirable "New Chapters in Greek History" was addressed to the classical scholar who wished to know what the specialist in archaeology had to teach him. Mr. Louis Dyer's "Studies of the Gods in Greece" was, by intention, mainly mythological, and necessarily left untouched sites of such supreme interest as Mycenæ, Tiryns and the Acropolis at Athens. Mr. Diehl's book is at once popular and precise. As is usual with French writers, he has made up his mind exactly as to what class of readers he is addressing, and in this case it is not the specialist or even the classical scholar, but the generally educated traveller, who, in increasingly great numbers, year by year visits Greece. The book has the further advantage that it is profusely illustrated, and yet of handy size. Miss Perkins has done her work of translating well, she knows her subject as well as her language. Only here and there is French idiom perceptible, as in the introductory paragraph. This and all the account of Dr. Schliemann's life would have been better rewritten. Each chapter is preceded by a fairly full bibliography, but we wish the translator had added uniformly the date of the works cited. Here and there a chance date is added, but even in the case of periodicals not with uniformity. Endless trouble is given by a reference like this, "For Pediments See in Journ. Hell. Studies." The journal, it is true, is indexed at intervals, but what ordinary student knows that, and what if the article falls in the years not yet indexed? Such references are strongly to be deprecated. The title gives us in full the scope of the book, and we need only add that Professor Poole gives a historical conspectus, with some critical remarks, in his sympathetic preface.

Lockwood's Dictionary of Mechanical Engineering Terms. Second Edition. London: Crosby Lockwood & Son. 1892.

THIS dictionary forms a very useful book of reference, embracing terms current in the work of the draughtsman, pattern-maker, moulder, smith, boiler-maker, fitter, turner, engineering erector, and also engineering storekeeper on works. The present volume, which is well printed, has been revised, with additions, and is edited by an experienced foreman of twenty-seven years' standing. The definitions aim at comprehensiveness of matter, combined with clear, concise, and adequate explanations; but, in a dictionary, alphabetical reference is of primary importance, and hence we think the value of the important additions made in this new edition becomes greatly reduced by the fact that they have not been incorporated with the original text, but are added at the end of the book as an appendix. The inquirer seeking an explanation, for instance, of the term "Hydraulic Joint," and finding no special reference to "joint" under the various hydraulic definitions given upon page 184, is apt to forget that there is a supplement at the end of the volume, and, consequently, to fail to avail himself of the definition provided upon page 428. The student would do well to interline the main text, in pen and ink, with the various references to the appendix in alphabetical order, for future reference.

Handybooks for Handicrafts. By P. N. HASLUCK. London: Crosby Lockwood & Son. 1893.

THESE volumes form a cheap and useful series, which now appears in a second edition. Each book is complete in itself, and is designed to supply information for amateurs, students, and workmen in the various handicrafts described dealing with the actual practice of a workshop. In describing the processes employed and the manipulation of material, workshop terms have been used, workshop practice dealt with, and illustrations provided where necessary, reduced from working drawings. A good index is appended to each volume.

We add some comments on some of the separate volumes:

The Mechanic's Workshop Handy Book.—A perusal of the first chapter shows that the author has studied both the history and the theory of his subject, and in a further perusal of the volume we note that special attention is given to the handling and treatment of various tools. The writer, in describing metals and alloys, reminds the reader that pure metallic iron has but little commercial use, and that its employment as malleable iron, steel, or cast iron is dependent upon the proportion of carbon it contains. The more free from impurities, the higher will be the electrical conductivity of the metal, and the greater the heat required for its fusion. The precise point at which metal ceases to be steel and becomes malleable iron is hard to determine, but the author gives as a distinction, that when heated to a full blood-red heat and plunged into cold water, steel becomes hardened, while upon iron the same process has not that effect. He gives various definitions of names given to iron and steel, and then follows on with the fusion together of copper and zinc, forming brass, and the fusion of copper and tin, forming bronze. The value of a little silver sand in welding iron to preserve the metal from the effects of the sulphurous fumes escaping from the coal and to prevent the ashes of the fire adhering to the metal, is ably pointed out. A "soaking heat" is necessary for a weld, and the sand not being a flux, it protects the iron from burning at a white heat, and protects it from cooling. In dealing with steel, the golden rule is to heat it as little as possible before it is forged, and to hammer it as much as possible in the process of forging. The worst fault that can be committed is to overheat the steel. The happy medium must be sought between heating it too much and too little,—between letting it lie too long "soaking" in the fire and not "soaking" it through. The remarks on solders and soldering, and upon abrasive and finishing processes are excellent, but our space does not permit further allusion to them.

The Metal Turner's Handybook.—This practical manual for workers at the foot-lathe, embraces information on the tools, appliances, and processes employed in metal-turning. It shows not only how work ought to be done, but gives evidence that the author understands how to do it, and consequently his descriptions are admirable. Plain lathes, geared lathes, screw-cutting lathes, overbearing gearings, slide-rests, chucks, cutter-spindles, milling and planing attachments are all as fully dealt with as the limits of a small handybook will permit, and even gas-engines as motors for working are described and recommended because they may be started instantly at full power and stopped with equal facility. They do not need constant attention, and though intermittent in their action, are useful and cheap. Turnery has special claims on amateurs, and to those who find recreation in this fascinating art, we can commend a perusal of this volume. The young beginner is advised not to choose a very small lathe.

The Model Engineer's Handybook.—The reader of this volume is assumed to have had some practical experience in handling tools, such as might be gained by a study of the handybooks above described. Model engines are objects of interest to the rising generation, but the amateur seldom realises the fact that the friction in a model varies in proportion to its size. The smaller the engine, the greater will be the percentage lost in friction. The "power" of an engine is the nominal, and the "duty" is the actual work it will perform; "duty" being the term used to represent the amount of work absolutely done. Slide valve engines, oscillating engines, governors, pumps, boilers, bearings, and other details, together with a chapter entitled "erecting a model" for experimental work are practically and concisely presented. The type of the letterpress is well produced, and the illustrative diagrams are clear.

The Pattern Maker's Handybook.—Practical pattern-makers are more accustomed to work to a specification than to write an account of the process of their art. Hence the literature upon this subject is scanty. Though every separate pattern requires independent thought and individual arrangement, yet there are certain principles which can be generally applied in every case, and therefore we welcome this little treatise as providing detail information which could only emanate from a practical pattern-maker. The author deals with moulding and founding, core-boxes, and pillow-blocks, and adds a glossary of the chief terms applicable in moulding and founding, together

with an explanation of the use of the tools employed. Useful hints are given for circular work and the effects of shrinkage. The allowance necessary for shrinkage varies, of course, with the kind of metal employed, but for castings where the thickness runs about 1 in., cast under ordinary circumstances, the author allows $\frac{1}{16}$ in. per foot for cast iron, $\frac{1}{8}$ in. per foot for malleable cast iron, $\frac{1}{8}$ in. per foot for brass, and $\frac{1}{4}$ in. per foot for cast steel, but he very properly adds that judgment and experience must guide the pattern-maker, as thicker castings, under the same conditions, will shrink less and thinner castings more than this standard.

The Cabinet Worker's Handybook.—This appears to be addressed by the author to amateurs principally, but it would be equally useful to a young mechanic at the beginning of his apprenticeship. Clear statement, with the help of many illustrations, leaves no doubt in the reader's mind as to the author's meaning. The book is provided with chapters on the different woods used, benches and appliances, tools of many descriptions, jointing and glueing, veneers and veneering, and simple examples of work, and the endeavour is made to thoroughly explain the principles and processes applied to actual work. The designs suggested are of a somewhat stockpattern character.

The Wood Turner's Handybook.—This book contains a large number of useful illustrations which accompany the text and make the author's meaning clear. It deals concisely with wood-turners' lathes, hand-tools used with lathes, the fitting up of a lathe, chucks, and the turning of various articles which test the turner's ability. It is a useful book for amateurs, to whom it is addressed.

MAGAZINES AND REVIEWS.

IN the *Gazette des Beaux-Arts* the valuable series of articles by M. Champeaux, on "l'Art Decoratif dans le Vieux Paris" is continued, accompanied by illustrations from Goujon's sculpture in the Ciel-de-beuf, at the Louvre, and of a fine bit of silver-work by Clodion. M. A. Renan continues his article on "Tiemcen," and M. Beraldi contributes some notes on the Meissonier Exhibition, especially in reference to the painter's book illustrations.

In the *Revue des Deux Mondes* the article on "Rome et la Renaissance," by M. Klacsko, is mainly concerned with the work of Michelangelo, but does not throw any new light on it. M. Gustave Larroumet contributes an article "L'Art Réaliste et la Critique," which is really a review of the critical work of Castagnary, whom he defines as "not a critic so much as a polemist," a definition which would fit some art-critics on this side of the Channel. He quotes Castagnary's dictum about M. Puvion de Chavannes—"He neither draws nor paints; he composes"; which is rather happy. A technical article on "Aluminium" is contributed by M. J. Fleury.

The *Art Journal* gives the first instalment of an article by Mr. Walter Armstrong on the Tate collection, with the welcome accompaniment of a fine etching by Mr. C. O. Murray from Millais' "Vale of Rest," which remarkable and poetic work forms a part of the collection. The excellent illustrations of Mr. Whistler's oil-paintings, affixed to an article by Mr. MacColl, show that some of his works are far better in black and white than in colour; in "Miss Alexander," for instance, we get the character of the attitude and expression without the crude and disagreeable flesh-painting. Mr. E. Browne's "From Hexham to the Sea" contains descriptions and illustrations of some interesting buildings of the Tyndale neighbourhood. Articles on "Houdon" (Mr. C. Phillips) and on "Mr. Burne-Jones" (Miss Cartwright) are included in a varied and interesting number.

The *Magazine of Art* also commences with an article on the Tate collection, with illustrations of some of the paintings. An article by Mr. Henry Silver on "The Home-life of John Leech" has a value for our readers on account of the admirable sketches of his various residences by Mr. Fulylove. Sir G. Birdwood's article on "Indian Metal-work at the Imperial Institute" is (of course) written with knowledge, and is illustrated by engravings of a number of beautiful examples of Indian work.

The most important article in the *Century*, from our point of view, is that on Westminster Abbey by Mr. H. B. Fuller, with numerous illustrations by Mr. Pennell. These latter are beautiful as book illustrations of architecture, and are more satisfactory also to the architect than some others of the accomplished artist's drawings. The article is exceedingly well written, though of

course we have the usual statement which American writers delight in, that everything that is good in the Abbey comes from French influence. Henry VII.'s Chapel, of course, is so entirely French in design and style! And the triforium design of nave and transepts too. American critics must fancy other people have no eyes to see with for themselves. The same number contains an illustrated article on Jamaica by Mr. G. Gaul, and one on "Artist Life by the North Sea," by Mr. H. W. Ranger.

Harper contains a good article on the Escorial, by Mr. Theodore Child, with a good many illustrations, partly architectural.

The *English Illustrated Magazine* contains a short article on "Heron Court, Christchurch," by Lady Malmesbury, with illustrations by Mr. E. H. New, which show a little too much affectation of an antiquated style of drawing. Colonel Stopford's article on "Upper Burma" is accompanied by some illustrations of buildings reproduced from photographs, and the number concludes with an illustrated article on the Great Northern Railway Company and its locomotives, by Mr. A. J. Brickwell.

In *Blackwood* the article on "The private life of the Renaissance Florentines" by Signor Guido Biagi, is worth attention.

The *Gentleman's Magazine* gives an article on "Bells and their Makers," by Mr. W. B. Paley, and the same magazine contains a curious suggestion of "A Cure for London Fog," by Mr. Owen C. D. Ross, who proposes that as a breeze always carries away the fog in a very short time, we should provide the means of producing an artificial breeze by a number of fans driven by electric motors. He calculates that 1,000 h.p. electrical power would drive 7,000 fans (of a limited size we should imagine) at a cost of 25l. per hour. We fear the suggestion is not more practical than others that have been made for getting rid of our fogs.

The *Philadelphia Journal of Architecture* contains an article protesting against the system of putting all Government buildings into the hands of an official architect who cannot possibly design them all, and claiming that such work should be given to private architects, the official architect merely exercising a general control; an opinion in which we entirely concur. The number contains some good illustrations of ancient and modern buildings in the Corinthian style of Greek architecture.

Correspondence.

To the Editor of THE BUILDER.

M. CORROYER'S THEORY OF THE GOTHIC ARCH.

SIR,—There are many points of contention in M. Corroyer's two treatises "l'Architecture Romane" and "l'Architecture Gothique." I will confine myself to two of them, viz.: first, to the date of St. Front de Perigueux, and, secondly, to the origin of the French ribbed vault.

After describing the churches of St. Mark's, Venice, and St. Front, Perigueux, M. Corroyer suggests that instead of the latter being a copy of the former, it was more probably the other way. Now, at the time he wrote this (1888) he was not aware that the late discoveries at St. Mark's have proved that the existing structure with its five domes was not erected till 1063-71. As he claims the date of 1047 for the consecration of St. Front, if that were true there might be some reason for his suggestion, except that in the archives of St. Marks the documents distinctly state that it was built in imitation of the Church of the Holy Apostles in Constantinople. But a church of St. Front, Perigueux (of which, in the entrance porch, there still exists some portion) was burnt to the ground in 1120; and this could not refer to the existing domes (or, rather, those which within the last few years have been taken down and rebuilt) because the whole structure is in incombustible material, the domes internally and externally were built in stone, and no trace of fire was ever seen on the walls. The five-domed church of St. Front, therefore, probably dates from 1120-1140. And now as regards the resemblance to the Church of the Holy Apostles at Constantinople, there were columns on two stories similar to those of the Mosque of St. Sophia. In St. Mark's they omitted the columns in the upper story, and made a gallery round the gallery altogether, and carried the arcaded decoration to the back wall. On the face of it, therefore, it seems probable that St. Front is

more likely to have been copied from St. Mark's than from the Church of the Holy Apostles at Constantinople, and the argument is confirmed by the singular fact recorded by M. de Verneilh that the dimensions of the two structures are the same if French feet are used in the place of Italian feet.

We come now to M. Corroyer's contention as regards the domical origin of the ribbed vault. M. Corroyer in his section, p. 263 "l'Architecture Romane" and p. 21 "l'Architecture Gothique," shows the joints of the stones of the pendentives as normal to the curve, but there is some reason to believe that they were built in horizontal beds and shaped afterwards to the curve, and there is no reason structurally why this should not have been done; but granted for a moment that they are built as M. Corroyer shows, they constitute part of a web or severy built in between the main arches carrying the domes.

It is absurd, therefore, to contend that there is any identity between the architectural functions of the pendentive and the diagonal ribs of a Gothic vault. You have, I think, sir, hit upon the true conclusion in your suggestion that the dome builders of the south of France borrowed the rib from their confrères in the north; and the reason is obvious; by the erection of a series of ribs first, on the northern system, they immensely facilitated the formation of these domes, as they were able to build without any further centring being required. The two systems of construction never worked harmoniously however, and on looking at the Anjou vaults, I have often thought how much better they would look if the stone ribs were removed now that they have served their original purpose. This had happened in one instance I saw, and revealed the fact that the dome rested on the extrados of the rib and was not built into it as is the case with a true web.

R. PHÉNÉ SPIERS.

ARCHITECTURE AT THE ROYAL ACADEMY.

SIR,—It is to be hoped that the architectural members of the Royal Academy will see to the interests of their professional brethren in the coming Royal Academy Exhibition. There ought certainly to be an architect on the Hanging Committee. Much dissatisfaction was felt last year, as it was said there was not one, one result being that an exhibitor not of the first rank had seven works on the walls. One certainly would have been enough, and have allowed six more persons to have the gratification of appearing. "Kissing goes by favour," no doubt, but such wholesale osculation as this is undesirable for many reasons.

COMPETITOR.

* * We understand that Mr. Waterhouse is on the Hanging Committee this year, and in that case architectural exhibitors are sure of every advantage which ability and impartiality can afford. It must be remembered that the Architectural Room is a small one, and there are always many more drawings sent in than it will contain. At the same time, we consider that the result of the hanging last year, both in regard to some drawings that were hung and some that were not, was such as to fully justify our correspondent's protest.—Ed.

THE ORIENTATION OF CHURCHES.

SIR,—The fact recorded by Mr. James Ardenstone (March 4) is undoubtedly interesting, but if the extract from "Bartram's Travels" refers to the direction of the axis, which it apparently does, of St. Mary's Church, York, it contains a fallacy which it may be well to notice.

It is unnecessary to inquire what day is intended to be referred to by the expression "Sancte Marie's Day," for it is evident that at no place in the British Isles does the sun rise on any day in the year so near the north as 56 deg. 15 min. north of east, which is the equivalent of "North-Este by North."

Tannton, March 6.

J. HOUGHTON SPENCER.

BUILDERS' MOULDINGS.

SIR,—It is quite sickening to think of the enormous quantities of ugly mouldings which are being constantly turned out of the steam moulding mills throughout England. But one gets an additional shock when seeing the same everlasting coarsely-moulded doors imported from Sweden. One of these, a 2 ft. 8 in. by 6 ft. 8 in. four-panel moulded door, 1½ in. thick, is to be seen outside a timber merchants' in Euston-road marked for sale at 10s. 6d.

I fear it is quite hopeless to expect the British public to discriminate between the ugly and the beautiful. All that can be done to lessen the supply of the former, and this rests with the builders and others who sell these doors.

C. F. M.

* * We print the foregoing letter because we

quite sympathise with the writer's feeling about the coarse class of mouldings he refers to; at the same time, we may point out to him that it is hardly reasonable to expect that builders should take that view of the matter, as their interest in building is merely commercial, and their aim naturally is to satisfy their customers at the least cost to themselves. The mass of the public are content with the coarse mouldings, and as long as that is the case they will be supplied.—Ed.

OBITUARY.

THE LATE KARL GRUNOW.—Herr Karl Grunow, the senior curator of the "Kunstgewerbe Museum," has just died in his seventieth year. He was well known as an architect until 1866, after which year his name was more associated with the arts and crafts. He was the actual founder of the museum, for which he was responsible to the Government at the time of his death, and it was mainly due to him that the collections under his care in the short space of some twenty-five years had come to rank among the first on the Continent. This is the second serious loss the administration of the Kunstgewerbe Museum has sustained since the twenty-fifth anniversary of its foundation, which was celebrated with much ceremony a few months ago.

The Student's Column.

CHEMISTRY.—X.

Symbol Si. Silicon. Atomic weight 28.

SILICON is a solid element which, like carbon, may be obtained in three allotropic modifications—viz., crystalline, graphitoid, and amorphous. It is never found alone in Nature, but in combination with oxygen it is very widely diffused throughout the world, and forms

Silica, SiO₂;

(silicon dioxide, or silicic anhydride).

The following are some of the various forms in which silica occurs naturally:—Quartz, sand, rock crystal, onyx, opal, jasper, agate, bloodstone, carnelian, amethyst, and sandstone. The various colours in the different forms of silica are usually due to small quantities of metallic oxides—such, for instance, as iron oxide.

Silica is found in grasses and bamboos, to the stems of which it gives rigidity, and also in granite, clays, coals, and hundreds of other substances.

Ordinary silica is insoluble in water, and is not attacked by any acid, except hydrofluoric acid, which possesses uncommon properties.

When fine white sand (silica) is fused with an excess of carbonate of soda, CO₂ is expelled, and the soda unites with the silica to form sodium silicate, or soluble glass as it is called, on account of its solubility in water. If this mass is treated with water and filtered, and a slight excess of hydrochloric acid is added to the filtrate, a gelatinous, semi-transparent precipitate of silicic acid separates out.

If this gelatinous precipitate be collected, dried, and heated to a red-heat, then cooled and thoroughly washed, pure silica is obtained.

SiH₂O₄ = SiO₂ + 2H₂O.

(Silicic acid.)

Silicic acid forms with metals, silicates, the most important of which are the clays or silicates of aluminium.

Pure silica cannot be fused at any ordinary furnace temperatures, but melts in the oxygen-hydrogen blowpipe-flame.

Glass.

Although silicates of the alkalis are soluble in water, and silicates of the alkaline earths are soluble in acids, a compound of the two is neither soluble in water nor acids, and when fused, such a compound forms glass. All the ordinary forms of glass consist chiefly of silica. There are very many varieties of glass, but those used commercially may conveniently be divided into four classes.

1. Crown, window, or plate-glass which is composed of the silicates of calcium and sodium.

2. Common green bottle glass, consisting of the silicates of calcium, and sodium, aluminium, and iron.

3. Flint, crystal, or lead glass, consisting of the silicates of potassium and lead.

4. Bohemian glass, consisting of the silicates of calcium and potassium.

The first two of these glasses are easily fusible, the second less so, while Bohemian glass is the least fusible.

Bohemian glass is employed for the manufacture of chemical apparatus in which it is required to boil liquids. The following table, extracted from Roscoe and Schorlemmer's chemistry, shows the composition of the various kinds of glass.

Description of Glass.	SiO ₂	K ₂ O	Na ₂ O	CaO	MgO	PbO	Al ₂ O ₃	Fe ₂ O ₃	Analyst.
I. Bohemian Glass									
Old Goblet	69.40	11.80	—	9.20	+	—	9.60	—	Dumas.
Drinking Glass.....	71.70	12.70	2.50	10.30	81	—	0.90	—	Berthier.
Mirror Glass	76.00	15.00	—	8.00	—	—	1.00	—	Péligot.
Combustion Tube	73.13	11.49	3.07	10.43	.26	—	.89	—	Rowney.
II. Crown, Window, or Plate Glass.									
Old Egyptian Glass.....	12.30	—	20.83	5.17	—	—	1.19	0.59	Benrath.
Roman Bottle	10.66	—	17.17	8.38	—	—	2.25	1.24	Benrath.
German Window Glass	71.56	—	12.97	13.27	—	—	1.29	—	Benrath.
English " "	70.71	—	13.25	13.38	—	—	1.92	—	Benrath.
French " "	71.90	—	13.10	13.60	—	—	1.40	—	Péligot.
German Hollow Glass	78.39	—	13.91	7.10	—	—	0.60	—	Benrath.
French " "	72.00	—	17.00	6.50	—	—	4.50	—	Berthier.
English Crown Glass	71.40	—	15.00	12.40	—	—	0.60	—	Cowper.
German " "	73.11	—	13.00	13.24	—	—	0.83	—	Benrath.
Plate Glass from St. Gobin ...	73.00	—	11.50	15.50	—	—	—	—	Péligot.
English Plate Glass.....	77.90	1.72	12.53	4.85	—	—	3.59	—	{ Mayer and Brazilier.
Corrian " "	78.75	—	13.00	6.50	—	—	1.75	—	Benrath.
Venetian " "	68.60	6.9	8.10	11.00	2.1	—	1.5	—	Berthier.
III. Bottle Glass.									
German	65.57	2.72	4.86	20.42	—	—	3.34	2.81	Schuller.
French	59.60	3.20	—	18.00	7.00	—	6.80	4.40	Berthier.
IV. Flint Glass.									
English Flint Glass	51.40	9.40	—	—	—	37.40	2.00	—	Berthier.
French " "	50.18	11.22	—	—	—	38.11	—	0.44	Benrath.
Heavy Optical Glass	44.30	11.75	—	—	—	43.05	0.50	0.12	Faraday.

Symbol B. Boron. Atomic Weight 11.

Boron is a solid element, having many of its properties similar to those of carbon and silicon.

It is not found in a free state in Nature, but it occurs as *boracic acid* in the steam and vapours which escape from certain old volcanic districts in Tuscany. It also occurs in combination with oxygen and sodium as borax, "finical," or sodium borate in California and Thibet. Borax is often obtained by neutralising boracic acid with sodium carbonate.

Both boracic acid and borax have antiseptic properties, and are sometimes used for preserving milk and similar substances. As, however, their effect upon the human system is still a matter of dispute, they should be avoided.

Boracic acid imparts a green colour to a spirit or Bunsen flame, and is often detected through this fact.

Many metallic oxides are dissolved by borax when fused with it, and produce coloured glasses. A metallic oxide in a mixture may sometimes be detected by the colour it imparts to a borax bead.

The Halogens.

The four elements Fluorine, Chlorine, Bromine, and Iodine are termed *Halogens*, or salt-producers. They exhibit a remarkable gradation of properties. Thus the first two are gases, the third a liquid, and the fourth a solid; the activity with which they combine with other substances also seems greatest with fluorine, and least with iodine. They all unite with hydrogen in the proportion of one vapour volume of the halogen to one volume of hydrogen to form two volumes of a gaseous acid. These acids are all very soluble in water, and all form well-marked series of salts.

The following are the special characteristics of the halogens:—

Symbol F. Fluorine. Atomic Weight 19.

A gaseous body which attacks all ordinary substances, except fluorspar and other fluorides, with amazing rapidity. It speedily eats its way through glass, and combines with many metals so rapidly as to set them on fire.

Symbol Cl. Chlorine. Atomic Weight 35.4.
A greenish yellow gas with very irritating odour. It is considerably soluble in water, and the aqueous solution possesses bleaching properties. Some metals, when in a very fine state of division, take fire when dropped into chlorine gas and form, of course, *chlorides* of the metals.

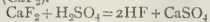
Symbol Br. Bromine. Atomic Weight 80.
A deep red liquid of intensely irritating smell. It is slightly soluble in water, and the solution possesses feeble bleaching properties than chlorine.

Symbol I. Iodine. Atomic Weight 127.
A dark, steel-grey solid, slightly soluble in water. Its solution does not bleach.

The properties of these acids bear much resemblance to one another.

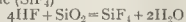
Hydrofluoric acid, HF.

This acid is used for etching upon glass. It is obtained by the action of sulphuric acid upon calcium fluoride, which occurs naturally as fluorspar (CaF₂).



Hydrofluoric acid is a gas which is very soluble in water.

Dry hydrofluoric acid gas has little or no action upon glass, but in the presence of water the silica of the glass combines with the fluorine of the acid, forming a volatile compound termed silicon tetrafluoride (SiF₄).



Consequently the acid cannot be manufactured or preserved in glass vessels, but is always prepared in lead vessels.

The acid is rather dangerous to work with, because it gives off noxious fumes, and when dropped upon the skin produces painful ulcers.

Etching upon Glass.

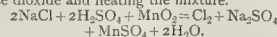
For etching upon glass either the gaseous acid or its solution in water may be used.

The glass is first covered with wax, and the design is then traced through the wax with a sharp-pointed instrument so as to expose only that portion of the glass which is to be acted upon. The glass thus prepared is then exposed to the action of the hydrofluoric acid, preferably in the form of vapour obtained by heating the sulphuric acid and fluorspar together in a leaden saucer.

After a time the wax is removed by means of oil of turpentine, and the design is found traced upon the glass. For all rougher kind of work, such as etching upon the windows of taverns, the acid solution is usually employed as being more convenient to use than the vapour.

Chlorine.

Chlorine is not found in the free state in nature, but in combination with sodium it occurs in large quantities as common salt (NaCl) and as rock salt. It is also found combined with potassium as potassium chloride. Chlorine may be obtained from sodium chloride or common salt by mixing it with sulphuric acid and manganese dioxide and heating the mixture.

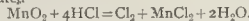


Manufacture of Chlorine on a large scale.

Chlorine is very largely used in commerce for bleaching purposes, principally in cotton, linen, and paper manufactures. It is sometimes used in the gaseous condition, but far more frequently in the form of a chloride of lime known as *bleaching powder*.

The following is the method generally em-

ployed for preparing chlorine upon a large scale. A large tank, usually made of Yorkshire flagstones, occasionally of sheet lead, is partly filled with *pyrolusite*, a native ore containing about 60 per cent. of manganese dioxide (MnO₂); commercial hydrochloric acid, known as "spirits of salt," is then run into the tank, and the mixture is heated by passing steam into it. The following reaction then takes place, and chlorine gas is liberated:—

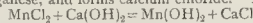


The chlorine is, therefore, obtained by the decomposition of the hydrochloric acid.

On account of the employment of such an impure ore as *pyrolusite*, a certain amount of ferrous chloride (FeCl₂) is always present after the action of the acid. It is found advisable to decompose this before continuing the process, by treating the whole mixture in the tank with chalk. The ferrous chloride is thus converted into ferrous oxide.



The chloride of manganese is now treated with slaked lime or with "milk of lime," which precipitates the manganese as hydrated protoxide of manganese, and forms calcium chloride. Thus—

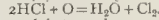


This mixture of Mn(OH)₂ and CaCl₂ is known technically as *Weldon mud*. By passing a current of air through it the MnO is converted into MnO₂, which can then be used again for preparing a fresh quantity of chlorine. This recovery process is known as "Weldon's process." It is found necessary, in practice, to add about 8 per cent. of *pyrolusite* to the contents of the tank each time a fresh quantity of hydrochloric acid is decomposed, in order to cover loss during the working of the process.

Deacon's process.

Another method which has been used for preparing chlorine gas on a large scale is known as "Deacon's process," and consists in passing hydrochloric acid gas and air over heated fragments of brick which have previously been soaked in a solution of copper sulphate, and dried.

The hydrogen of the acid combines with the oxygen of the air, and thus liberates chlorine,



The copper sulphate undergoes no change in chemical composition, its action being merely a catalytic one.

Manufacture of Bleaching Powder.

Bleaching powder, or *chlorinated lime*, commonly called *chloride of lime*, is a mixture of calcium chloride and calcium hypochlorite, hence it is sometimes termed *hypochlorite of lime*.

The calcium chloride always found in commercial bleaching powder may be regarded as an impurity, for the value of the powder depends entirely upon the amount of calcium hypochlorite it contains.

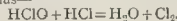
Its formula is supposed to approximate to CaCl₂ + Ca(OCl)₂ + 2H₂O; or, according to Dr. Frankland, to CaOCl₂ + H₂O.

It is made by passing chlorine gas into lead chambers, containing layers of slaked lime of a few inches in depth.

When the chlorine has been in contact with the lime for three or four days, the inlet pipe is closed, and the chlorine gas which fills the chambers is replaced by air by means of an exhaustor. Men are then sent into the chambers to rake over the lime, so as to expose the under surface to the action of the chlorine, which is again sent into the chambers for about two days. By this time, the lime is thoroughly chlorinated and ready for use. It is a dry, white powder, smelling feebly of chlorine, has an acid taste, and is partially soluble in water. If exposed to the air it deliquesces slowly, owing to the calcium chloride it contains; it also slowly absorbs carbon dioxide from the air and evolves chlorine and hypochlorous acid. When heated, bleaching powder gives off oxygen, and the whole becomes calcium chloride.

The activity of bleaching powder, both as a bleaching agent and as a disinfectant, is chiefly due to the fact that its chlorine when liberated has so great an affinity for hydrogen, that it will in several cases decompose a compound of hydrogen and oxygen, uniting with the hydrogen and liberating free oxygen.

The chlorine in bleaching powder is very readily liberated by the action of a mineral acid. When cloths saturated with solution of bleaching powder are suspended in a room, the carbonic acid liberates hypochlorous acid (HClO), which, when exposed to light, liberates chlorine and acts as a disinfectant, but the action of hydrochloric acid upon hypochlorous acid is to liberate free chlorine, thus—



Therefore, when hydrochloric acid is poured upon bleaching powder, free chlorine is more rapidly evolved, because the hypochlorous acid is decomposed by the HCl as quickly as it is liberated, and, moreover, chlorine is obtained from the acid as well as from the bleaching powder.

Bleaching powder will not bleach except in the presence of moisture. Ordinary goods to be bleached are first thoroughly cleaned, then dipped into a clear solution of bleaching powder, and finally immersed in dilute acid. This last immersion is termed *souring*, and has the effect of liberating free chlorine, which in turn decomposes some of the water thus:—



The oxygen thus liberated in the nascent state in the fibres of the materials oxidises the colouring matter present, produces colourless oxidation products, and consequently bleaches.

It is therefore the oxygen liberated by the chlorine, and not the chlorine itself, that bleaches.

GENERAL BUILDING NEWS.

NEW CHURCH, GREENOCK.—The new church erected by the congregation of St. Paul's Established Church, Greenock, was opened on the 9th inst. The church, which, exclusive of the tower (not to be proceeded with meanwhile), will cost between 10,000*l.* and 11,000*l.*, consists of a nave 90 ft. long, 31 ft. broad, 30 ft. from floor to wallheads, and 43 ft. to the apex of the ceiling. The choir space is 30 ft. long and 21 ft. broad, and there are north and south aisles. At the west end there is a vestibule, over which is a gallery, with access by porches to the north and south of the vestibule. The nave is divided into six bays, five of which open into a narrow aisle on each side, and which serve only as passages. On the north side is a transept 17 ft. deep, and provision is made for having a shallower one on the south side. Under the north transept are vestry, session-house, lavatories, &c., and under the choir and chancel a hall. The principal entrance to the church is on the west side, and is by a large pointed arched doorway, flanked by windows which light the vestibule. The church is lighted by the clearstory and large windows in the gables. The tower, when erected, is to be 40 ft. square at the base, 115 ft. to the top of the tower, and 180 ft. to the vane. Internally, the walls are fitted with terra-cotta brick, the pews are of stained Oregon pine, and the pulpit and choir stalls are of oak, carved. The heating arrangements are on the low-pressure system. The architect is Mr. D. Rowand Anderson, LL.D., Edinburgh, and the tradesmen were:—Mason work, Mr. Wm. Steel, Greenock; joiner work, Messrs. James Robertson & Sons, Glasgow; plumber work, Mr. John M'Jannet, Greenock; slater work, Mr. Adam Leisk, jun., Greenock; glazier work, Mr. James Graham, Greenock; heating work, Messrs. James M'Farlane & Co., Greenock; plaster work, Mr. James M'Creddie, Greenock; carver work, Mr. Wm. Vickers, Glasgow; pulpit and choir stalls, Mr. James Slake, Edinburgh; gasaliers, &c., Messrs. K. Laidlaw & Son, Edinburgh; tile layers, Messrs. Keen & Wardrop, Glasgow; and ornamental railings, gates, and ironmongery, Mr. Alexander Chalmers, Greenock.

ADDITIONS TO "CLEEVE HOW." WINDERMERE.—Extensive additions and alterations to Cleeve How, Windermere, for Mr. A. R. Sladen, have just been completed. These include new billiard-room with large ingle nook and alcove, lit by large windows at the end and a lantern light. The room has a paneled dado and fumigated oak, and the arches to the ingle nook and alcove are paneled, having enriched pilasters, &c., in the same material. The whole of the south front has been re-cast, including a new library, &c. This room has been fitted up in a similar manner to the billiard-room. The terra-cotta windows have been removed and new freestone windows inserted. The house is now lit by the electric light, the power being obtained from a 44 h.p. Crossley gas-engine. Messrs. Shrigley & Hunt, of Lancaster, designed and made the large end windows for the billiard-room, introducing various games in the different lights; they also supplied the rest of the lead lights for lantern, staircase, corridors, &c., &c. The heating has been done by Messrs. Seward & Co., of Lancaster, the decorations and place pieces by Messrs. Goodall, of Manchester, the rest of the work having been done by local workmen from the designs and under the superintendence of Mr. Robert Walker, architect, of Windermere.

SWIMMING BATH, EXETER.—On the 2nd inst. Mr. H. D. Thomas, J.P., laid the foundation stone of the New Tepid Swimming Bath, which is being built in the old King's Lodge College Grounds, Exeter. The architects are Messrs. Octavius Ralling & Toner, of Exeter, and the builders Messrs. Ham & Passmore. The measurement of the main building will be 90 ft. by 45 ft., and the swimming tank 75 ft. by 20 ft., the depth of the water increasing from 3 ft. 6 in. to 7 ft. 6 in. At the rear will be lavatory and douche accommodation, and also a large room for club purposes. There are

about 50 dressing boxes arranged round the side of the bath. The place will be lighted by a large lantern light running the whole length of the building, and heated in winter by means of hot-water pipes. Slipper baths, and also a plunge bath have been provided for. For the accommodation of spectators a gallery will be constructed round the building, approached by a staircase from the inside, and having an emergency exit as well.

EYE INFIRMARY, GREENOCK.—A new eye infirmary is to be erected at the corner of Nelson-street and Brisbane-street, Greenock, on a piece of ground which in extent is over a quarter of an acre. The building will consist of a dispensary for outdoor patients and a hospital for indoor patients, the two departments having separate entrances from Nelson-street. A large waiting-room for outdoor patients will accommodate from 80 to 100, near which will be the dispensary and patients' room, with doctors' room attached, the last named to be used also as a board-room. There will be male and female departments, each having six beds, whilst two other wards will each have two beds for treatment of special cases. Rooms for recreation will adjoin both male and female departments. Then there will be apartments for the matron, the house servants, with kitchen, offices, washing-house, and laundry. The department for outdoor patients and the larger wards will be arranged on the ground floor, while the two smaller wards, with matron's apartment, will be on the upper floor. It has been decided to set back the frontage of the building from the line of streets, the intervening ground to be utilised as a garden. In Nelson-street there is a frontage of 89 ft., and in Brisbane-street of 95 ft. Mr. Jas. B. Stewart, Greenock, is the architect, and the cost is estimated at between 2,000*l.* and 3,000*l.*

NEW PARISH CHURCH, MALONE, BELFAST.—A new parish church is being erected in Malone Park, Malone, Belfast. The site, at the end of Osborne Park, is the gift of Mr. Harvey. The architect is Mr. H. Seaver, and the builders Messrs. Dixon & Campbell. The style of the church will be Early English, of cruciform plan, with an old English square tower at the north-east corner. The walls are being built with Scabro stone, in "bonded" facing, with dressings of Dumfries stone. The interior will be lined with dark-red compressed bricks, drawn with white joint in Keen's cement. The internal woodwork will be of selected pitch pine, and the floor of the chancel laid in mosaic. The church will seat between 700 and 800 when completed. The nave and tower are not included in the present contract.

NEW RAILWAY STATION AT WALLSEND.—The new railway station at Wallsend, which has been built for the directors of the North-Eastern Railway Company, is almost completed. Messrs. J. & W. Simpson, builders and contractors, Blyth and North Shields, were successful in securing the contract for the rebuilding of the station from plans supplied by Mr. H. Bell, architect to the Company. The alterations, which were on an extensive scale, extended over several months. The new platforms, which are laid with concrete, extend to a length of 570 ft. On the south, or up line, there is a general waiting room. There is also on the same side of the line a ladies' waiting room, and retiring room adjoining, and a gentlemen's first-class waiting room. The station-master's office, porter's room, with large range and hot and cold water supply, and stores repository are situated on the up platform, and on both sides of the line are fountains with filtered water. On the north, or down line, there is a large waiting room, ladies' room, and lavatories. The means of approach to both platforms is from the level of Station-road.

SCHOOLS, BOURNEMOUTH.—In the paragraph under this head last week, it was implied by an oversight in the wording, that Messrs. Hoare & Sons were the contractors for both the two schools mentioned; they built the Boscombe school only, the other having been built by Messrs. George & Harding.

MEMORIAL CHURCH, TONNA, NEAR NEATH.—On the 20th ult., the St. Anne's Memorial Church, Tonna, near Aberdulfais, was dedicated by the Lord Bishop of Llandaff. The church is a Gothic cruciform structure of native stone, with Bath-stone dressings. The church consists of nave, chancel, and transepts, with organ-chamber and vestries. The architect was Mr. E. Lingen Barker, of Hereford, and the builder, Mr. W. Dowland, of Abergavenny.

SANITARY AND ENGINEERING NEWS.

PROPOSED EXTENSION OF DEFECCATION WORKS IN BRADFORD.—The Street and Drainage Committee of the Bradford Corporation, along with the Borough Surveyor (Mr. Cox), visited the Borough defeccation works at Frizinghall on the 10th ult., for the purpose of viewing the capabilities of the site. Extension has become necessary, says the *Leeds Mercury*, owing to the growth of the town and the more efficient working of the plant which will be required by the Joint Conservancy Board. The system at present in operation is that of lime precipitation, but as an improvement on this Mr. Cox has recommended the ferrocyanide process. Precipitation would, however, be valueless for manurial purposes, and destructors will be required to burn

the dried sediment. These Mr. Cox suggests should be erected close by, and made to serve all the requirements of the Frizinghall and Bolton districts. The cost of the scheme is set down at about 100,000*l.*

WAKEFIELD SEWERAGE DISPOSAL WORKS.—A- important inquiry was held on the 10th ult., by Mr. Arnold Taylor, on behalf of the Local Government, the Authority, Mr. Frank Massie, C.E., who is responsible for the Wakefield Rural Sanitary Authority for a provisional order to empower the authority to put in force portions of the Lands Clauses Acts for the purchase of land required for purposes of sewage disposal works in the townships of Stanley-cum-Wrenthorpe, Alverthorpe-with-Thornes, and East Ardsley, and for the purposes of an improved water supply to the high level districts of the authority, comprising the townships of East and West Ardsley, Crigglestone, and Stanley. It is proposed to treat the sewage on both outfalls on land, and to construct a service reservoir containing a million gallons, filter-beds, and pure water tank at a point near Tingley Hall in the township of West Ardsley. The Engineer to the Authority, Mr. Frank Massie, C.E., who is responsible for the three schemes, gave evidence in support thereof, and Mr. George Hodson, C.E., of Loughborough and Westminster, also gave evidence in favour of the schemes. There was practically no opposition, and this inquiry, involving the future expenditure of nearly 50,000*l.*, was concluded in four hours.

WATER SUPPLY, WELSHPOOL.—The Town Council of Welshpool have decided to take steps to improve the water supply of the borough and have called in Mr. W. Wyatt, of Shrewsbury, to advise them in the matter.

MAIN DRAINAGE WORKS, &c., BELFAST.—Mr. Charles P. Cotton, M.Inst.C.E., Inspector for the Local Government Board, held an inquiry in the Municipal Buildings, Belfast, on the 21st ult., under the Public Health (Ireland) Act, 1878. The Belfast Corporation acting as Urban Sanitary Authority for the district have applied to the Local Government Board for Ireland for their sanction to a loan of 75,000*l.* for main drainage works, a lot of 1,000*l.* for fire brigade station, and a loan of 10,000*l.* for street improvements. Mr. J. C. Bretland (City Surveyor) gave details as to the main drainage works; Mr. Munce (Assistant Surveyor) was examined as to the fire brigade buildings; and Mr. William M'Cammond, J.P. (Chairman of the Improvement Committee), was examined briefly as to the street improvements.

FOREIGN AND COLONIAL.

FRANCE.—A large new girls' school has just been opened in the Rue Ganneron, from the plans and designs of M. Decour. The municipal administration intends to devote a sum of 3,800,000 francs to the erection of new hospitals in Paris. The Municipality of Paris has accepted the offer of the Chemin-de-Fer de l'Ouest to continue, at its own cost, the railway line from Moulins to the Esplanade des Invalides in the first place, and subsequently to the Square Cluny. The railway company will, therefore, have to construct a bridge over the Seine at the end of the Rue de Constantine, opposite the Champs Elysées. In consequence of a new failure last week, the reservoir at St. Cloud, to receive the water of the Avre, will have to be almost entirely reconstructed. The Public Works Department have given orders for the excavations necessary in order to search for a subterranean water supply sufficient for the supply of Versailles and its environs, the district being at present in no satisfactory sanitary condition. A large pile of barracks is being built at Melun to replace those barracks which have been condemned as insanitary. The Hôtel de Ville of Calais has been transformed into a museum by Government orders. The French Government is pushing on actively this year the construction of certain number of railway lines for a special strategic object, viz., to assure to each *corps d'armée* the means of direct transport in case of mobilisation. Among these will be a line from Bourges to Tours and Verdun which will be prolonged to Limoges and Montauban; and in Corsica, that from Corte to Vizzanova. The town of Montreuil (Yonne) has opened an architectural competition for the construction of a savings bank. For the third time during the last two years the Palais des Dauphins at Grenoble has been nearly destroyed by fire. The Municipal Council of Lyons has instructed M. Gaspard André (architect) to design a monument to the memory of the popular poet Pierre Dupont. The viaduct at Lormont, over which passes the railway from Paris to Bordeaux, is undergoing important works of repair. A large school establishment has just been completed at Tournay with a capacity of 800,000 francs. The Palais de Justice at Grenoble is being restored at a cost of about a million francs. M. Paul Girardet, an engraver, of Swiss nationality, has just died at Paris at the age of 72. He was the last representative of the celebrated family of engravers of that name. He was also the near relative of the late Earle Reiber, architect, founder of "L'Art Pour Tous," and author of various works intended to popularise the teaching of drawing. He was

born at Schlestadt (Bas-Rhin) in 1826, and had studied architecture under the direction of Abel Blouin, whose assistant he was in various notable works, such as the Mairie of the First Arrondissement, and the bridges named after Arcola, the Invalides, and Jena. His decorative designs, made principally for the "Maison Christophe," procured him, in 1874, the chief prize of the "Union Centrale des Arts Décoratifs," and a gold medal at the Exhibition of 1875.

BERLIN.—The Emperor is again opening numerous churches or laying the foundation stones of such buildings. On the 26th ult. he opened the new Gethsemane Church, which Professor Orth had built at a cost of 23,000*l.*, and which holds a congregation of 1,600. On the 10th inst. he opens the new Nazareth Church, which has been built by the Government at a cost of 21,000*l.* There are 1,300 seats in this church. The design was by "Baurath" Spitta. There has been a competition for the design of a memorial monument to the Elector Frederick I. The assessors, by fifteen votes out of seventeen, selected the sculptor Boese's design. The Emperor, on seeing the competition designs, however, considered M. Calandrelli's scheme more to his taste, and has ordered the latter to carry out the work. The old scheme of running tram lines across the main thoroughfare, "Unter den Linden," has again come to the foreground. The Eold Emperor, who had certain rights in the matter, would not hear of the scheme. The proposed lines will be a great boon to the city, which at present has no good tram-service running from north to south. The present Emperor considers the scheme necessary, though the tram lines will by no means add to the dignity of the thoroughfare.

The competition for a memorial monument to the late Empress Augusta was by no means as good a one as expected. Only twelve models were sent in. Professor Schaper received the first premium. Over seventy designs were sent in for the great Provincial Museum Competition. The assessors have awarded the first premium to Herr W. Walther Eversheim, of Berlin. There were two second premiums, one to Herr Eggert, of Wiesbaden, the other for Messrs. Zaar & Vahl, of Berlin. Three other designs had been bought by the promoters of the competition. The highly interesting competition for the scheme of a large new "colony" of artisans' dwelling to be erected by Herr Krupp, of Essen, has been decided in favour of a proposal by Herr Walther Eversheim, of Aix-la-Chapelle. There were ninety-four candidates. The old "Dom," which has to make room for the new cathedral, is now being demolished. On opening the ball which had ornamented the cupola, a large collection of interesting papers and coins were found. Among the former is a drawing of the "Dom" as it was in 1747. The design for the so-called National German House at the Chicago Exhibition has been on view in the lobby of the Verein der Kunstler. The architect, Herr "Reg.-Baumeister" Radke has selected the Early German Renaissance style for his work. Mr. Fidler, of Chicago, has superintended the erection of the place. Of the many architectural models Germany sends to Chicago, one by Herr R. Berger of the new Houses of Parliament in course of erection promises to be the most beautiful. The workmanship on it is excellent. It has only cost 1,000*l.* The scale to which it has been worked is one twenty-fifth full size. From all reports this year's building season is to be an exceptionally bad one. The labour prices will, however, remain as high as before.

LEIPZIG.—The historical castle Pleissenburg is to be pulled down. Its history dates back to 1312 A.D., although the building now being pulled down only saw its present form in 1549, in which year Hieronymus Lotter acted as architect. The Leipzig municipality paid about 210,000*l.* for the ground. They require it for street improvements.

MISCELLANEOUS.

THE SURVEYOR'S INSTITUTION.—At the meeting of this Association on Monday evening last, Mr. C. J. Shoppee, President, in the chair, Mr. P. E. Pilditch, Fellow, read a paper on "Dilapidation Practice, particularly as affected by some recent decisions." We regret that pressure on our space precludes more than a passing mention of it this week, but we may note that Mr. Pilditch concluded by suggesting that "in cases which are settled before the higher tribunals, whose judgments have, or should have, a binding force over our entire practice, inasmuch as they constitute the only standard to which reference can be made, and by means of which some measure of certainty and uniformity of practice can be obtained, and without which our practice would be built upon the sand, and every surveyor's views in each particular case be as good as another's, so leading direct to chaos, a practical dilapidations assessor should be employed to advise the Judges upon points of fact and technique. I cannot help thinking that, if this course were once tried, the Judges themselves would never allow it to fall into desuetude; their judgments would lose nothing from a legal aspect, and would be even more valuable and easy to follow and interpret than at present, and we should never have otherwise profound judgments diminished in value through absence of technical knowledge. It would, I fear, be too much to

expect that in this or similar subjects we could have technical tribunals like that set up under the County Council of 1890, consisting at present of two eminent members of this Institution and the Royal Institute of British Architects, and a member of the County Council, the working of which has been so successful to my own knowledge as well as that of many other surveyors. Following this precedent, I think it could be managed, great advantage would result if a certain number of surveyors were to be nominated as suitable to act as dilapidations assessors, so that from this number the Judges might, upon such occasions as I have suggested, select one to act as technical assessor, not necessarily at the hearing of the case, though that would be advisable, but in the preparation of the judgment so far as it dealt, as so many judgments do and must, with detail and technique."

A NEW SASH-FASTENER.—Mr. Pollock, of 29, Queen-street, E.C., has submitted to us a model of a sash-fastener, which has the merit of simplicity and of having no spring in it, and nothing about it which can get out of order. It consists essentially of a tongue of metal working on a pivot rising from the screw-plate which is attached to the meeting-rail of the upper sash, in the same position as the ordinary fasteners. The end of the tongue, which turns on the pivot, is carried up round the pivot in the form of a moulded shoulder, by which the tongue can be easily lifted for about a quarter of an inch and turned either to right or left for fastening or unfastening. The lift referred to is necessary in order to allow the metal tongue to be turned, as the underside of this tongue is provided with a projection which drops into one of three holes in the screw plate on which the tongue is pivoted, one on the rail of the lower sash (when fastened) the others on the rail of the upper sash to receive the tongue when turned back. The top of the pivot is provided with a screw which screws down on the head of the fastener to keep it in its place when the window is closed, and is unscrewed to raise and unfasten it. There is a good deal in this fastener to recommend it; its defect is that it does not act powerfully in drawing the sashes together when fastened, which is an important point in a sash-fastener, which should make a sash not only safe but tight when closed.

LONDON SANITARY PROTECTION ASSOCIATION.—The twelfth annual meeting of this association was held on Monday at the House of the Society of Arts, Dr. J. S. Bristowe in the chair. The report of the Council for the year 1892 showed a further increase of membership, 506 having joined during the year. Five hundred and thirty-five houses had been inspected for the first time, of which 68 per cent. were reported as in a more or less bad condition, a rather larger proportion than the average of the previous eleven years, showing that the necessity for the society's existence is as great now as when it was founded. Amongst the buildings inspected were sixteen hospitals, schools or other public institutions. The Council regretted that no application had been received for the inspection of any working class dwellings, but they had given an additional donation of 10*l.* to the Mansion House Council on the Dwellings of the Poor. Application had been made for a share of the Berridge legacy, and if this proved to be successful the Council hoped to be able to at once take steps for rendering the results of their twelve years' experience available for promoting the general advance of sanitation by means of lectures, publications, &c.

WOOD MOULDINGS.—We have received from Mr. S. Wilcott, of Newbury, illustrated catalogues of his large stock of steam-struck mouldings, along with some samples of the mouldings as turned out from the machine. As specimens of machine-work of this kind these are remarkably clean and sharp in execution, and do great credit to the firm. The sections figured in the catalogue, though not all of equal merit, are in many cases of very good and effective design, and superior to the general run of stock mouldings.

THE "RED CROSS" DUST-BIN.—This is a sanitary dust-bin and cinder-sifter patented by Mr. Joseph Foulkes and made by the Gospel Oak Iron Company (Wolverhampton), which is made in a circular or barrel form, of galvanised iron or other suitable metal. Near the top of it is fitted a sieve, which can be worked to and fro through a small arc of a circle by handles protruding through two notches in the rim, the top being at the same time covered with a lid which prevents dust from spreading. The sieve works on rubber-tired runners to prevent noise in working. In the centre of the lower part of the bin, into which the dust and small matter fall through the sieve, is a funnel containing a disinfecting powder, which is supposed to escape at the top and disinfect the contents, about this part of the action we feel some little doubt. The bin however is a clean convenient and compact dust receptacle, and the combination of the cinder-sifter with it is well managed.

CAPITAL AND LABOUR.

BUILDING-TRADE LABOURERS, CARLISLE.—On the 1st inst. about 200 bricklayers and masons' labourers in Carlisle struck work for an advance of wages. Their present rate of pay is 5*d.* per hour, as compared with 8*d.* per hour paid to the masons and 8*d.* to the bricklayers. The labourers demanded that their

wages should be increased from 5*d.* to 6*d.* per hour, but the masters, who have an Association, have resolved not to grant the increase. They say that the present state of the building trade would not warrant the increase, but they are prepared to give 5*d.* per hour to those labourers employed as hod-carriers, who have to ascend and descend ladders. They refuse to raise the pay of labourers working on the ground.

BUILDING STRIKE AT PORTSMOUTH.—According to the *Western Morning News*, for some time past the bricklayers and labourers engaged in the building trade have been on the verge of striking, but the strike has occurred at an unexpected moment. On the 3rd inst. a largely-attended meeting of the Portsmouth branch of the General Labourers' Amalgamated Union was held at Landport. The President stated that the master builders had offered the bricklayers an advance of a half-penny an hour, but that no decision had been arrived at as to the claim of the labourers pending the reception of a deputation on the 8th inst. A letter was read from the secretary of the Master Builders' Association, stating that the labourer's claim was under consideration and that a committee had been appointed to meet the deputation of the Union. A resolution was then carried that the strike should commence at noon the next day, and another to the effect that all union men in the building trade should give notice simultaneously to draw their back time. The general strike of bricklayers and labourers began therefore at noon on the 4th inst. as arranged. The number of men on strike is nearly a thousand of whom over 800 are members of the Bricklayers' and Labourers' Unions. The present rate of wages is 7*d.* an hour for bricklayers and 4*d.* for labourers, and both trades claim an extra penny per hour. The Mayor of Portsmouth (Mr. Barnes) has offered to act as arbitrator in the dispute.

MEETINGS.

FRIDAY, MARCH 10.
Architectural Association.—Mr. G. H. Fellowes Prynn on "Screens: their Treatment and Symbolism." 7.30 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. Charles D. Barker on "Methods adopted in Constructing the Glasgow Central Railway Works—Bridgeton and Tongate Contracts." 7.30 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. F. J. Sykes on "General Powers and duties of Inspectors of Nuisances." 8 p.m.

SATURDAY, MARCH 11.
Architectural Association.—Visit to the New Synagogue, Dennington Park-road, West Hampstead, by permission of the architect, Mr. Delissa Joseph. 3 p.m.
Edinburgh Architectural Association.—Visit to Corstorphine Kirk, and to Beechwood.

SUNDAY, MARCH 12.
Sunday Lecture Society.—Mr. H. Somerville on "The Electric Current, what it does, how it is generated, and measured." 4 p.m.

MONDAY, MARCH 13.
Royal Institute of British Architects.—(1) Special General Meeting to elect the Royal Gold Medalist for the current year; (2) General Business Meeting to receive and consider the Report prepared by the Science Standing Committee upon Light and Air. 8 p.m.
Society of Arts (Lectures for Sanitary Officers).—Professor W. Chandler Roberts-Austen on "Alloys." 11. 5 p.m.
Clerks of Works Association (Carpenters' Hall).—Paper by Mr. D. M. Nesbit. 8 p.m.

TUESDAY, MARCH 14.
Institution of Civil Engineers.—Further discussion on Mr. Walter Pitt's paper on "Plant for Harbour and Sea-works." 8 p.m.
Sanitary Institute (Lectures for Sanitary Officers).—Dr. J. F. J. Sykes on "Objects and Methods of Inspection." 8 p.m.
Carlisle Architectural, Engineering, and Surveying Association.—Mr. J. R. Dixon on "Hygienic Essentials in Building."

WEDNESDAY, MARCH 15.
Carpenters' Hall, London Wall.—Mr. J. Alfred Gorch on "The Early Renaissance in England." 8 p.m. (Admission free.)
Society of Arts.—Sir Philip Magnus on "Technical Education: its Progress and Prospects." 8 p.m.
Survey Archaeological Society.—Annual General Meeting. 4 p.m.
Institution of Civil Engineers.—Students' Visit to the East London Waterworks, Lea Bridge. Train leaves Liverpool-street at 1.35 p.m.
Royal Meteorological Society.—Mr. Shelford Bidwell, F.R.S., on "Some Meteorological Problems." 7 p.m.

THURSDAY, MARCH 16.
Society of Antiquaries.—8.30 p.m.

FRIDAY, MARCH 17.
Sanitary Institute (Lectures for Sanitary Officers).—Dr. Arthur Newsholme on "Nature of Nuisances, including notices the abatement of which is directed by law." 8 p.m.
Royal Institution.—Mr. W. J. Russell on "Ancient Egyptian Pigments." 9 p.m.

SATURDAY, MARCH 18.
Glasgow Architectural Association.—Visit to Gartloch Asylum.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

FEBRUARY 23.—By *W. Woods & Snelling* (at Sidecup): 1 & 2, Calcutt-street, Foot's-Cray, Kent, 1*l.*, 455*l.*; "Havlock House," 1*l.*, 510*l.*
FEBRUARY 27.—By *Furber, Price & Furber*: Nos. 344, 345, and 346, Hartowrd, u.t. 70 yrs., gr. 30*l.*, r. 255*l.*; 47, Compton-rd., Highbury, u.t. 54 yrs., gr. 8*l.*, 8*s.*, r. 50*l.*, 560*l.*; 14, Bury-st., Bloomsbury, u.t. 48 yrs.,

Fetter-lane, E.C. [Adv]

47 and 49, St. Enoch-sq.

The Builder.

VOL. LXIV. NO. 2615.

MARCH 30, 1893.

ILLUSTRATIONS.

Church of St. Joseph, Aylesbury.—Messrs. Goldie, Child, & Goldie, Architects	Double-Page Ink-Photo
The "Equitable" Building, Denver, Colorado.—Messrs. Andrews, Jaques, & Rantoul, Architects	Double-Page Ink-Photo.
Design for Timber Spire.—By Mr. Walter Percival	Double-Page Ink-Photo.
Wilson's Grammar School, Camberwell.—Mr. E. R. Robson, F.R.I.B.A., Architect	Single-Page Photo-Litho.
Clock Tower of the People's Palace, Mile End, London.—Mr. E. R. Robson, F.R.I.B.A., Architect	Single-Page Photo-Litho.

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The Catalogue of the Spitzer Collection.



WE know not whether those of our readers who are not professedly collectors on a large and sumptuous scale—few architects enjoy the requisite wealth for the pursuit, however congenial it might be to them otherwise—have fully realised what an extraordinary and almost unheard-of sale of *objets d'art* is that which is to be prosecuted at No. 33, Rue de Villejust, Paris, during the period between April 17 and June 16 of this year. The sale is a phenomenal one, and the catalogue is no less phenomenal. It consists of two large and handsome folio volumes of letterpress, containing a short description, date and other information appended to the number of every article in the sale, and a still larger folio of plates of photographs of many hundreds of the objects in the collection. The sumptuous character of the catalogue, which in itself is, along with the illustrations, a record worth preservation in a library, is however only in keeping with the abnormal value of the collection, which in the present days of æsthetic indulgence, must probably be reckoned in millions rather than thousands.

To many of that large majority of mankind who are not rich enough to concern themselves with the traffic in rare and valuable works of art the Paris Exhibition of 1889 gave the first hint as to the extraordinary character of the Spitzer collection, when they found nearly all the most valuable Mediæval work in the Trocadéro Exhibition labelled "Collection Spitzer." The author or maker of this collection appears himself to have had a phenomenal career. He inherited no wealth. He was born at Vienna in 1815, with his own way to make in the world, but apparently with an inherent perception in regard to the merits and the commercial value of examples of ancient

industrial art, especially of Mediæval and Renaissance work. He appears to have combined æsthetic perception with business capacity so thoroughly that he was able to make his traffic in works of art itself the means of building up the fortune which enabled him ultimately to leave the greatest collection of the century. He commenced life by touring through Germany, England, Belgium, and Holland, in the pursuit of the trade of a *curio* dealer, making money and perfecting his information at the same time. In 1852, at the age of 37, he settled in Paris, at an epoch peculiarly favourable for his ambition. Paris was then the central depot of Europe for the curious in works of art, and the modern world was just then awaking to the fact that there are some other classes of artistic objects worth attention besides pictures and sculpture. In short, like Stephenson in the business of railway-making and Scott in that of church building and church restoration, Spitzer had the good fortune to come in at the right moment to make the best of a new taste, and make his fortune out of it. But he aspired to be something more than the leading dealer in works of art; he had the ambition to organise by his own single effort a complete museum of industrial art of the Mediæval and Renaissance schools. He appears to have pursued this object with an inflexible perseverance, purchasing and putting aside from the collections which passed through his hands the finest examples of each class of work, until he had slowly amassed the collection of *chef d'œuvres* which is now unhappily to be dispersed again by public sale only two or three years after its completion. One cannot help thinking that both Balzac and Spitzer were mutual losers by the great collector having lived too late to come under the notice of the great novelist. Had it been otherwise, Spitzer and his collection would have been immortalised in literature under some transparent pseudonym, and Balzac would have had a suggestion for an *étude* after his own heart.

The first section of the illustrations to the

catalogue gives a small number of peculiarly interesting Greek terra-cotta groups. These are mostly not single figures, like the well-known Tanagra examples, but sculptural groups on a small scale, some of them very remarkable both as compositions and for their force of dramatic expression. It is unfortunate that nothing is said in the catalogue as to their place of discovery, of which, however, their collector could perhaps have given no reliable information had he been living. Students of Greek art, however, will find them of no little interest.

Among a small collection of various objects in bronze which follow, is a remarkable bronze vessel of Roman work found at Palestrina, a circular vessel standing on three claws, and engraved with figures and quasi-Greek ornament in incised work, with a lid of which the handle is formed (in true Roman taste) by a nude figure bent backwards, and attached to the lid by the feet and hands. The collection of ivories which forms the next group is a truly remarkable one in its illustrations of Byzantine and early Gothic work of this class. Coasters, triptyches and diptyches with figure subjects in relief, carved horns, and single figures, are among this part of the collection. One remarkably rich coffer, showing figures in low relief in panels divided by bands of ornament, which has a very Byzantine appearance, is stated to be Italian work of the tenth century and in that sense has considerable interest as showing the surviving influence of Byzantine feeling in Italy at that date. The ivories include also some fine examples of French and Italian work of the Renaissance period.

The section of "Orfèverie Religieuse" includes nearly two hundred pieces of great interest and value. Prominent among these is a magnificent reliquary and monstrance combined, about 4 ft. high, described as "Hispano-Flamand" work of the fifteenth century, probably Flemish work under Spanish influence. A tabernacle of Venetian work of the sixteenth century offers an interesting comparison with this, as an object of somewhat the same nature designed in Renaissance form; it has more refinement

of detail and taste, but certainly far less power and richness of effect. An object with the foot and stem designed in the usual Gothic form for large chalices finishes above as a dish (set at an oblique angle) with the head of John the Baptist powerfully modelled in high relief, copper silvered and gilt; German work of the fifteenth century. Processional crosses, coffers, and monstresances are numerous. Among the coffers is a remarkably interesting piece of Limoges work of the thirteenth century. A processional cross of Spanish work of the fifteenth century, about 7 ft. in total height, is a splendid work, especially in the treatment of the extremities of the cross, in large plaques of blue enamel, on which rich leafage is fixed, cut out in engraved metal.

Tapestries are not very numerous, but include some very fine examples. Among these is the collection of eight mostly small but very elaborately-designed tapestries, illustrating the history of the miraculous image of Notre Dame de Sablon, made in 1518 at Brussels, by order of François de Taxis, "Maitre des Postes de l'Empire." They are specially remarkable for the minute and elaborate character of their architectural backgrounds. An Italian tapestry of the Annunciation (fifteenth century) and a German one of the Repose in Egypt (same period) are also very fine pieces of tapestry design.

The collection of Limoges enamels includes nearly 200 examples, prominent among which is a splendid work of Leonard Limosin, with a copy of Raphael's Neptune ("Quos ego") in the large centre panel, and mythological subjects connected with the *Aeneid* on smaller panels surrounding it. An oval plaque by Pierre Reymond (1563), Abraham refusing the presents of the King of Sodom, with a very fine border of grotesques, is another remarkable piece.

Palissy ware, of which there is a representative collection, hardly holds its old place now in artistic estimation, though it is still valuable from a collector's point of view. Some of the pieces here show Palissy at his best, especially some few in which the design consists of decorative patterns only, and which are very effective owing to the richness of surface obtained in this class of ware. But in general Palissy was too much occupied with mere clever imitations of nature, and in a general way it may be said that where his imitation is most successful, in a realistic sense, his design is worst, in fact can often hardly be called design at all.

Furniture comes next in the collection; but though there are a good many fine and varied examples, there is nothing superior, perhaps nothing equal, to the best work to be found in the South Kensington Museum. The collection of stamped leather contains some very fine work, as also the collection of metal work and keys, but nothing better than what we may see in well-known collections. The collection of "Dinanderie," *i.e.*, metal ware in the shape of more or less grotesque cups and vessels, for which Dinant was famous in the early Mediæval period,* furnishes illustrations of a kind of work which, ugly as it mostly is, has a historical interest.

Of Oriental faience the collection is but small, but there is a splendid show of Italian Renaissance faience, a class of work to which Spitzer attached great value. The remarkable point about Italian Renaissance design of this class is that it seems to combine a great deal of Oriental richness in general design and effect, with the refinement of detail and the good drawing of the figure which were characteristic of the art of the Renaissance. This combination of richness with elegance is finely exemplified in the three plates by Orazio Fontana, numbered

1089 to 1091 in catalogue. In these the general lines of the design show a freedom from the influence of conventional symmetry which is not frequently found in Renaissance work, while the details and pictorial subjects have the full Renaissance refinement and finish. A plate representing the death of Cæsar, and attributed to Nicolo d'Urbino (number 1073 in the catalogue) is remarkable not only for the spirit of the figures and composition, but for the curiously bold way in which the lines of the pilasters and piers of the architectural background are drawn straight up to the rim of the plate, ignoring the break in the ground between the rim and the centre. The effect is not good, it is only interesting as showing the purely pictorial spirit in which the artist treated his work, regarding the surface of the plate merely as so much space to draw on, and entirely ignoring the functional distinction between the central space and the raised rim. A similar treatment often occurs and is shown in other examples in this collection, but it is more noticeable where the background is formed of architecture which necessarily suffers distortion of its lines by such a treatment. A contrary method is shown in a curious plate attributed to the same artist, in which the pictorial subject is entirely confined to the rim (an unusually wide one), and the centre left plain, except for a coat-of-arms.

The collection of marbles includes a superb monument attributed to Antonio Lombardi, containing three large alto-relief panels, and a number of smaller subjects and ornaments in bas-relief, of the highest class of Renaissance work in regard to design and execution.

The remaining departments of the Spitzer collection include medals and coins, bronzes, and earthenwares, after which we come to "Orfèverie Civile," which contains a number of exquisite examples of Renaissance silversmith's work, some of them of very unusual fancy in design and idea. Next comes jewellery, stained glass (not a large collection, but containing some very valuable examples), glass (a very good collection), carvings in boxwood, cutlery, wax modelling, work in precious stones, clocks, watches, mathematical instruments, and embroidery and textiles. This last department contains some splendid work, in particular an altar frontal (No. 3,085) of Italian work of the seventeenth century, and another (No. 3,083) of Spanish work of the sixteenth century; this latter is a splendid bit of decorative design.

It is melancholy to think of such a phenomenal collection as this, the work of so many years, being all dispersed again. It might have been hoped that the French Government, with its well-known interest in the encouragement of art, might have made an effort to secure the collection, as it stands, for the nation, as French statesmen are not haunted by that demon of economy which interferences whenever any large expenditure on art is suggested in our own Parliament. The cost would be great, but what one man could manage to collect out of his private resources it might be supposed that the State could manage to purchase. We hope, at all events, that the various departments of the great collection may as far as possible be purchased *en bloc*, so as not to lose their collective value, and so as to be available for public inspection and study afterwards, either in France or in some other country.

SCHOOL OF CARVING, ABERGAVENNY.—We have received the prospectus of a new school of wood carving which has been opened at Abergavenny, under the management of Mr. J. J. Spencer, architect of that town. Mr. J. E. Powell being the practical instructor in carving. The school has been opened with the object of encouraging the art of wood and stone carving in the town and neighbourhood of Abergavenny. The school is prepared to execute orders for carved work to be carried out by the students, who will receive a commission on any of their work that is sold. It is to be hoped that the experiment will prove a success.

RAILWAY RATES.

HIS question has frequently been attacked, with more or less success, by each of the great political parties; but the result, so far, only goes to confirm Professor Jeans' opinion that it is a difficulty which will always be present with us. The fact that several hours were recently devoted to a discussion on the present aspect of the question, in a session crowded with other business of, perhaps, more political interest, of less practical importance, affords sufficient proof of the estimate in which it is just now held by the House of Commons.

The present difficulty has undoubtedly arisen from mistaken action on the part of the companies. This was partially admitted by Sir Julian Goldsmid (who is on the Board of the London and Brighton Railway) in the course of the debate on the 3rd inst.; the mistake consisting, in his opinion, in neglecting to publish, sooner than they did, a notice of their intention not to retain the maximum rates. That much of the alarm and annoyance occasioned by the sweeping nature of the changes made last January might have been avoided, is undeniable. There was absolutely no hint whatever that the revised rates then announced were of a temporary nature. Rightly or wrongly, the public are inclined to think that no notification of an intention to abandon or modify them would have been forthcoming at all, but for the persistence and strength of the pressure which has been brought to bear upon the companies. By reverting to the old conditions in such a vast number of cases, they have themselves proved most conclusively that those conditions had been needlessly disturbed. The only doubt is, whether the work of revision was really carried out at such high pressure as to render it impossible for the companies to foresee, or to stay to consider, its effect upon the trade of the country.

The Deputy-Chairman of the London and North-Western, in the course of a lucid explanation of the manner in which the work of revision was carried out, argues that the temporary abolition of the exceptional rates which have gradually come into existence, accounts for most of the extraordinary advances to which attention has been called; and states that these special rates are being reinstated wherever it becomes evident that they are necessary. We cannot see but that it would have been more to the point to have let them alone till it became evident that they were *not* necessary. Mr. Cawkwell, in his explanatory letter, gives a rather new rendering of the principle upon which some rates are fixed. Instead of "what the traffic will bear," it is represented as being determined rather by "what diminution of revenue can the company bear." The class rates once fixed, exceptional rates are continually being arranged "for facilitating and encouraging traffic," such special rates being a reduction on the ordinary class rates applicable, the extent of the reduction depending upon how much of the normal rate the company can afford to forego.

This letter was quickly followed by a strong remonstrance from Sir Courtenay Boyle, complaining generally of the additional burdens which were being imposed upon so many industries, with particular reference to certain questions affecting general conditions. Attention was called, for instance, to the omission to state the rebates allowed for services not performed by the companies; the unreasonable nature of the agreement to be signed by traders wishing to avail themselves of Owners' Risk rates; and the impossibility of ascertaining from the rate-books whether station terminals are or are not included in a rate. Sir Courtenay Boyle also remarked upon the fact that no instance had been proved to the satisfaction of the Board of Trade in which there has been any material reduction of rate in consequence of the action of the Legislature; and concluded by earnestly pressing upon the companies

* Taylor alludes to this in "Philip van Artevelde," where the spy who comes to Ypres in the interests of the French Court is advised to say he is a trader in this ware—

"Say you come from Dinant;
From Dinant, say, to sell Dinanderie,
Pots, pitchers, mugs and beakers, and the like."

the importance of making, as speedily as possible, such concessions as would satisfy the reasonable requirements of the trading community. The Railway Association at once gave a guarded promise of compliance, it being referred to each company to make such public announcement as it might think desirable. This seems to indicate a split in the cabinet, a division of opinion evidently existing between the members of the Railway Association as to the extent to which they are prepared to give way. Indeed, it is understood that some of the managers were not unwilling to guarantee that no advances should exceed 5 per cent. upon the old rates—a startling contrast to the figures submitted by Sir A. Rolitt and Sir J. Whitehead during the debate alluded to—while others objected to this course. Several of the leading companies have issued instructions to their station agents to accept payment of all accounts on the basis of a maximum advance of 5 per cent. upon the old rates, and to re-instate all last year's special rates for iron and steel. It is added that this course will entail considerable loss, and the right is reserved of "moderately increasing certain rates when trade and agriculture revive." As to the reductions, returns have been promised giving thousands of instances; and these will be awaited with considerable interest, as it is a subject upon which many people have been sorely puzzled. Will the explanation be found in the coal rates? We have been credibly informed that large manufacturers, who have had advances in both inward and outward rates for every description of traffic conveyed for them, have turned to their coal accounts confidently expecting to find some compensation there, but only to be disappointed. The whole of their traffic passes over the lines of the great coal-carrying companies, and it has always been understood that the "loss of revenue" so frequently referred to by the companies was largely through reductions in the coal rates. In the cases alluded to, however, so far from the trader being favoured by the new rates, there has not been a single case of reduction, while some rates have even been raised.

It now appears probable that the whole question will be made the subject of a Government inquiry, when, of course, these points will be made somewhat clearer than they are at present; but the widespread nature of the dissatisfaction is evident from the resolution unanimously passed by the House:—"That, in the opinion of this House, the revised railway rates, charges, and conditions of traffic are most prejudicial to the industries and agricultural and commercial interests of the country, and this House urges upon the Government the necessity of dealing promptly and effectively with the subject." The resolution, as originally drafted, was of a still more drastic character, a proposal being made for the establishment "in connection with the Board of Trade or otherwise, of a cheap, simple, and expeditious mode of determining, in case of dispute what are reasonable or unreasonable rates, charges, and conditions." It is not surprising that Mr. Mundella contrived to get the latter part of the motion dropped. The Board of Trade can appreciate, far better than anyone else, the difficult nature of the task it was proposed to assign to them, having had so much experience in their mediatorial capacity. The Board can at present, do no more than protest against any evident injustice, so long as the rates charged are within the statutory maxima, and do not infringe the law of undue preference. The historic inquiries ultimately fixed a line beyond which the companies could not go, but within which—subject to the limitation just referred to—they are, at present, masters of the situation. A law peer has declared that he would never permit the right of a company to charge a rate sanctioned by Parliament to be called in question. Further, Mr. Acworth says, in the *New Review* for February, that even now that the maxima are fixed more clearly than they have ever

been before, it will often need the united efforts of a railway lawyer and a traffic expert to unravel the statutory maxima in the case of through traffics. His opinion is that if the responsibility for actual rate-making is transferred from railway experts to the Board of Trade, the policy can only end in "well-earned failure." Without suggesting that Mr. Mundella or the officials of the Board share this view, it seems clear that the experience of the past few weeks has caused them to hesitate somewhat. It would, however, be a much easier and less complicated matter to decide whether a charge was reasonable or not, than to decide upon its legality; and if the present agitation should result in rates being tested from the more simple standpoint, the companies will certainly only have themselves to thank for the change.

Of course, the Railway Commission is always available in case of dispute, and decisions arrived at by the Commissioners are binding. But it has always been urged—and the argument was repeated during the recent discussion—that this tribunal is far too costly. The small extent to which the Railway and Canal Commission is utilised may be gathered from the fact that during the year 1892 the Commissioners only sat in Court twenty-two days. This is exclusive of meetings for the purpose of considering judgments and so on, but it is a very small record indeed for a Court from which so much was hoped. Certainly, Mr. Mundella's "conciliation clause" may have profitably diverted some cases from the Commission, but it is not unlikely that one result of the present agitation will be some alteration tending to make this Court more accessible, and thus more effective.

The railway managers have tardily awakened to the fact that, in spite of Mr. Acworth's prophecy, the Government would be pressed to take more extended powers in dealing with this question if necessary. "Agree with thine adversary quickly" has been the advice tendered to the companies, with the alternative alluded to in the event of non-compliance; and they now appear to have come to the determination to act upon this advice. There are other causes, in addition to the firm attitude of Parliament, and the threatened blocking of their Bills, which may have conducted to the more enlightened policy which they have now decided upon. In many districts their traffic is falling off, both land and water carriage taking the place of the railway. Canal and coasting competition has been utilised where available, while in Glasgow, Kilmarnock, and many other places in Scotland a considerable amount of traffic has been diverted to the turnpike roads. The only security for the future—in the absence of any further legislation—lies in the probability that the storm which the companies are now encountering will deter them from raising another by repeating this experiment. It is to be hoped that the promised reversion to something approximating to the old rates will be adhered to in good faith, and that this troublesome question will be satisfactorily adjusted without further disturbance to the trade of the country.

NOTES.

APARENTLY no inquiries worth the name are to be made respecting the failure of the two mill-chimneys, mentioned in our Notes last week. The one at St. Helen's, which was 300 ft. high, with a diameter of about 24 ft. at the base and 12 ft. at the top, was erected in 1850-1, and had, therefore, been in existence for more than forty years. Like the one at Widnes, it was known to be out of repair; the very day before it fell, it had been strengthened (?) with an iron band. Fortunately, the failure occurred in the middle of the night, and no lives were lost. And, presumably, because no lives were lost, there is to be no inquiry. This is a mistake, for the lessons

to be learnt from such a failure are the same whether men are killed by it or not. The plain fact is that the chimney fell; and such an occurrence is attributable to some cause. An inquiry might have elicited this cause, and might, therefore, have been the means of preventing similar accidents in the future. One circumstance is common to these two failures, and to many others, such as the Cleckheaton disaster last year, viz., the chimneys were known to be unsound, and were, indeed, being repaired at the time of their collapse. We may fairly infer that the repair of the chimneys had been deferred until it was too late. The old adage, "A stitch in time saves nine," is true of buildings as of garments, and the owners of mills ought to know that the neglect of repairs is economically wrong, besides being in many instances morally wrong too.

THE fourth of the Carpenters' Hall series of lectures was delivered on Wednesday evening by Mr. J. Alfred Gutch upon the subject of the early Renaissance in England. The lecturer, in opening his subject, necessarily touched upon one or two points that have been referred to in the previous lecture on Italian Renaissance, and then confined himself to the English development of the universal movement of the times. The discovery of America, the invention of printing, and the Renaissance in Art were mentioned in turn. It was pointed out that the story of the English Renaissance was more particularly a story of domestic buildings of a sumptuous character, and not of church building, though many instances of church decoration are attributable to the period between 1560 and 1620 in which the principal buildings in the style were erected, and these houses owed their origin in a great number of cases to the wealth that accrued to the nobles upon the dissolution of the monasteries. The lecture was admirably illustrated by lantern slides, and the first examples shown were Tresham's triangular house and the Lyveden new buildings in Northamptonshire, the curious symbolism employed in this design receiving special attention. The well-known examples of Longleat, Kirby Hall, Castle Ashby, Aston Hall, near Birmingham, Alicking Hall, and Fountains Hall were in turn illustrated and described. Not the least interesting portion of the lecture was the description of the gradual development of the fortified house, which, owing to the unsettled state of the country, had been so necessary, into the Elizabethan mansion, with its wealth of windows in the external walls, contrasting strikingly with the earlier building, with its rooms lighted from a central courtyard. In describing and illustrating the interiors, for the richness of which the Renaissance period is specially noticeable, Trinity Hall, Cambridge, with its hall, screen, and minstrels' gallery, Wadham College, Oxford, Hatfield, Knole, and Wraxall were specially mentioned. Mr. Gutch's lecture was an interesting conception of an interesting period. It was slightly marred at times by an undue straining after the facetious remark.

THE curiosities of contracts are inexhaustible; the latest is contained in the case of *Jackson v. Barry Railway Company*, reported in the current number of the *Law Reports*, in which it was admitted that a contractor had, in effect, agreed that the engineer of the employer should act as arbitrator. "It was," said Lord Justice Bowen in his judgment, "an essential feature in the contract between the plaintiff and the railway company that a dispute, such as that which has arisen between the plaintiff and the company's engineer, should be finally decided, not by a stranger or a wholly unbiassed person, but by the company's engineer himself. Technically, the conflict is one between the plaintiff and the railway company; but virtu-

ally the engineer, on such an occasion, must be the judge, so to speak, in his own quarrel. Employers find it necessary in their own interests, it seems, to impose such terms on the contractors whose tender they accept, and the contractors are willing, in order that their tenders should be accepted, to be bound by such terms.' Lord Justice Bowen then proceeds to point out that if parties enter into "such curiously-coloured contracts," it is no business of the Court to upset them. In the present case the plaintiff had successfully applied to Mr. Justice Kekewich for an injunction to prevent the arbitration from proceeding before the engineer, on the ground that his correspondence showed that he had prejudiced the question. But the decision was reversed by the Court of Appeal, which pointed out that the engineer necessarily had formed an opinion on the matter, being a detail of the work to be done, but would no doubt listen to anything urged before him by the contractor and refer any question of law to the Courts. Nothing, indeed, can be more unreasonable than for a contractor to blow hot and cold in this manner; if he wishes to have a purely unbiassed decision, he should stipulate in the contract that any dispute shall be referred to a person unconnected with the work. If he does not do this he must put up with the consequences, which are that practically the arbitration clause is, so far as he is concerned, absolutely valueless.

THE output of pig-iron and Bessemer steel in Great Britain during 1892, according to the statistics just issued by the British Iron Trade Association, was much less than in the preceding year, when, it will be remembered, the production was greatly below that of 1890. The British iron trade has thus passed through two years of increasing depression, and there are some who affirm that the last of the decline has not yet been seen. The total production of pig-iron in 1892 was 6,616,890 tons, compared with 7,228,496 tons in 1891. The decrease last year was, therefore, 611,606 tons, or almost 8½ per cent. Amongst the pig-iron producing districts, Cleveland was the greatest loser, her output having declined by 685,263 tons, owing to the stoppage of the furnaces through the three months' strike of the Durham miners. From the same cause, the production of Cumberland fell off by 121,931 tons, and of Lancashire by 123,294 tons. Independently of the stoppage of fuel through the strike, there were smaller decreases of production in South and North Wales, Derbyshire, South Staffordshire, and Lincolnshire. Scotland, thanks to the temporary suspension of blast-furnace operations in Cleveland, was able to increase her production by 302,788 tons. The outputs of North Staffordshire, Nottinghamshire and Leicestershire, South and West Yorkshire, Northamptonshire, and Shropshire showed minor increases. The home consumption of pig-iron in 1892 declined by 278,782 tons, or nearly 4·3 per cent., being only 6,209,705 tons, against 6,488,487 tons in 1891. Owing to the stoppage caused by the strike, the stocks of pig-iron were reduced during the year by 360,182 tons, or 29 per cent., amounting on December 31 last to 872,095 tons, against 1,232,277 tons at the same date in 1891. The production of Bessemer steel ingots in 1892 experienced a decrease of 141,195 tons, or 8·6 per cent., the total output being 1,500,810 tons, compared with 1,642,005 tons in 1891. There was a very heavy decline in the production of Bessemer steel rails. Only 535,836 tons of rails were produced, against 662,676 tons in 1891, the falling-off being thus 126,750 tons, or close upon 20 per cent.

AN "eligible site" for building, surrounded by houses, and not built upon before for reasons obvious to all who know it, is shortly to be brought to the hammer. It is a

little over ten acres in extent. Its history is within living memory. First it was known as a brick field. Many millions of bricks were made out of the clay which it yielded. Surrounding estates were built upon and the houses came to the borders of the brickfield. At last the brick-burning became a nuisance and on the complaints of the surrounding residents it was put a stop to. Then the process of filling up the excavations began. They had gone to the depth in some parts of from 20 ft. to 30 ft. Thousands of cartloads of cinders, house refuse, and street sweepings were thrown upon the land. Some of the refuse discharged was so offensive that the aid of the parish authorities had to be again invoked to put a stop to a nuisance. Meanwhile the land was "laid out" in streets, the plans of which received the formal approval of the Vestry and the Metropolitan Board of Works. The streets were also commenced upon the solid ground or virgin soil, as the phrase is; but building stopped when it came to the verge of the clay pits. At one corner a board school was built, and the master had sometimes to close the windows because of the overpowering smell from a polluted pool, which the parish authorities had at last to deal with. The Wesleyans built a Mission Hall on the solid margin. Behind that hall Messrs. Carter, Paterson, & Co., built a depot with stabling for ninety horses. To get a foundation for the rear wall of the stables they had to dig, to use the expression of an informant, "half as deep as the school is high." The general impression of all who know the ground is that it must be a most unhealthy site for dwellings, even if the basements were perfectly concreted. It is further believed that it would ruin any builder who dug to the depth necessary to obtain a solid foundation. As it is believed to be most undesirable and most improbable that the land should be built upon, and as it is surrounded by small houses largely occupied by working men, it is proposed that the land should be acquired by the County Council and converted into allotments. Memorials with this prayer, and bearing 100 signatures, were last week presented by Mr. Hubbard to the County Council. The memorials will go to the Allotments Committee. There will, of course, be inquiry as to the expediency, from a sanitary point of view, of allowing the land to be built upon. No injustice can be done to the estate, seeing that it has already profited from the sale of the bricks made, and, again, from the money received for allowing the land to be used as a dumping ground. The land in question is known as Loat's Land, and it lies between Acre-lane, Brixton, and Cornwall-road, Brixton Hill.

THE School Board of Gravesend seem to do business in a very remarkable manner. There has been a competition for new schools, in regard to which it was announced at a meeting of the Board that there were four votes (by ballot) for the design of Mr. J. J. Robson and four for that by Messrs. Cobham, whereupon the chairman gave a casting vote for the former. On Messrs. Cobham being informed of the voting, and that they had been awarded the second premium, they wrote claiming the first, as six members of the Board had told them that they had voted for their (Messrs. Cobham's) design. Thereupon ensued one of the most edifying wrangles we ever remember to have read in the proceedings of a body of that kind, in the course of which it came out that the chairman, who had given the casting vote for Mr. Robson's design, had in pure lightness of heart carried away and destroyed the balloting papers, while on the other hand the six members who had been named by Messrs. Cobham duly confirmed the fact that they did all vote for the design of the latter. Ultimately it was agreed to try what an appeal to the architects would do, and these gentlemen had the good sense to settle it amicably between

themselves, Mr. J. J. Robson accepting a compensation from Messrs. Cobham and ceding to them the first place on condition of his being given the second premium. The architects may thus be said to have come well out of the affair, which is more than can be said for the Board.

MRS. P. H. NEWMAN delivered a lecture, entitled "Gold Ornaments," on Thursday last, before the Society for the Encouragement of the Fine Arts, which was in many respects a remarkable one. Mrs. Newman is known to some of our readers as having established an *atelier* for the production of articles of jewellery of high art and correct taste. Her lecture proved that she is as conversant with the history of the craft that she has chosen as with its artistic design. With rapid progress she traced the rise of the art of the goldsmith in early times, and its development in the various countries of the East, in Greece and Rome, referring to the treasures rescued from the hand of time, now preserved at Vienna, Athens, and in the British Museum, she appearing to be conversant with all. The delicacy and beauty of many of the ancient examples were contrasted with the poor and unsuitable designs of much modern work. Referring to the excellence and delicacy of some works of the present time, she narrated Sig. Castellani's happy discovery in a small village on the Apennines, of some native gold-workers who still practised there some of the supposed lost arts of the ancient Etruscans. The hall in Conduit-street was crowded by the members and their friends, who frequently rendered well-deserved applause; for not only was the matter arranged with skill in a form suited to a lecture, but the delivery was excellent. This is the more remarkable, since we understand that this was the lecturer's first public essay. An animated discussion followed, in which Messrs. Forbes Robertson, Haité, Loftus Brock, Heighton, and Dr. Leitner took part. At the close of the proceedings, the vote of thanks proposed by the chairman, Dr. Phené, F.S.A., &c., was carried by acclamation. Several specimens of gold manufacture were exhibited, including one showing the peculiar granulated work of early times, each grain being solidly fixed to the surface of the article, as in the ancient models.

IT may be questioned whether the exhibition at the Fine Art Society's Gallery of "Pictures illustrating the Highlands and Lowlands of Scotland," by Mr. J. Farquharson, was altogether a well-judged undertaking; the artist has hardly that individuality and power of style which will bear the ordeal of the collection of a number of works by the same painter in the same room; a severe test even in the case of men of admittedly first-rate reputation. There are, however, some exceedingly charming works in the collection. In "Through Yellow Waving Fields" (6) there is a remarkably true and vivid effect of sunlight and shadow; the sea-coast scenes are mostly very good; the desolate effect of a snowed country in mid-winter is admirably given in No. 63, which is superior in truth and power to the larger snow pieces. Among others we especially like "Day's Dying Glow" (34), "Tansies" (42), "A Lonely Shore" (55), while "A Window in Thrums" (56) exactly answers to one's idea of the celebrated window in Mr. Barrie's remarkable book. The exhibition, however, certainly suggests the reflection that not all clever painters are strong enough to make a "one-man exhibition."

THE Exhibition of the Institute of Painters in Water-Colours, opened this week at their galleries, contains a larger percentage of good or interesting works than usual, though still beset with much of commonplace, as it must inevitably be as long as the Institute continue to endeavour to fill

galleries larger than they can supply with first-class work. The President's principal exhibit this year is a portrait, "Mrs. J. T. Wimperis" (380), in a picturesque costume which furnishes Sir J. Linton with good material for his rich and masterly treatment of dress in painting, the face being a somewhat subordinate consideration. His "Anthea" (235) is another example (we see too many) of the tacking of a poetic title and quotation to a mere prosaic study of a very ordinary head. Of other figure pictures we have Mr. Frank Dadd's "In the Hands of the Philistines" (211) which shows very carefully studied character in the three figures, but rather a want of point or meaning as to the incident; Mr. Dollman's "Shearing the Lambs" (282), a highwayman receiving the contributions of a party of women and children, which is a humorous scene rather than a good picture; and Mr. C. Green's "Sir Roger de Coverley" (262), which is good both in humour and pictorial effect, and is the central work of the collection. The tendency to paint jokes is becoming an increasing vice at the Institute, as in Mr. Evans's "A Passage of Arms" (554), a large picture, clever enough in execution, but all wasted on a poor piece of would-be humour. Mr. Stocks's "Sea Idyll" (202), a woman bathing in a sea-cave, is not altogether a success; as a matter of colour, the surroundings are better than the figure. It is in landscape that the exhibition is strongest, and especially it includes a good many small sea and coast scenes of more than usual interest: such as Mr. F. Walton's two (10 and 16); Mr. Carter's "Clovell Herrings" (196); Mr. Hamilton Macallum's "Ebb Water" and "Drift-wood" (234 and 244), the latter especially; and Mr. Wyllie's "North Atlantic" (254), which has the effect of a large sea piece reduced to a small scale. Among the larger landscapes, Mr. Bernard Evans's "Valley of the Wharfe" (112) is grand in style if a little heavy and conventional. Mr. James Orrock's "Smailholm Tower" (164) is a study in the old broad water-colour style, perhaps a little deficient in local colour. Mr. Alfred East's "Streathly Bridge, Sunset" (408), and "The Moonlit Harbour, Hayle" (516), arrest the attention at once, amid the number of only mediocre works, as the production of an artist with an original power of his own. Mr. Wimperis contributes several works in that characteristically broad and free style in which he may be said to be the most faithful follower of David Cox; "A Suffolk Estuary" (84), with a flat landscape and a grand sky, is the finest. Mr. Huson's "Chat Moss" (668), is a landscape with merit of a similar kind. Among other landscapes may be mentioned those of Mr. Harry Hine, the small one "In the Valley of the Usk" (279), is perhaps the best; Mr. Knight's "Across the Warren" (187), very real in effect, and yet with a rather mechanical aspect; "Lengthening Shadows" (26), is a finer though smaller and less pretentious work. There are an unusual number of Venice pictures: "Puerta de Passage" (66), by Mr. F. Brangwyn; "The Ducal Palace" (95), a large and fine architectural drawing by Mr. Fulleylove; "San Salute and Dogana" (205), by Mr. Pilleau; "San Marco" (259), by Mr. Fulleylove; "Venice" (611), by Count Seckendorff; and some others. Among drawings of architectural subjects we may mention also "The Market Place, Amiens" (38), by Mr. Harry Goodwin; "Returning from Market, Dord" (110), by Mr. W. G. Miller; "Main Street in Hamelin" (183), by Mr. R. Phené Spiers; "Lavenham" (318), by Mr. Yeend King; "Hatfield House" (363), by Mrs. Harry Hine; and "Asolo" (441), by Mr. Fulleylove. Among works not included in the foregoing classification may be mentioned, as specially worthy of notice, "Making Friends" (228), by Mr. Townley Green, apparently a reminiscence of Hampton Court Gardens; "In the Dumps" (253), by Mr. E. J. Gregory; "Rhododendrons" (261), a powerful realistic study of flowers, by Mr. A. Dudley; "Innocence" (267), a

perfect kitten picture, by Mdme. Ronner; "Boy's Love" (512), a "rustic idyll," by Mr. W. Rainey; "New Bedding" (519), an interior of a cow-house, with cattle and a figure, very broadly and powerfully treated, and one of the most original works in the gallery; "The Last Century" (527), a pretty group by Mr. Hugh Carter; "In the Desert" (581), a picture with a lion and lioness, finely designed and drawn, occupying the centre of an empty landscape; and "The Highwayman's Choice" (652), by Miss Gertrude Demain-Hammond, a clever work, which has the defect of not telling its story very clearly.

WHAT IS ARCHITECTURE, AND HOW CAN IT BE ADVANCED?*

BY PROFESSOR AITCHISON, A.R.A.

THERE is one thing on which the architects of the present day may congratulate themselves. They can now see the different phases architecture has taken in its progress through the ages, its successive developments, and the different branches that have sprung from the parent stem; branches that in some cases have been like those of the banyan tree, and have taken root themselves, and have, in some respects, surpassed the parent stem. We see, for instance, the Greek trunk that was transplanted to Rome; the Roman and Byzantine trunks that together gave rise to the Saracenic branch, which still lives, after being grafted with Romanesque, Gothic, and Indian; the Romanesque branch from the Roman and Byzantine trunks, and its ultimate luxuriance in Gothic, after its graft from the Saracenic.

We no longer look upon architecture as a collection of inert masses, but as an organism that, animated by man's spirit, has thrown out branches, some of which have again taken root and flourished.

If extended views are to be looked on as an advantage, we certainly enjoy them; for we have made great advances in the comprehension of this subject, from the time that Vitruvius treated the aesthetic part like a recipe from a cookery-book, to the time when architecture was treated by Viollet-le-Duc like comparative anatomy.

I think it is only due to the great men who have helped to produce this result, that we should mention them with respect and gratitude; from Professor Willis, who made clear to us the geometrical knowledge and skilful stone-cutting of the Middle Ages, to M. Choisy, who discovered for us the methods of building adopted by the Romans and Byzantines; methods that were quite unsuspected until the publication of his works. Our thanks, too, are due to M. Corroyer, for his book on Romanesque Architecture, in which he has so admirably shown, in a small compass, the effect of the important buildings in the old Roman Empire, on those subsequently erected. This truth has, I fear, generally escaped the notice of writers on architecture. In certain places the effect on the imagination of a grand and venerated building is very perceptible. The predominance of arched forms in the exterior of St. Mark's at Venice, shows its effect on the minds of architects in many Venetian buildings, and is particularly noticeable in the Hospital of St. Mark. We have also received great assistance from amateurs, and, in fact, Professor Willis was an amateur; and though some of these amateurs may have shortcomings, they have done a great deal to make the art popular, and even to give instruction to architects. Besides his eloquence, Mr. Ruskin has told us many truths, and illustrated many principles; while Fergusson has grouped together the greater part of all the systems, and all the buildings in the world. But there are two living architects to whom our thanks are specially due, for their contributions to the subject of these lectures, to Mr. Eidlitz for his book on "The Nature and Function of Art," and to that veteran in architecture, Mr. César Daly, to whom we in England owe much. He alone, to speak of nothing else, has preserved for us drawings of the Reform Club; but it is, in the present case, particularly due to him, for his directing our attention to the means of improvement, by his pamphlet on the "Higher Studies."

These books aid us thus far in the practical exercise of the art, by their teaching us what to learn, and how to learn it; and they not only

stimulate and encourage us, but dispel from our minds that dreary fallacy, that all that can be done has been done, and that there are no further grand achievements to be expected.

The great thing to be desired, under present conditions, is individual effort in the right direction; for I do not see how anything but individual effort is to help us out of our present dilemma, when architecture is not so much an art as a fashion; and I think that if we can once agree on the thing to be aimed at, though most of our bullets may miss the mark, still, when all the bullets are directed to that mark, it must be hit at last. I don't think the engineers have any other mark than the solving problems in the best and cheapest way, but that way is every day being made clearer to them.

Our aim is to express in our buildings for the noblest purpose the highest tendencies and emotions that animate society, and in other buildings the emotions that should be evoked by the uses to which they are put.

As I said before, all that can be taught is the use of our tools; natural aptitude, capacity, and genius we cannot give.

To look at another branch of art; we long for a new Shakespeare, a new Milton, a new Burns, and a new Tennyson, to give expression to the courage, the nobility, the self-devotion, and the other virtues that exist among us; and also to portray the picturesque, the thrilling, the humorous, and the terrible scenes that occur. We naturally ask, why we do not get such great geniuses now? but the cause of this want apparently lies too deep to be found out. We hope that the age in which we live is one of the finest that the world has seen; but we cannot be without a suspicion that the lack of such great men is owing to some deterioration in society: we hope at least that we have not added our forty-millionth part to this deterioration, by our own thoughtlessness and folly. The past is ours no longer, but each of us can determine for the future to have a lofty aim, and to live up to his ideal as nearly, at least, as poor human nature will let him. There are, however, some evils which afflict the nation which can by no means be laid to the charge of the architects. There must be opportunity, and some will say, without thinking, that there never were such opportunities; but such opportunities are like offering to Milton the chronicling of a Lord Mayor's feast. It is not only necessary to give the mere opportunity of building, but of embodying the highest aspirations of the people in the noblest way. If the nation will settle the sort of building that will embody these aspirations, and approach the solution in the way the Florentines approached theirs, we should have a chance of starting on a new career. In those days, all the highest aspirations were centred in a cathedral, and the merchants and manufacturers of Florence determined when they rebuilt their old cathedral, and dedicated the new one to St. Mary of the Blossom, that it should be the largest and most magnificent that was ever built by man, surpassing the finest works of the Greeks and Romans; that it should be incrustated outside with worked marble, that it should have marble cornices, pilasters and columns, carved foliage and figures.

And I also think that there must be appreciation; it could hardly be expected that we should have great musicians if all but the musicians were deaf; they, like the rest of the world, must live; but, unless musicians were very numerous indeed, which seems hardly likely to be the case amongst a deaf population, the great musicians would have no proper audience; and no man will give that incessant thought and toil which is necessary to perfect his art unless he has something more than mere wealth to repay him. He looks for the rapturous admiration and gratitude of his hearers, for that is the proper reward of all his striving, and a cure for all those dismal misgivings that have been eating out his heart. Now, as regards architecture, we want not only the opportunity of building structures that are to affect and charm mankind, but we also require the admiration, applause, and gratitude of our contemporaries. It seems, in the present day, ridiculous to speak of gratitude being bestowed on architects, for who ever heard of their getting anything but abuse? Nevertheless, they think it is their due: and it is certain that if they think they are neither to get applause now, nor fame hereafter, their efforts will be mainly directed to getting their living and keeping up their position; while what is most urgently wanted is an enthusiasm and single-minded devotion to infuse new life into architecture, so that it may again flourish as in the happy periods of the past.

The present state of society is very curious

* Being the sixth and last Royal Academy Lecture on Architecture this Session. Delivered on Thursday evening, February 9.

from an intellectual point of view; it seems to be supposed that the words that explain anything that man ought to know, do, or refrain from doing, are sufficient to make him see the force of them, and adopt their teaching; but this arises from an utter want of observation of the thoughts and habits of mankind. These lessons are wanted to be conveyed by the arts, so that they may form pictures that may at once be obvious and striking, or else the value of the teaching is almost sure to be overlooked.

Every one must see that the sun and moon are splendid things, that the colour of the sky when uncovered by clouds is lovely in the daytime, and perhaps even more lovely on clear nights when spangled with stars; that trees and flowers, brooks and lakes, rivers and the sea, woods and mountains, are beautiful to look on; that most animals are agreeable objects; that one of the delights of the country is the song of birds, the whispering of trees, and the murmur of brooks. If he be sufficiently reflective to ask himself why this is so, he will come to the conclusion that these things are made beautiful for the solace, delight, and cultivation of man, and that if, when he lives in large societies, and is surrounded by man's works, these are dull, ugly, or hideous, he not only loses this solace, delight, and cultivation, but blunts his capacities for the enjoyment of beauty, and loses the improvement that he would derive from those sources, and so becomes an inferior creature. What are the main things that are seen in a town, besides the strip of sky? People, animals, vehicles, and buildings. It seems obvious that if nature's works are pleasant and improve him, he should try and make his own works pleasant and improving too.

Now to speak of our clothes, which is all we see of man, except his face, and sometimes his hands. Are our clothes beautiful in form or colour? I think the universal answer would be No, and that they are not only ignoble in form and ugly in colour, but destroy all grace of movement or action. All that can be said for our clothes is that they are tolerably convenient; but they even want variety, for nearly everyone is dressed alike, to give an appearance of equality, equality being one of the favourite fictions of the day. If a Prime Minister is in the street, we probably take him for an omnibus conductor out for a holiday. If he does not care for dress, we take him for an attorney's clerk out of work. We are worse dressed than the organ grinder's monkey; we have not even the scarlet robe with the spangles, nor the cap with the peacock's feather. If a minister were dressed as most persons invested with dignity and power have been, and even now are dressed in all countries that are not Christian, in magnificent robes, and surrounded by guards, he would doubly impress people; they would see at once that he was a person of importance; they would admire the beauty and richness of his dress, and he would as well stimulate them to try and rise to such a position. The same thing may be said of action, attitude, and tone of voice; no attempt is ever made to give dignity to motion, position, or discourse, at least so far as the latter is affected by the manner; people, even orators, only stand, lounge, talk, draw, or chatter. Consequently pictures are hardly to be painted of individuals, that can be embraced under the head of fine art; and from the loss of handsome and becoming clothes, dignified movement, and artistic grouping, crowds become almost as unpicturesque and as unpaintable as the individual himself. Sculpture and statuary are even in a worse plight, for they have not the aid of colour to redeem the want of form. We sometimes wonder why the things made by savages are so beautiful in form, and so artistically decorated. The savages that make them are probably naked and are surrounded by the works of nature; in this way their memories get filled with beautiful forms; so that what they make is sure to assimilate with the beauties they see. Théophile Gautier said that, if you met with an elegant-shaped basket, or with a beautiful mat, it was probably made by savages, who were cannibals; while, if any article was hideous in form and repulsive in colour, it was probably made by a pious Christian in a highly civilised country. Men are naturally idolaters, and if they have not got a golden calf to worship, they will worship a leaden one, or one of clay. What is true of man's clothes is also true of his vehicles; the ancient biga and quadriga were noble things, and either, when carved in stone, made a splendid finish to a building; but any modern vehicle would degrade almost any building it was put on. The old streets of London are made up of dingy brick walls, with holes in them; the new streets

of shops and offices are without proper expression, being mostly of terra-cotta paraphrased from Renaissance palaces. The dignified monuments of the past were always rare, and are being pulled down daily from the mere greed of gain, to no end. The City, once picturesque from Wren's steeples, is now nearly bare, so there is nothing worth looking at but the horses, dogs, cats, and sparrows.

You can hardly expect people to give much consideration to the work that goes on within buildings if they are insignificant, ugly, or commonplace; and if you invest buildings with great dignity, beauty, and importance, in which commonplace work goes on, the effect is to make the work within contemptible or ridiculous.

There are two difficulties that present themselves to architects,—the difficulty of finding an adequate motive for a noble, dignified, or sublime building, and that of making the bulk of those who see it appreciate its excellence, not to speak of the mental efforts that have produced it. To speak of beauty alone, if we were the greatest admirers of it, we must in a very short time have this sense completely dulled, or live a life of misery, if we inhabit an English city. Every machine is hideous to look upon, and the present tendency is naturally towards ugliness, in the perfecting of every kind of instrument. The primitive musical instruments of savage nations are mostly odd; in the next stage they are mostly beautiful. Even to this day the long straight tuba or trumpet of the Romans has been seized on by artists as a striking and effective motive. The lyre and the lute are both admirable in shape, and the harp itself is not without grace; but almost every musical instrument that has lately been improved is ugly in shape, if not hideous. If we wanted a simile, we might say, "As ugly as a musical instrument." Wind instruments of the flute order are peculiarly preposterous, being covered over with triangular levers like the cranks of a bell; the "wry-necked fife" is almost beautiful as compared with them.

We cannot blame the engineers for making so many of their works ugly, because the problem they have to solve is not how to make a thing beautiful, but how to do it at all.

Architects, like the rest of the inhabitants of the country, have their faculties dulled by this constant succession of ugly and ignoble things; and even if they manage to create for themselves a mental environment of beauty; and create beautiful, dignified, or sublime works, that supreme reward, the rapturous admiration of their fellow-countrymen, is entirely withheld from them; because their countrymen are perfectly indifferent to the propriety, beauty, or ugliness of anything.

Aristotle tells us that the Greek scheme of education consisted in reading and writing, gymnastic, music, and drawing. The music did, I believe, include playing on some instrument; but that was only looked upon as a small, and by no means an essential part of musical education. Had it been, we can hardly imagine that Alcibiades would have been allowed to omit learning to play the flute, because he said it distorted his mouth.

Music with the Greeks meant a graceful movement of every part of their body, and of every motion they made. In fact, some sort of rhythmical cadence was supposed to pervade everything that was important and polite. We may hope some day to see engineering structures made graceful, dignified, or sublime; but until some new principle animates mankind, or that particular fraction of it which exists in England; we can hardly hope for becoming clothes, dignified movement, or artistic grouping. We may hope, however, that our statesmen will see the importance of making important functions, performed both by themselves and by the multitude, impressive and dignified. They would do so, if they knew and could realise the effect it has on the mind of man. Architects may, however, find one consolation, that their works, being obtrusive and mostly large, cannot escape notice; while their importance will always induce a select part of the community to take a certain interest in them.

It is, perhaps, a painful thing to say, but I fear it is nevertheless true, that all the teaching in the world will never convert a man, who has not the native genius for it, into a great architect. Still, no one knows whether he has genius or not, until he has first learned the elements, and then tried to apply them. Suppose a student is possessed of all the requisite knowledge—and by that I mean how the best former architects have produced their effects; how they have converted rude forms into elegant or beautiful ones; how they have applied the laws of composition; how

they have got over those æsthetic difficulties that mostly arise; and the means they have employed to raise the higher emotions in the completed building—he will then, as a means of education, draw out an existing building that, in his judgment, is the best adapted to meet the requirements, that has the most daring construction, and has the best æsthetic appearance; that its destination demands; and if this building be intended to raise the highest emotions, to see that it produces them. After doing this, he would paraphrase the building, correcting any errors he might discover, and expressing each part in his own architectural language, just as if he were paraphrasing some literary masterpiece. Pope was born a poet; when he had learned the elementary mechanism of his art, he translated Homer, and he paraphrased the satires of Donne and pieces of many of the poets, Greek, Latin, French, Italian, and English. If we knew as much about other poets, we should find them doing the same. The poets have not only taken ideas and metaphors from former poets, but have mostly borrowed their most striking phrases and beauties.

To return to architecture, let us say there is a case where cast-iron columns have to be used 30 diameters high; the task is to try and make them agreeable to the eye, without destroying their character or strength, or using a ridiculous excess of metal. A cast-iron girder, whose necessary requirements are a small upper, a large lower flange, and a web, must be treated in the same way. The success in doing such things as these shows what progress you have made in the practical æsthetics of your art.

I am inclined to recommend the student to take the carcass that has been got by the proper arrangement, and the proper construction, and try to get the effects he wants without paraphrasing buildings that exist. I think if this plan were pursued ardently, and with a determination to get an effect pleasing to him, that if he had genius, he would at least produce something that was more or less original and had some merit.

It would be sure to have one merit, that of not being paraphrased from anything else. Noble simplicity is, of course, the very acme of perfection in all the arts; so we must set that end before us and strive to arrive at exquisiteness. When we begin, we may find our skill unequal to the task, and be obliged to use elaboration in parts; but as we proceed, the work would become more and more simple and effective.

When we admire buildings of former ages, erected in semi-barbarous times, we are obliged to make allowance for the times; but such allowances cannot be made for similar shortcomings in our own work, as we do not live in a barbarous age. It is a very good plan to consider that the walls of your building are to be covered with the best painting and sculpture of the day; you will then feel that any semi-barbarous work will not harmonise with the figures; and instead of degrading the figures to the level of the architecture, which is too commonly done; the proper way is to raise the architecture to the level of the figures.

The remarks I have made about the necessity of having buildings for the highest purposes, to enable the architect to show his powers, are comprehensible to everyone. But there are other conditions which are almost as necessary to make these buildings a worthy problem for a great architect to solve. They must be large, lofty, and not altogether simple, so that the construction and the lighting may be difficult. The æsthetic problems to be solved must be of a high order, and the emotions to be raised the most profound that human nature is capable of experiencing. Another important requisite for the perfection of architecture is that the highest class of buildings shall be frequently repeated, not only at the same epoch, but for many generations. Without the first condition, the highest powers of the best architect cannot be called into play, and without the latter the architecture is hardly likely to reach perfection.

It is clear that to the Romans the vertical and horizontal line were the type of the highest sort of building, while to us the arch is. But I suspect that we shall have to go back again to the rectilinear form, for that is the form that iron most conveniently and commonly takes, and I think we must look forward to iron taking the principal part in the buildings of the future. I mentioned some constructional objections to the use of iron, as well as the objection to its rapid transmission of heat, for this means in our damp climate, a rapid condensation of moisture. This condensation has been found so objectionable in London, that cast-iron columns have had to be,

cased with plaster, to prevent pools of water being formed at their base.

The æsthetic objection to cast iron is this—that in large castings it is very difficult to get the faces true and the ornamental work cast finely, for the material is too hard to allow of chasing. The expedient of having the ornament cast separately, and pinned on, will not recommend itself to architects. I do not think the want of fineness is always an objection; for it is only on parts close to the eye that fineness is perceptible; and I hold, too, that the able architect should adapt his ornament to the material. There is one opportunity that iron will afford when it is used in magnificent buildings, it can be enamelled in all the beautiful colours that enamel affords. I cannot say whether enamel would cause much less condensation than the iron itself; still in magnificent buildings the air could be dried; and we can hardly imagine anything more splendid than well designed enamelled columns. For outside work enamel could hardly be used, until some better method can be discovered of applying it; as now pieces of the enamel flake off, when enamelled iron is exposed to the outer air. If the Barff process would really answer, *i.e.* if it would last for centuries, I do not know that the dull black colour which iron takes under the process could not be effectively used.

At present the use of metal for the lining of buildings might be looked on with disfavour, even though we have Dr. Richardson for its advocate; but I presume this is a mere matter of habit. In early days it was thought the acme of propriety. Not to speak of the woodwork of Solomon's Temple, overlaid with gold, and the palace at Cebatana with gold and silver, Homer dwells with great complacency on the metallic palace of Alcinoüs; and Plutarch tells us that though Phocion was without ostentation, he liked to have his house decent; and this seems to have involved its interior being lined with bronze plates. (*Plutarch's Lives*: "Phocion.") It is evident that a taste for the precious metals as wall linings revived during the Byzantine Empire. Constantine Porphyrogenitus gives many accounts of the metallic ornamentation of rooms and churches, including the silver pavement of one of the chapels enriched with niello.

It has occurred to me that some of the statements I have made seem to be contradictory, and this is not a comfortable position to leave the student in. As someone justly remarked, we hardly want professors to teach us how to doubt! The two conflicting statements were these: that architecture should perfectly express the objects for which the building was erected; and the other, that buildings, both sacred and profane, had been used for both purposes without any apparent discordance. It would have been improper to have left you to suppose that the expression of former buildings did completely call up the special emotions that were wanted in each, when the contrary was really the case; for instance, the arm room of a public bath is not wanted to raise the same emotions that should be raised by a cathedral, but the size, height, proportion, and lighting of each, produced emotions which were wholly proper to the cathedral. My former statement was intended to convey the hope that we might eventually so individualise each particular emotion that a secular building could not be used as a sacred one, nor the reverse, without this improper conversion being apparent. I may of course be mistaken in this hope, and it may never be possible to express different emotions so tactily in architecture, that you cannot use one building for another purpose; though I think, if architecture alone cannot succeed, the desired result might be attained by means of appropriate sculpture. Music is vague too, but I do not think it is so vague as architecture, for music, I think, capable of raising more varied impressions. I am not so capable as I could wish, of exactly defining all the various emotions that music can excite; but those most ignorant of music know that there are lively, cheerful, gleam, and mysterious phases of music. A jig could never be mistaken for a requiem, nor a waltz tune for a hymn. Although architecture has marked phases, none, perhaps, are so strongly marked as those of music; though Newgate does not suggest a cheerful abode.

I think that any expression in architecture conveying the knowledge of what a building is used for, beyond its shape and openings, is wholly due to old associations; and I believe it is mainly owing to this that the persistence of the different styles of architecture is due. Almost all the old buildings at have been used for Christian worship in this country are either Romanesque or Gothic, and consequently we associate them with ecclesiastical

work. Most of our old secular buildings for private use are either Elizabethan or Early Renaissance. Public buildings are mostly Classic, or of the later Italian Renaissance, and when any of these buildings have features that are proper to them, these features recall the purpose for which the building was originally built. In every past time, when a living style existed, it was universally applied to all sorts of buildings; the difference of expression in the building was owing to its material wants, and possibly in important buildings to the attention given to make them imposing.

The earlier we go back, the fewer private buildings we find; for there has in all times been a certain reverence shown by the conquerors to sacred buildings, except in the case of the conquerors being savages, or belonging to a different and antagonistic faith. To take Athens for an example: there is little to distinguish the Propylæum from the Parthenon, although the latter was a sacred edifice and the former was a secular one. We should know almost as little about the private houses of the Romans as we do about those of the Greeks, had it not been for the preservation of Pompeii and Herculaneum. But these towns were small watering-places, and give us no idea of the magnificence of the great Imperial palaces, nor of those of the nobles. More secular Gothic buildings have been preserved, owing to Gothic times being so much nearer to our own, for it is not much more than 250 years ago since the last important pieces of Gothic architecture were erected in England, viz., in the latter days of Charles I., so that many specimens of Gothic secular buildings have come down to us. The best foreign secular buildings of the Gothic period have a certain ecclesiastical flavour, in spite of our seeing, from the forms of the buildings, that they were secular. I have looked at buildings for all sorts of uses and of all epochs, from Greek days downwards, in the hope of finding certain forms, or groups of forms, used to express special abstract ideas, such as exaltation, joy, grief, or adoration, but I have never found anything but provisions for the necessary wants of the building, the construction made agreeable to the eye, and ornamented in such a way as pleased the people of the time, and certain vague emotional effects; but whether these emotional effects have been expressly sought after or not, I cannot say. In the case of buildings whose size, height, width, or breadth produced emotions which make us call the effect sublime, it is impossible to say if the architects were not simply intent on showing specimens of their skill in construction, rather than in trying to create the emotions which now affect us.

The Pantheon, whose interior strikes us as being the most sublime of anything we have seen, also strikes architects as being but the glorified hot room of a bath; and when architects are satiated with the effect, and analyse the building, they always wonder what the great shield or damper was like that covered the opening, and what became of it.

The Pantheon seems too brilliant an invention to have been conceived off-hand, but we know of nothing from which the architect got the idea. Still there might have been hot rooms on a smaller scale, where a similar effect was seen; and the architect of the Pantheon being a genius, might have pictured to himself the imposing effect it would have on a grand scale; and how fitted it would be for a temple to all the gods. In the same way, at the Alhambra, the light arcades supporting pierced work might have been adopted by the architect as expressive of delight, as well as for the admission of the breeze.

We can see the immense advantages Mediæval days had over all subsequent times; there was continuity of teaching; and there was mainly one sort of building, viz., chapels, churches, and cathedrals, for nearly the same purposes, only of different sizes and grandeur; and these buildings were to excite the same emotions on an increasing scale. Therefore, we are not particularly astonished at the great results that were obtained. But we are astonished that an entirely novel æsthetic expression should have emerged; and that the geometrical ornament should have commended itself so strongly that it gradually overspread the building, inside and out. This was doubtless due to the familiarity of the Mediævals with Saracen work. Greek work, though it has a similar mystery about its origin, and perhaps about its rapid perfection after the Persian war, has no such mystery about its continuance, for its ultimate expression was very like its first. One of the great marks of the transcendent genius exhibited in Greek work is to be found in the impression it leaves on all architects,

that they would have invented it if the Greeks had not forestalled them. In Gothic the idea is just the reverse, for until the key to its latest elaboration is got, Gothic impresses us in the same way that the stalactites of the Saracens do—we think neither could have been invented by human beings.

As I have so often said before, I believe that what taste there is amongst us mainly runs in the direction of artistic simplicity, while arrangements and construction rather run in the opposite direction; and it is by no means easy to imagine how complex arrangements and construction are to be treated with simplicity. We cannot help wondering how a Greek architect would have solved the following æsthetic problem:—Let us suppose that the circular end of a Gothic cathedral had been built in the rough, with all its piers, buttresses, and flying buttresses, and the Greek architect were told that the building was a temple, what would he have done to it, to invest it with the proper expression, having due regard to artistic simplicity? However, except I were a prophet I could not tell you what ultimate form English architecture is to take; all I can do is to repeat my former advice, the rest must be left to the happy inspirations of genius, when genius does us the favour of appearing. I would also recommend you to pursue the same study of the effect our atmosphere has on the forms and appearance of architecture, as the Greeks bestowed on the effect of Greek sunshine; that study alone would give an English character to our buildings. We want, too, some new plants chosen for our ornamental sculpture, that may give a new aspect to floral ornament, but although the sculptor may originate a new development of floral form, I cannot see how it is to flourish, if good and bad, old and new, equally fail to charm the public. The acanthus was taken from the Greeks by the Romans, and elaborated by them to the highest degree of excellence for monumental purposes; and subsequently, in the hands of the Renaissance architects, new beauties and somewhat new motives were added to it. The Renaissance artists developed new characteristics from striking plants, from the thistle in particular, and introduced flowers and grasses rarely used by the Romans. We must also get the sculptors to take more interest in architecture than they mostly do, if architecture and sculpture are to go hand in hand, as they did of yore. What is to be said about figure sculpture I know not, for contemporary clothed figures, even if treated by the best sculptors that ever lived, would destroy all feeling of grace or beauty, and make any building mean and ridiculous.

It has been said that the artist—and by that term I mean any adept in any of the fine arts—should imitate the behaviour of the man of science, who pursues his investigations and makes his discoveries without regard to the ignorant public, while his discoveries are only known to a few other scientific men, until some man of business sees that the application of one of these discoveries will meet a public want, and fill his pocket. But the arts are invented solely for the delight and instruction of man, and, with the exception of dancing, singing, and music, which are the spontaneous outcome of high spirits, are by no means their own reward; while the investigation of Nature's laws is not only a delight to the investigator, but raises him to a higher level than his fellows. I never heard of a poet, orator, story-teller, painter, sculptor, or architect, perfecting himself in the art for pure personal delight, with no one but himself to be charmed by his finished work.

"Fame is the spur that the clear spirit doth raise,
(That last infirmity of noble mind),
To scorn delights, and live laborious days."

It must be clear to all, that if there is absolutely no desire for anything but bare shelter, as there was at the end of the last century and the beginning of this, that architecture as a fine art must cease, as it then did. Such a state of things shows mankind to be in a sadly degraded condition in that particular, if its highest ambition is to be housed in a plain dog-kennel or rabbit-hutch, but it may be above that state as regards the other fine arts; if it be in the same state as regards them all, history, as far as it is concerned, is a blank page. If there happen to be a city like Sybaris, filled with persons wholly intent on gain and feasting, mankind expresses its contempt of such persons, as the ancients did, by calling a worthless and contemptible person a Sybarite.

When one sees the intense devotion displayed by other artists in acquiring skill in their professions, I think there may be a slight remissness in the architectural students. It is true that the necessary knowledge in architecture is so great

and varied, that devotion cannot be confined to a single branch. Architects may, however, be stimulated to exertion by reflecting that the beauty or dignity they create is not fleeting, like that of music or acting, but may last for many centuries; and that buildings have mostly the advantage of size, which if properly treated, greatly impresses the beholder.

If we observe the laws of morality, which affect us as favourably as they do society, if we include their effects on the character; the art or life-work of anyone should be the true expression of his worship; so I beg all of you to devote yourselves heart and soul to the perfection of our art.

Architecture is not generally taken up by men of means, therefore a livelihood must be gained by it. Man, however, can live on very little, and if he do so, this self-denial leaves him a much greater opportunity of perfecting himself and of carrying out high aims. So I would recommend you to devote a considerable portion of your time to the designing of noble public monuments, for we can never tell that new ones may not be wanted for high objects, now undreamt of. The great Diogenes, who knew how to rule men, was a beggar; while Socrates said he kept himself and his family on five farthings a day. We cannot all expect to take the position of these great philosophers, but we may all recollect Franklin's lesson to his friends. When he was the editor of a journal, and published unpopular opinions, his friends predicted that he would lose his patronage; he invited them to supper to discuss this matter: the supper of many courses consisted solely of boiled oatmeal, technically called sawdust pudding: none of his guests could eat any, though Franklin made an excellent supper, and then said to his friends, "A man does not want patronage, who can live on sawdust puddings."

It may be fancied that I am opposed to extraneous cultivation in architects, but this is by no means the case. I should be delighted to see them all like Orgagna and Leonardo da Vinci, who were poets, painters, musicians, engineers, sculptors, and architects. But there seems to me so much to learn in architecture, that I am loth to see men exerting their powers on other subjects, before mastering the one which is to confer immortality upon them. I cannot shut my eyes to the fact that most poets, painters, sculptors, and musicians find that life is not too long to master their own professions, and I think the architectural students of to-day are determined to master theirs. Let us hope that mankind will be convinced of the supreme importance of fine buildings, not only to delight and instruct the nation, but also to serve as memorials of our greatness when the glory of England—though may that day be far distant!—has passed away; and that more and grander buildings will be insisted on by the nation for high purposes, which may display our sublime art.

SCREENS, THEIR TREATMENT AND SYMBOLISM:

THE ARCHITECTURAL ASSOCIATION.

The ordinary fortnightly meeting of this Association was held on Friday, the 10th inst., in the meeting-room of the Royal Institute of British Architects, 9, Conduit-street, the President, Mr. H. O. Cresswell, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. A. H. Colquhoun was elected a member of the Association.

Mr. F. T. W. Goldsmith, hon. secretary, moved a hearty vote of thanks to Mr. John Belcher for his kindness in meeting the members of the Association at the new building for the Institute of Chartered Accountants, Coleman-street-buildings, Moorgate-street, on the 25th ult., and for conducting them over the building. This was agreed to unanimously.

Mr. G. H. Fellowes Prynne, F.R.I.B.A., then read a paper on "Screens, their Treatment and Symbolism." After a few introductory observations, he said:—

Fascinating as is the study of isolated details of our art, such study is not without very distinct dangers. By the chance of living near, or otherwise being brought in contact with, some one beautiful feature or detail, naturally and healthfully inspires an interest, which leads to careful study of the subject, which may in turn lead to the most helpful enthusiasm, but which becomes a danger and a pitfall to the grander conceptions of architectural design as a whole, if it is allowed to end in a hobby. Therefore, in choosing a detail I do so not because it is simply a hobby, but because it is a subject that I hope may

not be so often ignored as it has been, but that screens may be treated as one of the great means by which our temples may again become more and more beautiful.

In the short time I have before me I must confine myself to church screen work solely and chancel screen work in particular, and in doing so I must say at once that the subject is so large a one and comprises such a vast amount of detail that it will be impossible for me to go minutely into the subject or to give more than a general outline of historical facts, and humbly to offer such suggestions in treatment as may perhaps be found useful to at least some of the younger members of the profession when they are called upon to use their abilities in the highest and noblest objects of design, the beautifying of God's house and the furniture thereof.

It may be inquired why it is I have in heading my paper connected the treatment with the symbolism of screens. It is simply because I consider them inseparable. Most undoubtedly screens were originally called into existence for useful as well as symbolical reasons; their natural usefulness is at once apparent for enclosing spaces, either with the object of preventing unnecessary intrusion or for sake of actual protection. Their symbolical use is not less apparent; that is in marking off and shielding a portion or portions of a building which are held to be places of special honour or specially the spots where the most sacred mysteries of the Christian religion offered, and in the case of chancel screens they symbolise the division between the life here and the life hereafter, or the separation between the higher and lower estate. And again, when passing under the Holy Rood it is intended to remind one that we cannot attain the highest blessings of Heaven without first passing under the shadow and sorrows of the Cross, or the passing from the Church Militant through the suffering of Calvary to the Church Triumphant.

From the earliest times and in all kinds and stages of religious worship have screens of one kind or another been used to mark off especially honoured spots. In the Jewish Church I need hardly point out that the Holy of Holies was the place where the Priest was alone allowed to enter, and the worshippers had to be content in knowing that the High Priest was pleading the great typical sacrifice on their behalf.

Although under the new dispensation all were allowed to be admitted to be partakers of the fruits of the atonement, and to join with the Priest in divine worship, yet it is to be thought for one moment that when the great fulfilment of the antitype had been consummated on Calvary, that the early followers of Christ should view with less honour the places where the great Christian memorial sacrifice was to be offered to the end of time.

Certain it is, however, that it was this reverence that led the early Christians to adopt the screen. The presbytery or choir and sanctuaries were separated from the rest of the building either by marble, stone, metal, or wood screens or balustrading not necessarily as high as those of later date, but seldom less than 4 ft. or 5 ft. from the nave floor level. In the decrees of the Second Council of Tours in A.D. 557 it is ordered that "lay persons are not to enter the chancel, which is divided off by screens, except to partake of the sacrament of the altar."

Old decrees and early writers still speak of this portion of the church as holy of holies. The altar was even veiled in some cases, and in the Eastern Church veiling is still the custom. In fact, history, ancient writings, and architecture itself all go to prove that it is simply a plain matter of fact that in the earliest and purest ages of the Church, chancel or altar screens were considered to be a very essential part of the furniture of a church. It is left for the highly enlightened and intellectual brains of these latter centuries to find or imagine something wrongful and superstitious in this useful and beautifully symbolical feature.

Yes, in these enlightened days if a faculty is wanted one often has either to omit the screen altogether or carefully to omit showing the gates, and if shown, one has to plead they are for safety. If you have not already learnt from sad experience, you would hardly credit how small and vexatious are the quibbles raised by the present day chancellors: they seem to put on their Popish spectacles and see Popery in every detail.

In the ancient planning of chancels, stone pulpits or amboines, similar to those shown on some of the sketches and photographs on the walls, were placed on either side on lower end of choir. The walls of these amboines often formed a kind of screen in themselves, and in some cases

they were designed as part of the screen, as in the churches of the Friars, Venice, S.S. Nere Achille, Rome, and St. Miniato, Florence. This Epistle was read from the southern and the Gospel from the northern amboines. These pulpits were also used for chanting the lessons and other portions of the Divine office.

The date of the introduction of rood-lofts is not known exactly, but they are of considerably antiquity. It is more than probable that the first suggestion of the rood-beam seen in many churches arose from two circumstances:—1st, the general use of tie-beams, and 2nd, the common and early custom of suspending a large cross in a prominent and central position. The combination of the two is, I think, the most natural suggestion to the mind.

Be that as it may, rood-screens and lofts of large dimensions were used at an early date, as that of S. Sophia, at Constantinople, was large enough for the crowning of emperors to take place in it, and at Rheims Cathedral the French kings were crowned in the rood-loft. Altars were sometimes erected in lofts at the foot of the rood.

The larger rood-lofts are generally ascended by two staircases, carried up either in circular turrets on either side, or in the thickness of the walls.

These staircases often became quite a feature, as in the examples of Exeter and other cathedrals. In foreign examples, staircases often go up in the thickness of the screen, as at Metz and Toul, at the church at Oberwesel (illustrated by one of Mr. Millard's sketches).

The earliest screens however, were undoubtedly of less massive and pretentious character than the rood-lofts to which I have just referred.

It was with the gradual growth of communal life in the church, that the necessity for more distinctive and solid screens began to be felt.

In cathedrals, abbeys, collegiate and conventual churches, which were originally used by large numbers of ecclesiastics, something more than a low wall or an open grille became absolutely essential for the repose and comfort of those who were compelled by the nature of their liturgical devotional offices to remain so many hours in the church. Churches in those days were heated by hot water, steam, and hot air. Kneeling was not interfered with by small or large pipes running under one's seat. The passages were not then adorned with cast-iron grating and one might leave or enter the church without the creaking and rattling grating proclaiming the fact to the whole church that you were on your move. Still, without these innovations the fact remains, the churches were not so comfortable, and to make devotional offices possible so protection from the cold draughts became positively necessary. Even at best, screen or no screen on cold days it must have been many degrees removed from what we in this nineteenth century consider comfortable. It makes one feel that there is a true ringing about the devotion of the early Christian worshippers. It was, indeed, the case in those days that the words of the prophet Malachi were fulfilled, "For from the rising of the sun even unto the going down of the sun Thy name shall be great among the Gentiles, and in every place shall incense be offered unto thy name and a pure offering."

Again, we must remember that the nave, transepts, and aisles were continuously thrown open to the lay worshippers who came in and out at all times of the day, and whose continual moving about would have been most distracting to those saying their offices in the church.

The general form of the great rood-screens was in three, five, or seven bays, and in England the divisions are sometimes more numerous, as at Lincoln, York, Ripon, and other cathedrals. Parochial altars were generally placed on the inside of the screen. On festivals and occasions of high services the Epistle and Gospel were read with great solemnity from the rood-loft, and that all on both sides of the screen should be able to join the service, choirs were sometimes placed in this position.

The dignity of reading the Gospel in this position at the foot of the great cross or crucifix appealed to the devout imagination of the worshippers in those days, and as a consequence we see, in the fourteenth, fifteenth, sixteenth, and even seventeenth centuries, rood-screens erected in hundreds of parochial churches.

The one central idea was, of course, the elevation of the Cross. That the first thing entering the church should be the great glorious symbol of the Christian Faith (a symbol that, shame to say, we have often to hunt for, and in some cases to hunt for in vain in our church





CHURCH OF S. JOSEPH, AYLESBURY



GOLDIE, CHILD & GOLDIE, ARCHITECTS

at the present day); that those looking on the Cross might, in the words of Wordsworth, say—

"Mindful of Him who in Orient born
There lived, and on the Cross His life resigned
And Who, from out the regions of the morn,
Issuing in pomp shall come to judge mankind."

It may be safely asserted that, in almost every church up to the end of the sixteenth century, there was a screen of some kind or another, and that nearly all had the holy rood set up either on the screen or some equally conspicuous place. The word rood, perhaps I need hardly point out, is taken from the Saxon word "rude" or rood, meaning cross. The rood, as such, used upon a screen or beam, or hung from the rood, was seldom considered complete without attendant figures of the Blessed Virgin and St. John.

The custom of reading the Gospel from the rood-loft has generally fallen into disuse, and it is now perhaps questionable whether it is desirable in these days to design such massive and heavy screens as were called for in the fourteenth and following three centuries. Don't mistake me for a moment. I am the strongest possible advocate for the retention or restoration of the rood-screen in some form or another in every church in the land, but as long as the screen is crowned with its proper symbol—as long as the symbolism of the screen is acknowledged—and as long as the precincts of the sanctuary are properly protected from irreverent intrusion, I should be satisfied. But in designing a screen I should never for a moment aim at shutting out from view the altar and its surroundings; and while I have not much sympathy with the all-seeing mania of the present day, I should ever aim at not allowing the screen to usurp an undue prominence by obscuring the far more important feature—the altar. A dreary sight indeed it is to go into some of our dear old churches and be called upon to admire a roodless, but otherwise beautiful, screen as an ancient feature, a thing of antiquarian interest; yes! a thing of beauty of design and workmanship, each very well in their way; but when, on turning to the Holy Table, one sees a table that you would be ashamed to use in your own dining-room, one feels sadly that the admiration bestowed on this detail the screen, is but the mere admiration of an art curiosity, and not the reverent admiration and pleasure that one should feel in that the main object of this detail is the beautifying of God's House.

In no country in the world are there more churches with rood-screens, or remains of same, than in England, and for beauty of detail and workmanship we are hardly surpassed.

Having now spoken of the general historical and partially symbolic side of my question, I move for the sake of convenience, divide the practices side into three sections:—1st, Stone Screens; 2nd, Wood Screens; 3rd, Metal Screens.

First, as regards the treatment of stone screens. The principal stone screens remaining in England are of the cathedral type such as those at Canterbury, York, Westminster, Lincoln, Gloucester, Exeter, Ripon, Norwich, Wells, St. Albans, and others. The general features of these are too well known to render it necessary that I should dwell further upon them in detail. I will, therefore, only pick out one or two leading points in treatment and designs.

The general appearance of these screens at present is of course very different from when they were first erected. In the first place the rood or crucifix with attendant figures have been removed in every case. In the majority of cases the sculptured figures that formerly occupied the busy canopied niches have been destroyed or disfigured, and the niches now appear to be unmeaning architectural features. When on a visit to Winchester Cathedral, I was informed by the vergers that one of the Deans had allowed the empty niches in the altar screen to be filled with stone urns (an illustration of the screen with these ornaments is given in Mr. Kitchen's most interesting book on the screen). Remarkable that I supposed it was symbolic of a dead religion. The goodly vergers turned on his heel and remarked, with evident indignation, "I don't know, sir; I don't know."

In many cases the rood has been replaced by a great organ with cases of fine design, but, in my humble opinion, they are and appear entirely out of place.

Of these latter, York Minster stands pre-eminent, and Exeter, Norwich, and Manchester are good examples. Of course, organ-builders and even musicians will insist that this is the best place for the organ. Do not be misled; from an ecclesiastical, devotional, and, I think, artistic point of view, the position is an utterly wrong one.

Choose the west end, transept, or sides if you like, but do not spoil the general vista of your churches by blocking them up in the centre with an organ. Do not let the organ be the first object to attract attention on entering the church, and usurp a false position of importance. In short, do not convert your churches into sacred music-halls.

I am anxious not to be mistaken. I desire as much as any man that the organ should have the power of speaking to the soul through the beautiful language that only an organ can speak. I desire to see the beautifully-designed organ cases, and I cannot too strongly condemn the far too prevalent custom of shutting away an organ in a mere box of a building, and thus destroying the effect of its soul-stirring notes.

No; a right place and space for all things is the motto. Depend upon it, however, more of our churches suffer from being over than under organed.

I feel in sympathy with a wish expressed by Charles I. on entering York Minster, that the organ might be removed so that the east window might be better seen.

Regarding these massive screens, I must confess that when in the nave I have a feeling of being shut out; especially has this struck me at Canterbury, where I think the nave, as at present, seems cold and undevotional in effect.

The beautiful fifteenth century screen in the transept of the martyrdom, Canterbury, is well worthy of notice. Of the various screens of the kind named, Exeter seems the most satisfactory. Details I will point out presently by the aid of the lantern slide.

There are not a large number of stone screens left in our parochial churches, but amongst the few I am able to exhibit the photographs of this evening I must mention the exceedingly rich example of a fifteenth open stone screen at Totnes, Devon, one of the finest of the kind in England; it is entirely and richly coloured, and the lower panels show the remains of various painted saints. For many years it was spoken of as an oak screen, the deception being from the fact that a part of the cornice is very evidently oak. There are many points in the treatment that are very uncommon, if not unique. The small canopy work upon the face of the muntins is especially worthy of notice.

An interesting example of tomb screen-work exists at Paignton, Devon, and other stone screens at Clumstock and Colyton.

A simple thirteenth century screen at Skipton in Berkshire, of which I exhibit a drawing, was carefully restored by Mr. Withers some years ago from a small remaining fragment.

An extremely interesting and uncommon example of what I must call, for want of a better term "Constructional Screen work" exists at Westwell, in Kent; the treatment is very suggestive. It is in the form of three trefoil headed arches, supported on two slender columns. The church was restored by Mr. Ewan Christian some years ago.

Another noteworthy example is at Stebbing, in Essex, shown on one of the drawings. The flying tracery in centre opening originally carried the ancient rood, but, needless to say, this has been ruthlessly hacked away.

The screen to the Lady Chapel in Gloucester Cathedral is a fine perpendicular example of constructional screen work.*

LONDON IMPROVEMENTS BILL.—Mr. Ahrenfeld, lithographer, sends us a large scale plan of the new street proposed by the County Council from Southampton-row to the Strand, showing the existing streets and property affected by the proposed scheme.

OLYMPIC MUSIC HALL.—A company is being formed for converting the New Olympic Theatre, in Wych-street, into a music-hall, the premises being held on a lease for sixty years from December 25, 1889, at a rent rising to a maximum of 3,000l. a year. The present house was built by Messrs. Holliday & Greenwood, after the plans and designs of Messrs. Crewe & Sprague, architects. According to reports by Mr. E. Clark and Mr. W. Emden, architects, the premises occupy an area of about 14,000 ft. superficial, have a total capacity for about 3,000 persons, and the lease is worth from 45,000l. to 50,000l. The former estimates that the contemplated alterations, which include removal of the first-tier boxes, will cost 4,600l. The new theatre was opened by Mr. Wilson Barrett, lessee, on December 4, 1890. We gave a short account of its earlier history in a "Note" in our issue for July 13, 1890, and a description of the interior, fittings, &c., on December 13, 1890.

* The remainder of the paper, together with some notes of the discussion, in our next.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

THE ROYAL GOLD MEDAL.

A SPECIAL general meeting of this Institute was held on Monday evening last, Mr. J. Macvicar Anderson, President, in the chair, when it was resolved, *nem. con.*, on the motion of the President, seconded by Prof.essor Kerr,

"That, subject to her Majesty's gracious sanction, the Royal Gold Medal for the year 1893 be presented to Mr. Richard Morris Hunt, Honorary Corresponding Member, New York, Corresponding Member of the Institut de France, for his executed works as an architect."

The proceedings of the special general meeting then terminated.

The tenth general meeting (business) of the Session was then held.

The death was announced of Mr. Alfred Pope Strong, Fellow.

The following gentlemen were then balloted for and declared to be duly elected as Fellows, viz., Messrs. Rhodes Calvert (Bradford), Joseph Billing (Bolton), Alfred Edward Purdie, Thomas Butler Wilson (Leeds), John Henry Woodhouse (Manchester), George Harry Wolloughby (Manchester), Jesse Horsfall (Tudmorden), and Edward Hewett, Associate (Manchester). Messrs. Alfred Ryshworth Hill, Edmund Herbert Child, and William Edward Johnson were elected Associates.

The Report of the Science Standing Committee upon Light and Air was brought up by Mr. Lewis Angell, and after some discussion it was resolved:—

"That the general principles of the Report upon Light and Air, prepared by the Science Standing Committee, be adopted, and that the Report be referred back to the Committee for reconsideration of details."

The meeting then terminated.

The next meeting of the Institute, which will be a special general meeting (for members only), will be held on Monday, March 27, for the following purposes:—(1) to receive and consider a recommendation of the Council that Mr. J. Macvicar Anderson, President, be requested to allow himself to be nominated as President for the ensuing year of office; and that, consequently, Bye-law 26 be suspended; (2) for the nomination and election of candidates for membership; and (3) for receiving a report from the Council as to the qualifications of Fellows under Section 3. of the Charter.

THE ARCHITECTURAL ASSOCIATION. SPRING VISITS:

THE HAMPSHIRE SYNOGUE.

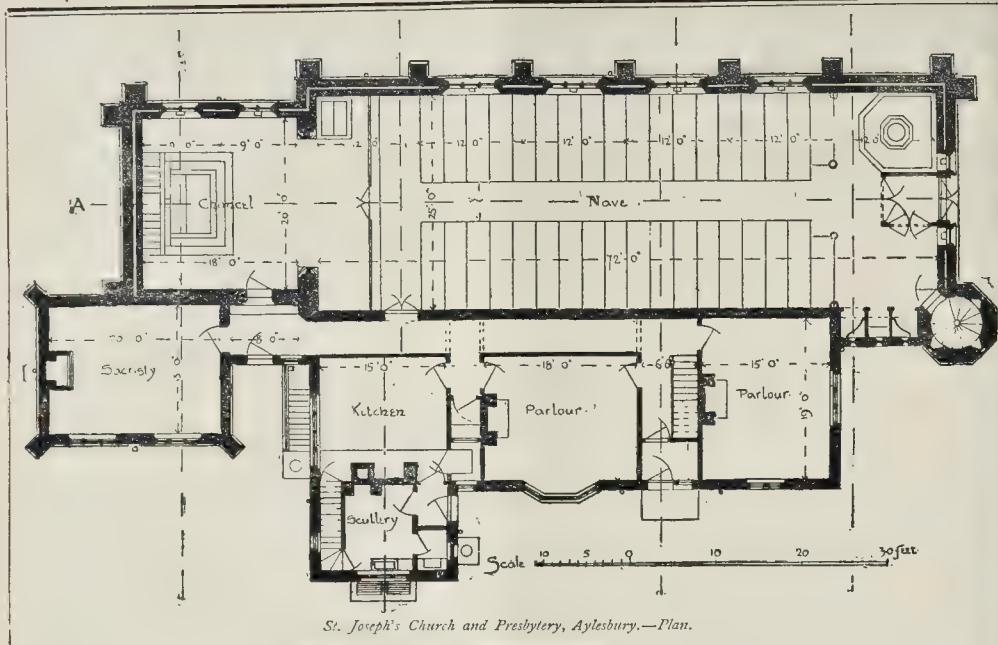
UNDER the guidance of Mr. Delissa Joseph, the architect, and Mr. F. T. W. Goldsmith, Honorary Secretary of the Association, a rather small party of members visited the new Hampstead Synagogue on Saturday last. The building has been erected in Dennington Park-road, on the site of Laurieston Lodge, and differs in several respects from the type of synagogue plan generally adopted in London. Instead of the usual cubiform building, the main structure is octagonal on plan, and an inner octagon is marked by the columns carrying the galleries and leading up to the dome which surmounts the central area.

The ark, the reader's platform, and the pulpit are grouped together at the east end of the building, thus following the Continental arrangement rather than that hitherto adopted in London. The choir is located behind the ark and screened by wrought iron grilles, which, in common with other wrought iron work in the building, is well designed and skilfully executed.

To the visitors, few of whom, probably, will ever be called upon to design a synagogue, useful hints were afforded by the provision made for the comfort of the worshippers in directions seldom studied by architects of churches and chapels.

In the first place, ample cloak-rooms with lavatories are provided both for male and female worshippers, so that the inconvenience and unhealthiness of sitting in one's heavy out-door clothing is avoided. This, of course, necessitates ample room in vestibules and lobbies, a requirement well supplied in the Hampstead Synagogue. We noted, however, evidence of one inconvenience that the use of cloak-rooms is apt to produce in a notice on the door of the ladies' cloak-room that a certain garment had been taken by mistake by another than the owner.

The arrangement of the seats tends also to comfort. Each seat has a rising flap with a box underneath for service books, and the book-rests in front are hinged so as to lift, and thus increase the width of passage way. The provision of a



St. Joseph's Church and Presbytery, Aylesbury.—Plan.

book-box under the seat interferes, however, with kneeling, unless the distance from back to back is made very wide, so that comfort is obtained at the cost of devotion. Especially commendable is the ample provision made for exit, there being no fewer than seven entrances on the ground floor, which, it will be admitted, is sufficiently ample for a building of the maximum seating capacity of 700. This is indeed one of the striking features of the plan, the sense of spaciousness in the accessory portions of the edifice, the entrances, vestibules, and approaches.

The building being somewhat hemmed in by adjoining houses, the entrance front is the principal façade, and practically the only one of which any satisfactory view can be obtained. In character it is what a lay critic would probably call "heavy," that is, it is severe, dignified, and free from meretricious ornament or fussiness. We should decline to label the treatment as belonging to any past "style" of architecture, as it is entirely nineteenth-century in character, or feeling, or expression, call it what you will. This character is obtained by the use of red brick, simple circular headed openings, and a massive central tower. As a matter of taste, and admitting difference of opinion, we do not admire the very large window which occupies the upper part of the tower, and takes away from the expression of mass which the general proportions of the design of this feature suggest. Again, as a matter of taste, we rather question the finish of the interior of the building in unrelieved pure white. Our disinclination to admire the particular treatment of the design does not, however, prevent us from appreciating the character and individuality of the Hampstead Synagogue.

COMPETITIONS.

BATHS AND WASH-HOUSES, HACKNEY.—The Commissioners for Public Baths and Wash-houses for the Parish of St. John at Hackney invited seven architects to compete for buildings to be used for public baths, offering premiums for the three selected designs, the premium in the case of the architect employed to carry out the work to merge into the commission of 5% per cent. Ten sets of designs were submitted. The Commissioners, with the assistance of their professional adviser, Mr. T. Thornton Green, F.S.I., unanimously selected the design bearing the motto "Compact," Scheme A (Messrs. Harnor & Pinches, Adelphi), for the first premium; the design "Otter" (Mr. F. J. Smith, Westminster), for the second premium; and the design "Practical" (Messrs. Spalding & Cross, Queen-

street, E.C.), for the third premium. The designs will be on exhibition to the public this Friday and Saturday, March 17 and 18, from 12 noon to 9 p.m. each day.

BATHS AND WASH-HOUSES, KENSAL TOWN. Mr. H. Wright, the Clerk to the Commissioners for Public Baths and Wash-houses in the parish of Chelsea, informs us that the Commissioners have had under consideration the designs and specifications submitted to them in connexion with this competition, and that they have determined upon the designs for which the premiums agreed upon will be given. It is added that "no mottoes are yet known to the Commissioners, the designs being numbered only." The designs will be open to inspection by the public at the Town Hall, Chelsea, from Monday March 27, to Saturday, April 3, and at the Parochial Offices, Kensal-road, from Tuesday, April 11, to Tuesday, April 18, from 10 a.m. to 5 p.m.

KIRKSTALL ABBEY GROUNDS.—At a meeting of the Corporate Property Committee of the Leeds Corporation, on the 8th inst., plans for the laying out of the grounds adjoining Kirkstall Abbey were considered. Thirty-seven sets of plans were originally submitted. These were reduced to half-a-dozen by a sub-committee appointed for the purpose. The committee resolved to give the first premium of 20l. to Messrs. J. Cheal & Sons, landscape gardeners, of Crawley, Sussex, the carrying out of whose design will involve an estimated expenditure of 3,000l. The second premium of 10l. was awarded to Mr. T. H. Mawson, of Windermere.

BUILDING TRADES' EXHIBITION.—Some notes of this Exhibition, which was opened on Monday last (need we say in its usual state of unreadiness?) are unavoidably held over for want of space. The Exhibition will remain open until Saturday, March 25.

A TOWN BUILT UPON PILES.—Phnompenh, the capital of Cambodia, says the writer of "Notes from the Far East," in the fifteenth article of that interesting series, now appearing in the *Times* (see that journal for the 11th inst.), may be divided into three parts—the French town (which is on territory ceded to the protectorate thirty years ago), the native quarter, and the palace. The native town is entirely built upon piles, the river rising in flood time between 30 ft. and 40 ft. Upon the platform thus raised are constructed the thatched houses of palm leaves and bamboo, through the open windows of which the numerous inmates (for the Cambodian have large families) can be seen all seated on the floor—the position invariably assumed by the Cambodian when not afoot.

Illustrations.

CHURCH AND PRESBYTERY OF ST. JOSEPH, AYLESBURY.

THE site of this building is one of the best in the market town of Aylesbury. The church is to be of red brick, with stone dressings; the nave will have an open timber roof of the hammer-beam type, and the chancel a semi-circular panelled one, covered with Westmoreland slates.

The walling of the presbytery is of red brick up to the level of the first floor, and from this to the eaves of yellow-tinted rough cast. The roof is covered with the local red tiles. The interior is treated like the more simple of the town houses of the early part of the eighteenth century, with plain panelling and wooden chimney pieces. The staircase has carved cantilever ends to each stair, and turned balusters.

The whole of the floors of church and the ground floors of presbytery are of wood blocks.

The work has been carried out by Messrs. Webster & Cannon, from the designs of Messrs. Goldie, Child, & Goldie.

THE "EQUITABLE" BUILDING, DENVER, COLORADO.

THIS building, which is one of the largest and finest office buildings in the West of the United States, was erected in 1891-2 for the Equitable Life Assurance Society of New York. The building is nine stories in height, and has a lofty basement, which is arranged to accommodate a Safe Deposit Company.

The materials of the exterior are a pinkish grey Colorado granite, which extends through the first two stories; the walls above are of straw-coloured bricks, and the cornices, balconies, sills, and lintels of white terra-cotta. The building is stated to be as absolutely fire-proof as modern science can render it. It is served by eight rapid elevators; one of which runs to the elevated central platform of the roof, from which point one may follow the sweep of the Rocky Mountains for 150 miles.

The greater part of the plumbing work is concentrated upon the eighth and ninth floors; but in addition to the public service there are additional lines of supply which will enable several different suites of offices on each floor to have its own plumbing service if desired. The building is heated by direct steam radiation, and completely furnished with electric lights, the power for which is supplied from a special plant in the basement.

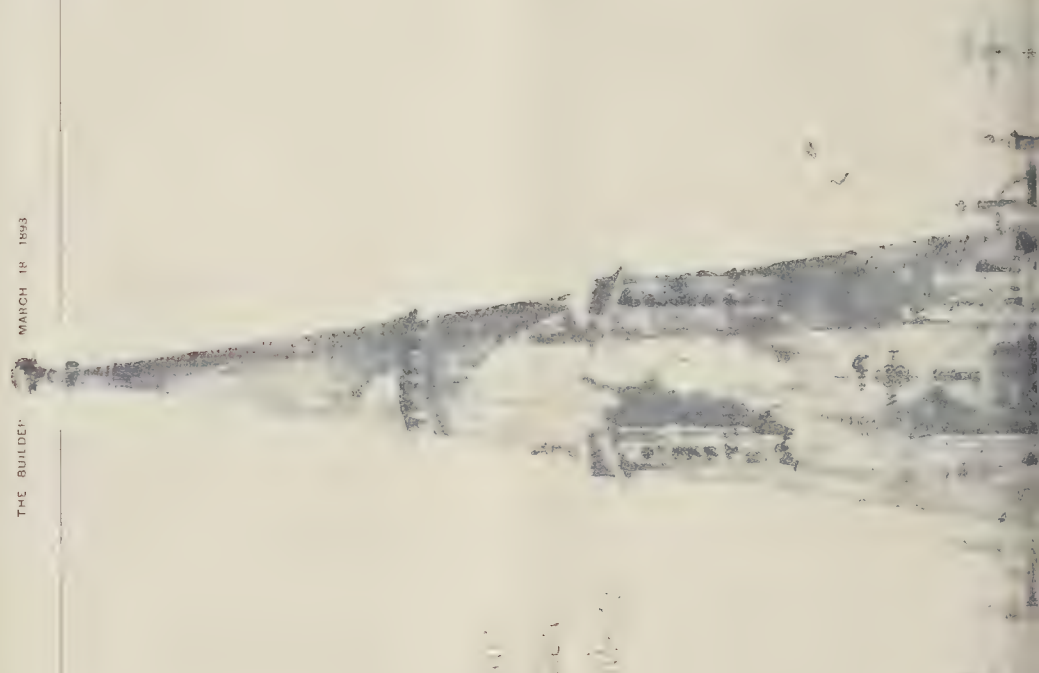
The main corridors and hallways of the ground



THE BUILDER

MARCH 18, 1893

Church of St. Andrew, St. Paul
Church, St. Paul - St. Paul
Royal Academy of Building, St. Paul

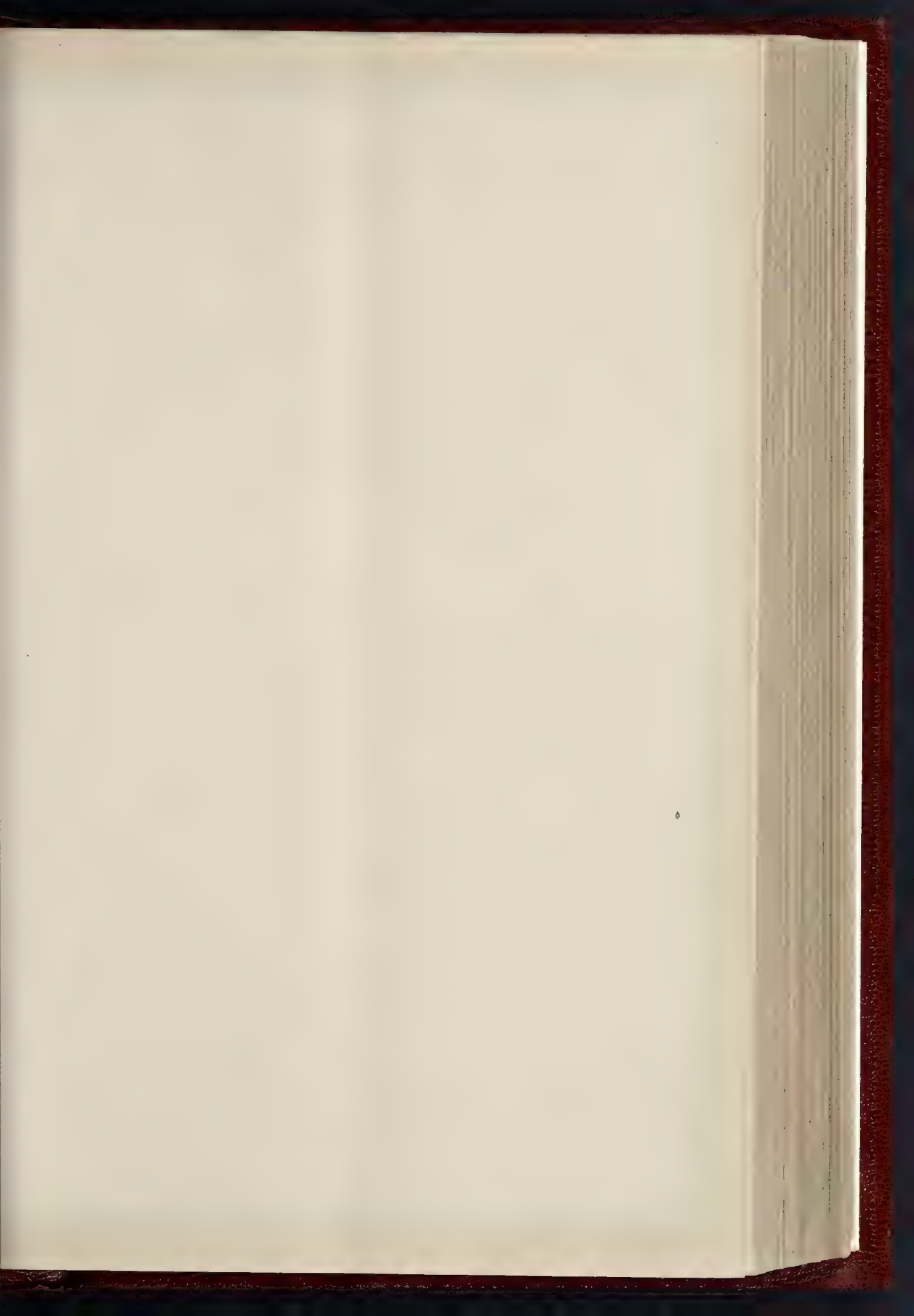




THE PULP MILL AT MILL CREEK, BRITISH COLUMBIA, 1927

DESIGN FOR TIMBER SPECIES FOR MILL WORK PROGRAM

Road Addition Extension 1927



THE BUILDER, MARCH 18, 1893.





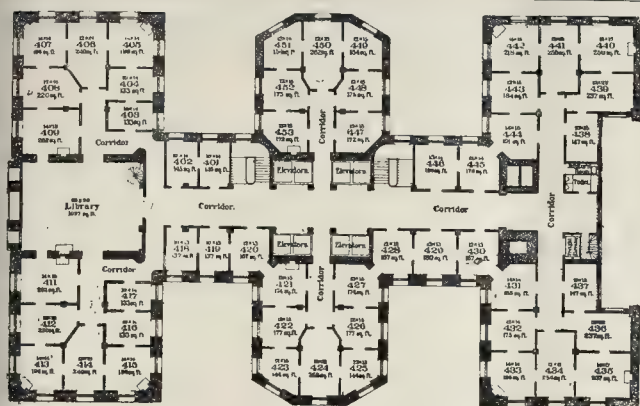
CLOCK TOWER OF THE PEOPLE'S PALACE, LONDON, E. MR E. R. ROBSON, F.R.I.B.A., ARCHITECT



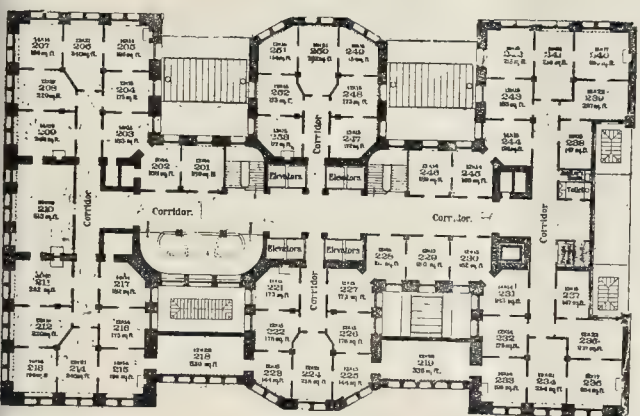




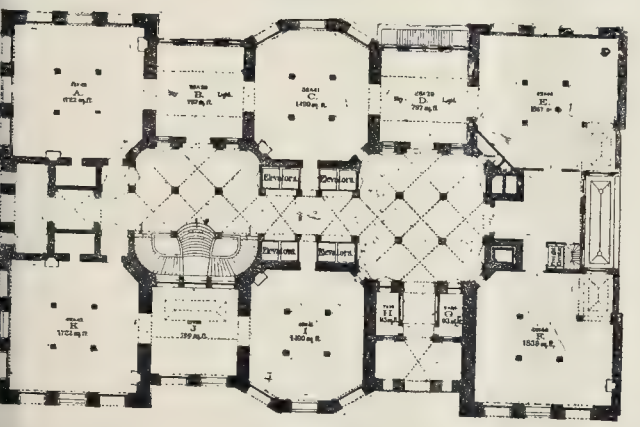
THE "EQVITABLE" BUILDING.
DENVER, COLORADO.
Messrs Andrews, Jaques & Rantoul
Architects.



FOURTH FLOOR.
Area: 11,127 sq. ft.



SECOND FLOOR.
Area: 12,127 sq. ft.



FIRST FLOOR.
Area: 12,127 sq. ft.

The "Equitable" Building, Denver, Colorado.—Plans.

floor are finished in marble and bronze, and receive direct light and air. The offices of the round floor have entrances from this hallway as well as from the street.

The architects of the building are Messrs. Andrews, Jaques, & Rantoul, of Boston and Denver.

DESIGN FOR A TIMBER SPIRE.

This drawing, prepared from a design made some little time ago for a timber spire, a subject set by the Royal Institute of Architects in one of the annual competitions, was an attempt to produce a bold and, at the same time, if possible, a

picturesque skyline. Originality with dignity was striven after, but with an endeavour to avoid the eccentricities of form which appear to be so rife in modern work. A free style of Renaissance was chosen, and the several features so massed as to secure as much relief as possible with variety of light and shade. The illustration is a reproduction from a drawing exhibited at the last Royal Academy Exhibition.

WALT. PERCIVAL.

WILSON'S GRAMMAR SCHOOL, CAMBERWELL.

THIS school, which is an old foundation for the education of boys, is of red brick with stone sparingly introduced in the form of heads, sills, and bands, and has been erected in two sections from the designs of Mr. E. R. Robson; the first portion being carried out by Mr. Nightingale, the builder, and the second by Mr. Jerrard. A further extension is contemplated when funds permit. The building is well set back, with playground in front, so as to avoid the noise of the thoroughfare from which it is seen.

It was not possible, in the first instance, to secure a central hall, and the building was therefore planned with a wide corridor. When the second portion came to be considered the Governors decided to add a hall, which accordingly was placed at the end as shown on the plan, but on the first floor.

CLOCK TOWER, PEOPLE'S PALACE.

THE clock tower of the People's Palace in the Mile End-road is entirely built of clean-hewn Portland stone, from the designs of Mr. E. R. Robson; its cost, which was 2,000*l.*, being contributed wholly by the Baroness de Stern.

The position of the tower on a line with the street, and in front of the building, would have had more architectural meaning had the design of the latter with curved wings leading out with lodges to the street being carried out in its entirety. There are granite fountains, one next the street with dog-trough and another towards the grounds. The dial, clock, and bell were supplied by Messrs. Thwaites & Reed, of Clerkenwell. The builders were Messrs. Perry & Co., of Bow.

ARCHITECTURAL SOCIETIES.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The monthly meeting of this Society was held at the School of Art on Tuesday evening last, when a paper on "Everyday Construction" was read by Mr. Stuart H. Davies, formerly in the office of the City Surveyor, and now on the staff of the London County Council. Mr. Innocent presided. The lecturer pointed out that in these days of new building materials and general appliances, it was more necessary than ever for a young architect to master the construction of his work, and to let the designs he prepared truthfully clothe the construction. He proceeded to give clear, technical descriptions of the processes of manufacture of iron and steel and the mode of constructing girders, &c., explaining the formula for calculating strains, and the best means of testing beams, roofs, &c. The paper was illustrated by lithographed diagrams handed round to the members.

EDINBURGH ARCHITECTURAL ASSOCIATION.—A meeting of the Edinburgh Architectural Association took place on the 8th inst. in the Royal Institution, Princes'-street, Mr. W. W. Robertson, the President, in the chair, when Dr. Rowand Anderson read a paper on "Dunblane Cathedral," which has been restored under his direction. Giving, in the first instance, a general outline of the history of the church, he explained that the tower was the only remaining part of the old Culdee Church which was supposed to have existed at Dunblane, and that the building in other respects dated from the thirteenth century, at which time it was raised by the instrumentality of Bishop Clemens. The decorative work in the cathedral had suffered greatly at the Reformation time, and until the beginning of the present century, when some alterations were carried out to make the chancel suitable as a place of worship, it seemed to have been disused and neglected. Only the lower two-thirds of the tower appeared to be of a period anterior to Bishop Clemens' time, but in that portion of it there were no structural indications to show what

position it occupied in the old building of which it formed part. There was not so much architectural history in the building as in many cathedrals, and this was to be accounted for by the energy of Bishop Clemens, the moderate size of the structure, and its situation on the high road between Stirling and Perth. The west door, the absence of tracery in some of the clearstory windows of the nave, the comparative smallness of the chancel aisle arch and the presence of two openings above it, the blank wall on the north side of the choir, and the long apartment on the north side of the choir were points referred to by the lecturer. Mention was also made in the same connexion of the vesica window in the west wall of the nave. In restoring the cathedral to a condition in which it could be used for its original purpose as a place of worship, Dr. Anderson emphasised this, that he had only repaired and renewed where such was structurally necessary. The wall-heads had been made secure. The whole of the building had been roofed, the tracery of the nave windows had been renewed where necessary, the masonry blocking up the chancel-aisle had been removed, the windows had been glazed, and, following out the principle of not repairing or renewing except where structurally necessary, the west door, still beautiful, though dilapidated, had been allowed to remain untouched. Mr. Hippolyte J. Blanc proposed a vote of thanks to Dr. Rowand Anderson for his paper, which the Rev. Mr. Ritchie, Dunblane, seconded. The paper was illustrated by a series of limelight views, showing the building as it was and as it now is.—On the 11th inst., the members, under the leadership of Mr. Hippolyte J. Blanc, A.R.S.A., visited Corstorphine Kirk and Beechwood House, Murrayfield.

GLASGOW ARCHITECTURAL ASSOCIATION.—The annual business meeting of this Association was held in the Rooms on the 7th inst., the President in the chair. The Committee's report was submitted and adopted. It showed the work of the past session to have been very successful. Reports were also submitted by the Treasurer and Librarian, and these were likewise adopted. The following gentlemen were elected as office-bearers for the coming session:—Hon. President, Mr. Campbell Douglas, F.R.I.B.A.; President, Mr. Alexander McGibbon, A.R.I.B.A.; vice-president, Mr. Alex. N. Paterson, A.R.I.B.A.; hon. secretaries, Mr. John White, Mr. Walter Watson; hon. treasurer, Mr. Hugh Dale; hon. librarian, Mr. W. Tait Conner, A.R.I.B.A.; general committee, Mr. Robt. J. Gildard, Mr. Andrew Robertson, Mr. John Arthur, Mr. Wm. Fraser, A.R.I.B.A.

ARCHITECTURAL SECTION OF THE GLASGOW PHILOSOPHICAL SOCIETY.—The monthly meeting of the Architectural Section of the Philosophical Society of Glasgow was held in the upper hall, 207, Bath-street, on Monday last, Mr. Campbell Douglas, the President, in the chair. Mr. Buchan gave a paper on "Ventilation." A vote of thanks was awarded to the lecturer.

ARCHÆOLOGICAL SOCIETIES.

SURREY ARCHÆOLOGICAL SOCIETY.—The annual general meeting of this Society was held on Wednesday afternoon last, at No. 8, Dane's Inn, Strand, the President, Viscount Midleton, in the chair. The thirty-eighth annual report detailed the various excursions and meetings held by the Society during the past year, and stated that the Society's publication has been kept up to date, the first part of Vol. XI. having been issued in August last, and the second part of the same volume is well in hand, for distribution during the year 1893. The Calendar of Feet of Fines for the County is all set up in type, and only waits the completion of the index. This has been a very laborious undertaking, and the council expresses its indebtedness to the editor, Mr. F. B. Lewis, for his painstaking endeavours to render the Calendar as complete as possible. The recently published Calendar of the Feet of Fines for London and Middlesex contains many entries for the county of Surrey, and taken in conjunction with the Surrey Calendar will place a large amount of material at the disposal of all students. The Surrey Calendar will be ready for distribution early in the summer. The Catalogue of the Church Plate of the County is making steady progress in the able hands of the Rev. T. S. Cooper, one of the honorary secretaries. Although up to the present no pre-Reformation example has been found in the county, the series of Elizabethan cups is very striking. The Visitation of Surrey is at last approaching completion, and the editors have every hope of finishing it in two

more parts. In August last the Society received notice from the Committee of the Croydon Institute to remove the Museum from their buildings. This was accordingly done, and the collection is now temporarily warehoused until some suitable home can be found for it. The Council draws the attention of members to the archaeological survey or map of the county, now being prepared by one of the hon. secretaries. Although a circular was issued to all members asking their co-operation and assistance, the replies were few. The great importance of such a survey being complete must be evident to all, but without the co-operation of members thoroughly knowing their own part of the country it is almost impossible to insure that accuracy which is desirable. Early in the year the Society lost an old and active member of council by the death of Dr. Alfred Carpenter, of Croydon. Mr. J. F. Eastwood, was duly elected a member of council to fill the vacancy thus created. The number of members is 320, viz.: annual, 220; life, 97; honorary, 3. During the year 19 new members have been elected, viz.: 16 annual and 3 life. By death the Society has lost 10 members, viz.: 9 annual and 1 honorary; by resignation, 10 members—total, 20. Loss over gain, 1. The library still continues to increase, not only by the exchange of publications with other societies, but also by donations from members. To Mr. S. W. Kershaw, F.S.A., the Society is greatly indebted for a most valuable gift of books in memory of his brother, the late Dr. W. W. Kershaw. This generous gift makes the Society in possession of a complete set of the *Journal of the Royal Archaeological Institute*. The Society was again represented at the fourth Congress of Societies in union with the Society of Antiquaries of London. After payment of all outstanding liabilities, there remains a balance on the year's expenditure. The total reserve fund now amounts to over £400.—The report was adopted, and it was unanimously resolved "That the debt of £95 now owing to the reserve fund, on behalf of life compositions, be cancelled." Mr. Mill Stephenson, B.A., F.S.A., and the Rev. T. S. Cooper, M.A., were re-elected hon. secretaries; Mr. W. F. Potter was re-elected auditor; and Mr. Wren was appointed auditor in place of the late Mr. Pope, with whose family a vote of condolence was passed.

ENGINEERING SOCIETIES.

LIVERPOOL ENGINEERING SOCIETY.—On Wednesday evening, the 8th inst., Professor H. S. Hele-Shaw, M.Inst.C.E., read a paper before the members of the Liverpool Engineering Society, entitled "The Graphical Method of Solving Engineering Problems." The first portion of the paper pointed out the considerably increasing use that is being made of graphic methods in engineering text-books and journals, and drew attention to the peculiar advantages of this method, both for solving problems and representing facts. After certain preliminary definitions, a reservation was made of the use of only two dimensions of space which was quite sufficient for the engineer in designing structures and machines. It was then pointed out that a very large proportion of graphical statements take the character of either Cartesian (sometimes called the linear) diagrams or of polar diagrams. These kinds of graphical statements, given by such plotted or automatically-recorded curves, were nothing more than graphical tables of numerical results, which have the great advantages of exhibiting at a glance the general nature of the facts and taking a practically unlimited number of points on such a continuous curve. Attention was then called to the class of graphical statements which do not take the form of a continuous curve, and to the graphical modes of operation which correspond to arithmetical or algebraical operations. Coming to the actual mode of graphical operation, the author said that we may place first and foremost, in utility, simplicity, and frequency of employment, the method of "interpolation," which merely consists in finding from any graphical statement in the form of a continuous curve an intermediate value by drawing a line at the point required, as, for instance, to find the pressure in an indicator diagram at any given stroke. The actual graphical operations other than the mere construction of linear and polar diagrams were then considered at some length.

EAST OF SCOTLAND ENGINEERING ASSOCIATION.—On the 14th inst. the seventh meeting of the session of the East of Scotland Engineering Association was held at No. 5, St. Andrew-square, Edinburgh, Mr. James Massie, President, in the chair, Mr. I. Robb, Assistant County

Surveyor, read a paper on the "Maintenance and Management of County Roads," with special reference to the system carried out in the County of Midlothian.

THE LONDON COUNTY COUNCIL.

A SPECIAL meeting of this Council was held on Friday, the 10th inst., at Spring-gardens, Mr. John Hutton, the Chairman, presiding.

Rates of Wages and Hours of Work.—The report of the Works and Stores Committee on rates of wages and hours of work now came up for discussion. The report and schedule, as printed in the last number of the *Builder*, were adopted, with some verbal amendments in the terms of the recommendation.

The Stones of the Burlington House Colonnade.—The report of the Parks and Open Spaces Committee, recommending the re-erection of these stones in Battersea Park (under the circumstances mentioned in last week's *Builder*, p. 195) was agreed to without discussion.

New Fire Brigade Stations.—It was decided to acquire sites for new Fire Brigade Stations in the City (near the Blackfriars end of the Victoria Embankment), and in Tabernacle-walk, Finsbury.

Proposed Improvements in Old-street.—A recommendation of the Improvements Committee to widen the Goswell-road end of Old-street, at a cost of £141,800, was defeated by an amendment (moved by Mr. Hubbard) expressing inability to proceed with the work "pending an alteration in the incidence of taxation."

The Blackwall Tunnel.—The consideration of a long report dealing with the question of suggested alterations in the mode of carrying out some portions of this work was deferred until Tuesday next, March 21.

The ordinary weekly meeting of the Council was held on Tuesday last, Mr. Evan Spicer (Chairman of the Finance Committee) presiding in the first instance.

Re-election of Chairman, Vice-Chairman, and Deputy-Chairman.—On the motion of Lord Carrington, seconded by Mr. John Burns, Mr. John Hutton was re-elected Chairman of the Council. Having taken the chair, he returned thanks, and Mr. Charles Harrison and Mr. W. H. Dickinson were re-elected as Vice-Chairman and Deputy-Chairman respectively.

Alexandra Palace and Park.—The Parks and Open Spaces Committee reported that they had considered the present proposals of Mr. Littler, Q.C., and the Middlesex County Council, to the effect that the Alexandra Palace and Estate, 386 acres in extent, should be purchased for 275,000l. The Council's Valuer, however, estimated the full value at a much less sum, and if the restriction as to building remained the value would be still further reduced. The position was represented to be that Middlesex would contribute 30,000l., Hornsey 25,000l., and Wood-green, Friern Barnet, and Finchley a sum which will bring up the total amount promised to over 70,000l. Mr. Littler proposed that the Council should contribute 120,000l., and if that were secured he stated he had no fear of the balance not being forthcoming from voluntary aid and from the City companies. The Committee, after considering the whole circumstances, were of opinion: (a) That the acquisition of the palace and grounds would not benefit the inhabitants of the County of London to such an extent as to justify the proposed outlay; (b) That the proposed system of joint management is open to considerable objection, and is a system in which the Council could not be advised to acquiesce; (c) That the price asked for the palace and grounds is excessive. They recommended:—

"That the Council do not contribute towards the cost of acquiring the Alexandra Palace and grounds." The recommendation was adopted without discussion.

After transacting other business the Council adjourned.

REGISTRATION OF PLUMBERS.—At the last meeting of the Registration Committee of the Hull District Council for the National Registration of Plumbers it was resolved that the next examination of the students attending the local plumbing classes should be held at Hull on Tuesday and Wednesday 28th and 29th inst. It was also resolved that, subject to a sufficient number of candidates applying, an examination of applicants for registration should be held on April 8, and that the same should be advertised in the local press. It was remitted to the secretary to make the necessary arrangements for the exhibition of the work executed by the students of the plumbing classes.

Correspondence.

To the Editor of THE BUILDER.

ARCHITECTURAL PAPER WARFARE.

SIR,—It is difficult for the ordinary man, whose time is greatly occupied by the practical needs of life to spare the time to follow all the papers and articles by which we are now being instructed how to practice architecture, but I think he gathers enough from his cursory observation to arrive at the conclusion that the architects of the latter half of the nineteenth century are very odd people.

We have all one object. That, I suppose, is admitted. We all love our art—or pretend to—and are anxious to advance its interests by every legitimate means. Most of us are ready to admit that the average condition of architecture of the present day is hardly calculated to invoke the enthusiasm of other countries, and we each have our pet panacea for putting things straight. These vary in degree from the cultivated artist, who chafes under all restraint and who objects to the Institute and all its works, to the practical person who hopes to find right England in the folds of an Act of Parliament. These various schools of thought are very indignant with one another and spend their time in scolding charges of great import, which they periodically deliver with a serious effort at impressive solemnity.

Now this state of things may gain for many of the eminent gentlemen who take part in it a brilliant reputation as accomplished tacticians and debaters. But I think they consider that they are conscientiously discharging their duties as leaders of the architectural thought of to-day? I sometimes think when contemplating some beautiful work of the past, how much grander and nobler it is because of the absolute silence of its author. I suppose this must be ascribed to the want of facilities for publishing his views, but I doubt whether we should respect the views of the Parthenon or York Minster any more if there were preserved from their hands a passionate attack or defence as to the propriety of an examination for architectural students.

The objections to this worthy warfare would be lessened if it were to lead to any practical end, but I would venture to submit that so far its only result has been to bewilder the student, to annoy the architect, and to afford the public opportunity for amusement. I confess I cannot see where it is going to benefit our art.

To hope to suggest a way of peace is, I am afraid, far too ambitious a dream for a humble individual like myself; but if I might venture to express in place a few of the current notions among the younger men with whom I have discussed the question, I may, perhaps, be pardoned my presumption.

Take one question—the attack on the Institute. What is the object of this? The Institute may, perhaps, not be the altogether perfect assembly that we might desire, but are we likely to change its policy by standing afar off and saying cutting things about it? The Institute is, after all, merely a collection of individuals, and these individuals by no means all think together. There are many members, more especially among the younger members now joining, who are mainly in sympathy with the Memorialists, but how can they hope to materially influence the policy of the corporate body, when the men who have earned their respect from the high quality of their work, and whom they are ready to follow, stand aloof.

Then there is the attack on the Examinations. Do the Memorialists fully realise the strength of the prejudices they have to overcome when they cry out against examination? They are contending against the young eager desires of the students who come to the study of their art with all their school and family traditions in favour of examination, and who, if they have any pluck in them, will not hesitate to present themselves for the ordeal whatever the Memorialists may say. If the preparation for the Examinations as they are at present constituted encourages academical methods of thought, and so tends to push on one side that earnest study of the handicrafts which many believe to be essential if the architect is to be really loved and respected by his workmen, so much the worse for Architecture. I think we are hard on the progress of our art by their singular course of action, but that view is held and is extending among those who are otherwise in entire sympathy with them.

On the other hand, there are many signs that the impatience in the Institute to its policy of admitting any respectable father of a family is spreading silently and slowly, and that a feeling is growing up that the character of the present examination is too academic. It is felt that it somewhat tends to encourage the production of gentlemen who are competent to carry on learned discussions on the Hypæthra of the Ancients, but who are not equally able to enlist the sympathies and call out the best efforts of the mechanics working out their designs. The idea that architects should be architects in reality as well as in title is a favourite among the younger men, and it is felt that this will mean a more intimate connexion and feeling of mutual respect between the architect and the workman than is possible under existing conditions.

But any ideas or aspirations we may have, whether members of the Institute or not, may as well be frankly set aside while these trying discussions are proceeding; and I would venture to appeal to those who are carrying them on, to consider how greatly they are injuring our art by their action, and to see if they cannot find some common ground whereon efforts may be concentrated for a united and determined onslaught on the inartistic building which is disgracing every city and town in the kingdom.

London, March 3.

OWEN FLEMING.

THE INSTITUTE AND TERRA-COTTA.

SIR,—I had hoped that in your issue of the 4th inst. someone would have taken up the discussion commenced on the previous Monday evening at the Institute. The onslaught upon the Institute itself in an article which recently appeared in the *Quarterly Review*, which, with its attempt to deride the works of one who has but recently vacated the highest office of the Institute, coupled a diatribe against the material so extensively employed by him, surely rendered the consideration of the merits of terra-cotta by the Institute itself a matter of serious moment. It is to be regretted that the discussion was not adjourned to another evening. No doubt many others, like myself, attended the meeting in the hope (as expressed by Colonel Edis) that we might take part in a quiet debate upon new ways of using this valuable material, rather than to listen to a paper (Mr. Stokes's) which savoured so strongly of the ungenerous sentimentality and disrespectful comment of the article before referred to, as to suggest a common origin. Failing that, I now write to ask that an exchange of views on the question may find a place in the columns of the Press devoted to matters of architectural interest.

I wish to say that in my estimation terra-cotta possesses so many advantages, both artistic and practical, that I consider it one of the most distinctive materials available at the present day. But I make a broad distinction between the terra-cotta available to-day and that made twenty years ago; the enormous difference between the two seems to be ignored both by Mr. Stokes and Mr. Brydon. Within that period many defects of the material, which were then only too palpable, have been remedied by attention to the details of manufacture, and by assiduous study of the nature of the material by the architects who have used it.

We have now before us, if we choose to avail ourselves of it, a material which is of the greatest value to the architect who aims at individuality in his work, which individuality can best be made evident in the details of his work.

In endeavouring to embody in our work our ideas of detail, how often are our good intentions thwarted by the ever-recurring consideration of expense? So much so that our ideals are but seldom realised. Should we not therefore welcome any material which lends itself so readily to the expression of our individuality? Of course, in using this or any other material, we must keep our imagination within due bounds and exercise proper restraint; otherwise we shall drift into those excesses which have brought about the downfall of every style and phase of art in the world's history.

The limitations placed upon us, especially in large towns, make it impossible for us to attain picturesqueness in the ways of the past, nor can we adopt the methods and materials then in vogue, when sites were ample and restrictions almost unknown. Those who build to-day do so under entirely different circumstances, in the majority of cases for clients having commercial interests which may not be ignored, so that we have to face increased difficulties in conceiving designs which shall satisfy the cumulative conditions imposed upon us.

Obviously, then, we must have many modifications of the older architectural forms, and I suggest that it is wise to soften these departures by associating them with an entirely new material, rather than to accentuate them by their execution in materials which have their orthodox forms.

I do not know of any material which lends itself so happily to the presentation of such old forms as must be retained side by side with newer ones than terra-cotta. Neither do I think the question of the advisability of using that material is disposed of by an inquiry into its capability to outlast stone or the reverse. The false conditions thrust upon the material by those who have looked upon it simply as a substitute for stone and judged it by its approximation to that material have much to do with the qualified results which are to be found by assiduous searchers like Mr. Stokes. But he forgets or is ignorant of the fact that many of the solecisms of which he and others complain are due in a great degree to conditions forced upon the pioneer users of terra-cotta by unappreciative manufacturers—conditions represented by clamour for the design to be brought to the material rather than the material to the design.

Such conditions are now happily modified, and it rests with the architects of to-day to reap the full benefit of their removal.

My own feeling is that one of the greatest advantages to be obtained by the use of terra-cotta is the soft light and shade—the mezzotint as it were—resulting from the employment of detail, which,

whilst elaborate enough to give enormously increased interest to a building when looked at at close quarters, does not interfere with the general breadth of effect at a distance.

I fancy some mistake has been made in translating "facility of production" into "facility for reproduction." Facility means that the scale of detail becomes of less import so far as cost is concerned, and it becomes possible in using terra-cotta to introduce detail of delicacy and refinement, the cost of which in stone would be absolutely prohibitive.

For these reasons, if for no others, I think terra-cotta is a material which merits the best consideration at the hands of those who have to grapple with the conditions of to-day, and I trust that the examples of its happy utilisation by such architects as Mr. Webb, Mr. Bell, and Mr. Colcutt, will far outweigh the deprecatory remarks of those who are anxious to strike through the material at the users of it, and through them at an institution of which I am proud to be a member.

H. HUNTLY-GORDON.

TERRA-COTTA AND STONE.

SIR,—With reference to the report of the recent meeting of the R.I.B.A., as printed in your issue of the 4th inst., at which papers were read, and a discussion subsequently ensued respecting the above, I think the thanks of the Portland stone quarry owners are due to Mr. Leonard Stokes (principally) and Mr. J. M. Brydon (who also on February 6, 1893, in his paper entitled "English Renaissance of the 18th Century," read before the above-named Institute, when alluding to Somerset House, spoke well of our—as he then termed it—"noble stone") for the good defence they made for Portland stone.

At the same time, as some able representatives of the terra-cotta industry were permitted to be present, and reply to the criticisms passed upon their manufactures, and Portland stone was not allowed to pass without criticism, I venture to respectfully suggest that another time the Institute might see their way to honour some of the representatives of the Portland (or other stone trades) with an opportunity of attending, and thus be able to reply to the criticisms which may be passed upon their products. Colonel Edis and Mr. Aston Webb were able to mention one building each that was erected some decades of years ago out of Portland stone, that is showing some signs of decay; and possibly had a representative of the Portland stone industry been present, he might have been able to suggest a cause for the above failures (although a century is a good innings for Portland stone, if terra-cotta is stated by Mr. Stokes to have decayed in ten years—especially if their first cost is equal—for Portland stone thus being proved to be ten times as durable, is worth as many times as much, instead of the same amount only). For instance, in a certain Midland city some few years since, Portland stone was said, to my surprise, to be rapidly decaying, and only terra-cotta could stand the acid atmosphere of this place; but I directed a practical man who had assured me of the failure of Portland stone to go and visit a certain important building erected of stone from some of my quarries (then the property of my predecessors) some twenty-seven years ago, and, after some delay, he wrote me as follows:—

"I am sorry I have not had time to go and inspect the . . . until yesterday, when I went and had a thorough good look round, and am glad to say I found the stone had stood remarkably well; there is not the slightest sign of decay—in fact, every edge, and mitre, and moulding is as sharp and as good as when new."

Now this building was erected of stone from some fresh quarries here in the island, which had not been greatly worked, and the success of the stone from that quarry against the failure of stone from others, shows that if a quarry-owner is permitted to send to a town just the particular sort of stone his knowledge of his material and of the atmosphere of the place where the stone is to be erected may suggest as being the right sort, even the few failures which Colonel Edis and Mr. Webb criticised may be minimised, if not effaced. As in Bath and York stones, so in Portland, there are several districts in the island (true, not very widely separated), producing stone varying very greatly in quality, some of which is undoubtedly the best for some towns and some for others, but very generally we find Portland stone specified broadly as such, when, as a consequence of no stone from any particular group or district being specified, a mixture is sometimes ordered (possibly intentionally by the manipulators at the other end), or if discretion is used when ordering, possibly the wrong sort is ordered, and being ordered is sent, hence a failure is the result of what might otherwise have been an unqualified success.

F. J. BARNES.

Portland Stone Quarries.

P.S.—Another explanation of the very rare occasions upon which Portland stone fails is to be found in a circumstance which has just now occurred, viz., I have been supplying the stone for a certain important building in the Midlands, and I have sent into that town just that sort of stone which I was satisfied in my own mind would be most suitable for its atmosphere; but my customers insisted upon having, and are now using, stone from another bed in another part of the island; hence, in

such instances, Portland stone merchants are powerless to prevent what they may beforehand feel assured must be a failure sooner or later.—F. J. B.

THE MANCHESTER CATHEDRAL CONTROVERSY.

SIR,—The temperate tone of your Note in the *Builder* on the Manchester Cathedral controversy is a refreshing change after the personalities of my critics in the *Manchester Guardian*. The writer of your Note, however, regrets a certain carelessness as to facts on my part. I take leave to point out that, with one exception, Mr. Oakley has not established the inaccuracy of any of my statements.

Mr. Oakley pointed out that I was in error in regard to the Fraser Chapel, an error into which I was led by a photograph of the church taken previously to the latest restoration, and by what I think must have been an inaccurate plan given in the latest published account of Manchester Cathedral. This error I admitted at once, giving the authorities on which I had based my criticism. With this exception, not a single one of my criticisms has been disproved. Mr. Oakley attempted to prove that I had been hopelessly wrong in regard to the quarries. He made out that a diamond-shaped quarry, measuring 4×3 ft. from point to point of centres of corners, if multiplied by 8, produced a quarry $2 \frac{1}{2}$ ft. 8 in. high. I set this quarry out full size, and multiplying it by 8, I found its area came to 50 square inches; that is to a quarry 8 in. by 64 in., the exact size I had in view.* So far from my having been inaccurate in regard to facts, the gravamen of misrepresentation is against the other side. Mr. Oakley, as I have pointed out in the *Manchester Guardian*, misrepresented my statements. This may have been due to a misapprehension, or to a pardonable zeal in defence of his old master. Mr. Oakley at least wrote in a reasonably temperate manner, but most of the other writers to the *Manchester Guardian*, when they were not misquoting my statements, were making a furious outcry at the presumption of any criticism of that sacred monopoly, the work of the architectural profession. One person, who concealed his identity under the title of "Not a Manchester Architect," made the deliberately false assertion that I had been wrong in five specific points, and he based his abuse on the fact that I had not "restored" many churches as Sir Gilbert Scott and other eminent performers in the process of obliterating national history. Your contributor may have been misled by the fact that I did not think it worth while to reply to this abuse; but as the reproach of carelessness has been brought against me in the columns of the *Builder*, I am driven, in self-defence, to ask you to insert this contradiction on my part, a contradiction which I think will be confirmed by any competent person who tests my statements by an independent examination of Manchester Cathedral. The various "restorations" of the Cathedral carried out in this century have reduced the building to a condition of absolute illegibility, and the object of my criticism was to direct public attention to the injury which is everywhere, and all over England, being inflicted on what must now be considered as national monuments by the zeal of ill-instructed piety.

REGINALD BLOMFIELD.

RE SMITH MEMORIAL, ST. MARGARET'S, WESTMINSTER.

SIR,—In your notice of this work last week I find I am credited with the whole of the work on the glass. This is, however, hardly correct, as Mr. L. Jacques executed the principal portion of the painting under my direction, &c.

The mistake has arisen, I expect, from the description furnished you.

HEN. G. MURRAY.

The Student's Column.

CHEMISTRY.—XI.

Hydrochloric Acid. HCl.

HYDROCHLORIC acid is one of the most common and most important of the commercial acids. It is known also as *spirits of salt*, as *muratic acid*, and as *hydrogen chloride*. The name "spirits of salt" was probably obtained from the fact that it is prepared by heating common salt with sulphuric acid and is evolved as a vapour or gas.

Hydrochloric acid is used in very large quantities for the preparation of bleaching powder and for other chemical manufactures, and also as a solvent for many of the metals.

* Mr. Blomfield will find that he has made some mistake here. The area of a symmetrically-shaped diamond quarry of which the diameters are 4 in. and 3 in., is 6 square inches; that of a similar quarry of which the diameters are 8 in. and 64 in., is 25 square inches, exactly half what Mr. Blomfield makes it out to be.—Ed.

It is a colourless, irritating, strongly acid gas which fumes considerably in moist air. It is very soluble in water, and the solution thus formed constitutes the hydrochloric or muriatic acid of commerce.

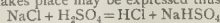
A saturated solution of hydrochloric acid in water has a specific gravity of 1.21, and contains about 42 per cent. of true HCl. The strength of the acid solution, however, varies with its temperature and with the atmospheric pressure.

A mixture of hydrochloric acid with nitric acid is known as *aqua regia*, and is used as a solvent for gold and platinum, which are unaffected by either acid if used separately.

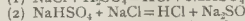
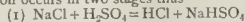
Hydrochloric acid may be obtained by mixing equal volumes of hydrogen and chlorine, and exposing them to diffused daylight, when they become chemically combined. If exposed to too strong a light, the gases combine so rapidly that violent explosion occurs.

The acid is, however, usually prepared by heating common salt (sodium chloride) with sulphuric acid.

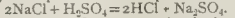
If the temperature to which these substances are heated is comparatively low, the reaction which takes place may be expressed thus:—



If the temperature employed is great, the reaction occurs in two stages thus—



but may be expressed in one equation, thus—



Most of the acid of commerce is obtained from these materials, as a bye-product from the manufacture of sodium carbonate, thousands of tons being manufactured every week in England alone. The commercial acid, however, is always impure, containing iron as ferric chloride, arsenic as arsenious chloride, and sulphuric acid. It may, however, be purified by simple distillation.

Experiments. Group 7.

1. Prepare some chlorine gas.

Fit up an apparatus as shown in Fig. 11. Put about an ounce of black manganese dioxide into the flask, and pour upon it enough strong hydrochloric acid to thoroughly moisten it. Upon gently heating the mixture, chlorine gas will be rapidly evolved, and being heavier than air, may be collected as shown in the figure. The jars may be considered filled when a wet litmus paper held over the mouth of the jar is bleached. There is, of course, always a little air present when the gas is collected in this manner, but that does not affect most of the experiments. If preferred, the gas may be collected over water in the usual way, provided that the water employed is as hot as the hand can bear. The gas is very considerably soluble in cold water. Avoid inhaling the gas.

With the gas thus collected prove—

(a) That chlorine will not bleach in the absence of water, by placing a piece of dry red cloth or a bunch of violets in a jar of the gas. The colour of the cloth or violets will be almost unaffected. Now wet them and again plunge them into the gas, and they will be rapidly bleached.

(b) That chlorine will readily combine with metals in a fine state of division, by dropping some powdered antimony or a leaf of Dutch metal into a jar of the gas. The metal will combine so rapidly with the chlorine that the heat of combination will cause the metal to ignite.

(c) That chlorine readily unites with hydrogen to form HCl, by moistening a strip of blotting-paper with turpentine and plunging it into the gas. The heat produced by the rapid combination of the hydrogen of the turpentine with the chlorine is so great that the paper and turpentine will burst into flame. The carbon of the turpentine will be liberated as dense volumes of smoke.

2. Prepare hydrochloric acid.

In a flask fitted in a similar manner to that employed for making chlorine, place about 3 parts by weight of common salt to 5 of strong sulphuric acid. Heat gently on a sand bath or piece of wire gauze. A colourless gas will be evolved, which, being heavier than air, may be collected in the same manner as chlorine. It is, however, more convenient to pass it into water, and thus form a solution of hydrochloric acid. Prove that the gas or solution obtained possesses the properties of HCl.

3. Place some bleaching powder in a beaker, and pour upon it a few drops of hydrochloric acid. Prove that chlorine gas is evolved.

Symbol S. Sulphur. Atomic Weight 32.

Sulphur is an element which is found in a free state in volcanic districts. Most of the sulphur used in this country comes from Sicily and Italy. It is found as a matrix with rock salt and gypsum,

and is separated from these by simply melting it out. Sometimes the sulphur is poured while in a liquid condition into tubular moulds, and then forms, when cool, "roll sulphur" or "stick sulphur." Sulphur is purified by heating it until it vaporises and allowing the vapour to pass into a large brick chamber, in which the sulphur condenses out as a fine powder, and is sold as "sublimed sulphur" or "flowers of sulphur." Combined with metals, sulphur is found as *sulphides*, thus iron pyrites (FeS_2) is a sulphide of iron, and galena (PbS) is a sulphide of lead. In combination with metals and oxygen, sulphur occurs as sulphates—e.g., gypsum or calcium sulphate ($\text{CaSO}_4 + \text{H}_2\text{O}$). In the gaseous condition sulphur is found combined with hydrogen as sulphuretted hydrogen (H_2S), and with oxygen as sulphur dioxide (SO_2) in volcanic regions. Sulphuretted hydrogen is sometimes found dissolved in mineral waters, as at Harrogate. In small quantities, sulphur is found in many organic substances, such as eggs, garlic, coals, onions, oil of mustard, &c.

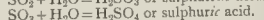
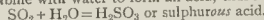
The blackening of silver spoons by eggs is due to the action of the unoxidised sulphur, a black sulphide of silver (Ag_2S) being formed.

By exposure to the atmosphere of towns in which much coal is burnt, silver rapidly blackens on account of the action of the sulphuretted hydrogen upon it.

Sulphur, like carbon, may be obtained in three allotropic modifications.

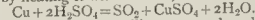
Ordinary sulphur is practically insoluble in water, but dissolves readily in bisulphide of carbon, or in turpentine.

Only two oxides of sulphur are of any importance commercially, viz., sulphur dioxide, SO_2 , and sulphur trioxide, SO_3 . Each of these will combine with water to form an acid, thus:—



Sulphur Dioxide. SO_2 .

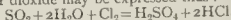
When sulphur is burnt in air or oxygen, it burns with a blue flame, and produces a colourless gas termed sulphur dioxide or sulphurous oxide. One of the most convenient methods of preparing it, however, is to decompose sulphuric acid by heating it with a metal, thus:—



Sulphuric acid and metallic copper when heated together yield sulphur dioxide, copper sulphate, and water.

Sulphur dioxide has a very irritating and suffocating odour. It is very soluble in water, and forms with it, as shown above, an acid, termed sulphurous acid. H_2SO_3 .

Sulphur dioxide possesses bleaching properties, and is usually employed for bleaching materials that would be injured by chlorine—such, for instance, as wool, silk, straw, or flannel. It is also used as an "antichlor" for removing the last traces of chlorine from materials which have been bleached by that element. The action of the sulphur dioxide may be expressed thus:—



The preparation and use of sulphur dioxide as a disinfecting agent has been described in a previous paper.

Sulphur Trioxide. SO_3 .

Sulphur trioxide is a white or colourless crystalline solid. It can be prepared by passing dry sulphur dioxide and oxygen together over heated, finely-divided platinum.

Sulphur trioxide does not redden blue litmus paper, but when brought in contact with water, the two substances combine with great violence, forming an intensely acid solution known as sulphuric acid.

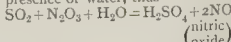
Sulphuric Acid, H_2SO_4 .

This acid is commonly called "oil of vitriol." It is used, directly or indirectly, for almost every chemical manufacture; consequently the quantity manufactured per week in the United Kingdom is enormous.

The acid is prepared by bringing into contact—

(1.) Sulphur dioxide		
(2.) Air	which result into	dilute sulphuric acid.
(3.) Water vapour		nitrogen.
(4.) Nitric acid vapour		nitrogen trioxide.

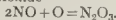
The whole process depends upon the fact that although SO_2 will not combine to any appreciable extent with free oxygen and water to form sulphuric acid, it is capable of abstracting oxygen from nitrogen trioxide (N_2O_3) to form the acid, in the presence of water, thus—



The nitric oxide formed by this reaction imme-

* See p. 135, ante.

ately combines with atmospheric oxygen to form nitrogen trioxide



the nitrogen trioxide is then ready to convert a fresh quantity of SO_2 and water into sulphuric acid, as shown in the first equation. The nitric acid therefore merely acts as a carrier of oxygen to the sulphur dioxide.

There is some difference of opinion as to whether it is really trioxide of nitrogen or another acid called peroxide of nitrogen (NO_2) which acts as the oxygen carrier. It is, however, quite immaterial, as in either case the reaction is much the same. The reactions given above are those accepted by Sir Henry Roscoe.

The nitric oxide is obtained from the nitric acid vapour through the decomposition of the SO_2 and cyan, thus:



The four substances, SO_2 , HNO_3 , vapour, steam, and air are brought together in large sheet lead vessels, and when the manufacture is progressing satisfactorily, dilute sulphuric acid is being continually drawn from the chambers, while nothing escapes at their outlets but nitrogen, with a little oxygen and nitrogen trioxide. These residual gases are passed over strong sulphuric acid, which absorbs the nitrogen trioxide; when this acid is diluted, the trioxide is evolved and is used for the conversion of a fresh quantity of sulphurous acid into sulphuric acid. The nitrogen dilute trace of oxygen are not absorbed by the sulphuric acid, and are allowed to escape into the atmosphere.

The dilute acid drawn from the lead chambers is called "chamber acid," and has a specific gravity of 1.4, and contains about 65 per cent. H_2SO_4 . This is then concentrated by being heated in leaden pans until it attains a specific gravity of 1.7, and contains about 78 per cent. H_2SO_4 , when it constitutes the B.O.V., or *bona opera* oil of vitriol, of commerce, the brown colour being due to the presence of traces of organic matter. All further concentration has to be effected in platinum or glass vessels, because the acid rapidly attacks the lead if stronger than B.O.V. By concentration in this way an acid of specific gravity 1.84, containing about 94 per cent. H_2SO_4 , is finally obtained, and constitutes the ordinary "oil of vitriol" of commerce.

It always contains lead, from the lead vessels, an impurity, and usually contains arsenic, from iron pyrites (FeS_2) employed for manufacturing SO_2 .

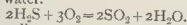
Pure sulphuric acid is a colourless, odourless, liquid, having a specific gravity of 1.84. It avidly absorbs water from the air, and is much used in laboratories for desiccating purposes. When sulphuric acid is added to water great heat evolved; if strong acid is poured upon sugar, oil, or similar organic substances, they become charred through the rapid absorption of the water by the organic substances by the sulphuric acid.

Nordhausen Sulphuric Acid.

Fuming or Nordhausen sulphuric acid is prepared in Saxony and Bohemia, for special purposes, by distilling anhydrous sulphate of iron in new retorts. It is a brown, fuming liquid, and has the formula $\text{H}_2\text{S}_2\text{O}_7$. It is used for preparing artificial alizarin and for dissolving indigo.

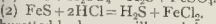
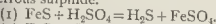
Sulphuretted Hydrogen, H_2S .

Sulphuretted hydrogen, or hydrogen sulphide, is a colourless gas having a disagreeable odour, which somewhat resembles that of rotten eggs. When inhaled in considerable quantities it acts as a poison; but in very small quantities it is not injurious to the health. It is inflammable, and burns with a bluish flame, forming sulphur dioxide and water.



At the ordinary temperature, water will dissolve about three times its own volume of sulphuretted hydrogen.

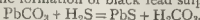
The gas is most conveniently obtained by the action of dilute sulphuric or hydrochloric acid on ferrous sulphide.



Sulphuretted hydrogen will precipitate many of the metals as sulphides from their solutions, some being precipitated from their acid solution, and others only when their solutions are neutral or alkaline. Thus bismuth, tin, arsenic, antimony, stannic, silver, lead and copper are precipitated from their acid solutions by H_2S , while iron, nickel, manganese, and zinc are only precipitated in their alkaline or neutral solutions. To render a solution alkaline, hydrochloric acid is the reagent to use, while to render it alkaline, ammonia solution is usually employed.

Ordinary white paint, which contains lead car-

bonate, is blackened by sulphuretted hydrogen, through the formation of black lead sulphide.



Experiments. Group 8.

1. Prepare some sulphur dioxide.

In a flask, as shown in fig. 11, place some copper turnings, and just cover them with strong sulphuric acid, heat gently and collect the gas as shown.

(a) Pass some of the gas into water and note its great solubility. By means of test-paper, observe that the solution is acid.

(b) Bleach violets, roses, coloured wool or silk, by suspension in a jar of the gas, and note that in some cases the colour may be restored by dipping in a weak solution of sulphuric or hydrochloric acid.

2. Prepare sulphuretted hydrogen.

Place a few pieces of ferrous sulphide in a flask fitted as shown in fig. 11, and down the funnel tube pour enough water to just cover them; then add strong HCl. Note the odour and inflammability of the gas evolved, and pass some of the gas into (1) a beaker containing lead carbonate dissolved in HCl and diluted with water; (2) a beaker containing copper oxide similarly treated; and (3), a beaker containing metallic zinc dissolved in HCl, and diluted, but finally made alkaline with ammonia. In the first two cases a black sulphide will be produced; but in the last case a white sulphide.

OBITUARY.

MR. ALFRED POPE STRONG, F.R.I.B.A.—We regret to learn, from the *R.I.B.A. Journal*, of the death of Mr. Alfred Strong, of John-street, Adelphi. He was the son of the Bavarian Consul to the Greek Court, and was born on September 20, 1834. Educated at Cheltenham College, he was articled to Mr. Marchand, of Hamburg (pupil of Chateaufort and Hittorf). In 1859 he entered the office of the late Mr. T. H. Wyatt as improver, where he remained to the end of 1861, and then commenced to practise on his own account. He was elected an Associate of the Institute in 1861, and a Fellow in 1869. He competed for several important buildings, and assisted Mr. Garling in his design for the Law Courts. He joined Mr. Samuel Parr in 1867, with whom he remained in partnership for twenty-one years. During that period his chief works were: Additions to Somerset County Lunatic Asylum; St. Paul's Rectory, Chippenham; Ludenden Foot Church and Schools; additions to Vicarage, New Parsonage, National Schools, Gravelly Schools, New Mill Schools at Tring; All Soul's Church, Vicarage, and Schools, Eastbourne; Buenos Ayres Grand Southern Railway Terminus. For years he was a contributor to our columns, principally upon foreign subjects. His death happened rather suddenly on the 5th inst., through an internal ulcer, from which he had suffered several years.

MR. THOMAS LOVICK, C.E.—We regret to hear of the death at his residence, Haverstock-hill, on the 14th inst., of Mr. Thomas Lovick, who was for many years Assistant Engineer to the late Metropolitan Board of Works, and for a while also to the London County Council. He had desired to retire from office a year or so after the advent of the new body, but he was requested to continue in the service of the Council for another year until the new staff had been appointed and got into working order. Mr. Lovick had only enjoyed his pension for two years. He had been intimately connected with nearly all the principal public improvements in the Metropolis, sanitary and otherwise, during the last half-century. Originally holding the post of Surveyor to the Parish of St. Andrew, Holborn, he was selected by Viscount Morpeth (Earl of Carlisle) for a surveyorship to the then new Metropolitan Commissioners of Sewers, in which office he was installed in 1847. That Commission had charge of the sewers and drains of the whole of London (without the walls), under various Acts of Parliament extending as far back as the time of Henry VIII. Mr. Lovick took a prominent part in the brick-sewer v. pipe-drain contest, being in advance of the views of a large number of the members of the Institution of Civil Engineers, who stoutly stood up for the maintenance of the large brick sewer, and strongly opposed the then new stone or tubular drains. Mr. Lovick's views in favour of the pipes, as our readers know, ultimately triumphed. He was much associated with the late Sir Edwin Chadwick, Mr. John Phillips, and other well-known sanitarians, in working out sanitary problems of all kinds. On the creation of the late Metropolitan Board of Works, Mr. Lovick was in 1856 appointed Assistant Engineer to that Board, and was associated with the late Sir Joseph Bazalgette (then Mr. Bazalgette) in carrying out the metropolitan main drainage works. Mr. Lovick was resident engineer for two of the great intercepting sewers, and also for a part of the Victoria Embankment. He was a man of high character and ability, and his fidelity and integrity were never questioned. He was a teetotaler, and had resided for forty years in his house at

Haverstock Hill. He died after an illness of six months' duration. He leaves two sisters,—his sole surviving relatives, we are informed.

GENERAL BUILDING NEWS.

CLERKENWELL TESTING OFFICE, FOR WEIGHTS AND MEASURES.—This office, which was opened on the 1st inst. by Dr. Bott, Chairman of the Public Control Committee of the London County Council, has been built upon part of the surplus land available after the formation of the viaduct which carries the new thoroughfare from Gray's Inn-road to Islington. A portion of one of the arches under the viaduct has been added to the premises. Upon the basement level, entered from Warner-street, a store has been provided for the vehicles used by the inspectors; and stabling for six horses, with harness-room, &c., has been added at the rear. There is here a weigh-bridge capable of taking weights up to 7 tons, a platform for receiving large packages and receiving and testing heavy weights. From this platform there is a lift to the upper floors, and near it is a provision for testing the largest scales. There is also a heating apparatus with coal stores. A small room has been provided in the mezzanine for the use of workmen at meal-times. On the ground floor, entered from Rosebery-avenue, is a waiting lobby for the public, a large testing-room for the testing and stamping of measures, scales, weights, &c., and an office for one of the inspectors. Upon the first floor is a room for testing and marking glass measures, with offices for two inspectors. Upon the second floor is a room for testing the finest work, such as the weights and measures used for bullion and by apothecaries; there is here also a sitting-room, kitchen, and scullery for the caretaker. Upon the third floor are three bedrooms, and a drying-room has been formed in the roof. The building is faced with red Suffolk bricks and red Corshill stone, the style being an adaptation of the French Renaissance. The design is by Mr. Blashill, the Architect to the London County Council, and the cost of the building has been about 6,800*l.*, the contractors being the Co-operative Builders, Limited, of Burton-road, Brixton.

VOLUNTEER HALL, JOHNSTONE, RENFREWSHIRE.—A new Volunteer Hall has just been erected at Johnstone. The building, which is of red stone, is of the Scotch Baronial style. The ground floor of the front part of the building is occupied with officers' room, members' room, sergeants' room, armoury, and all other modern adjuncts are provided. The drill-hall, 150ft. long by 45ft. wide. This hall is also to be used as a gymnasium. The second story of the front building is set apart for the drill instructor's dwelling-house. The architect is Mr. Peter Kerr, of Johnstone, and the contractors were:—Mason work, Messrs. David Jaffrey & Son; joiner work, Mr. Morison; slater and plaster work, Mr. George Thomson; plumber, Mr. Charles Murdoch; painter, Mr. Boyd.

WESLEYAN SUNDAY SCHOOLS, NEWCASTLE.—The memorial stones of the new Wesleyan Sunday Schools at New Benwell, Newcastle, were laid on the 1st inst. The school building will be about 90 ft. long by about 35 ft. wide, and will consist of a large hall, infants' school, and two class-rooms on the ground floor, with caretaker's house on the first floor, and heating chamber, &c., in the basement. The building is to be of stone, relieved with red-stone. The interior of the hall will be relieved by arched recesses and ornamental plaster and woodwork. Messrs. Thompson & Selby, of Newcastle, are the architects, and the general contractors are Messrs. Thirlwell & Son, of Benwell, the masonry work being executed by Messrs. N. & R. Reid, Newcastle.

PROPOSED ADDITIONAL BARRACK ACCOMMODATION IN PLYMOUTH GARRISON.—During the coming year, says the *Western Morning News*, important building operations are to be carried out to provide improved accommodation for the troops quartered within the fortress of Plymouth. There is no present intention to increase the number of troops stationed in the Western District, but rather to improve their quarters. Barracks are to be built at Crownhill, and Plymouth Citadel will be reconstructed, and appropriated as the headquarters of the Royal Artillery in the Western District. Under existing arrangements, the Artillery are quartered in various parts of Plymouth fortress, but by the new scheme, all these scattered detachments will be concentrated during the winter months at Plymouth Citadel. The building of the new barracks at Crownhill will be commenced during the coming year.

RENOVATION OF ST. MARY'S CHURCH, GREASBOUROUGH, YORKSHIRE.—On the 10th inst. the re-opening took place of St. Mary's Church, Greasborough, near Rotherham. The foundation stone of the church was, says the *Sheffield Telegraph*, laid on September 29, 1826, and the consecration took place on October 17, 1828. The plan of the church is a simple rectangle, 75 ft. by 45 ft., and without any structural channel. The pews, now removed, were narrow, and to some extent awkward. Owing to the abrupt fall of the ground, the renovation committee were unwilling to incur the expense of building a channel. A quasi-channel has therefore been formed by low traceried Wentworth oak screens on a base of Roche Abbey stone. On the left, a vestry, and on the right an organ-chamber

has been formed by oak screens 12 ft. high. The nave has been furnished with open seats in pitch-pine. The choir stalls, reading desks, and lectern are of oak. A new communion table has also been provided. The walls are painted in oil-colours of a light terra-cotta tint, with dark red dado, and ornamented with bands of passion flowers and lilies, the wall of what would ordinarily be the east end being more elaborately adorned. The windows have been filled with pale cathedral glass. The church is now heated with hot water, and lighted with Cowan's patent lights. The total expenditure is about 1,000*l.* The contractors were: Joiners work, J. Wortley, Rotherham; decorator, George Woollen & Son, Rotherham; hot-water apparatus, Blakeborough & Rhodes, Stockton-on-Tees. The whole has been done under the superintendence of the architect, Mr. E. Isle Hubbard, of Rotherham.

ST. JOHN'S CHURCH, APPERLEY BRIDGE, YORKSHIRE.—A new church has been built at Greengates, Apperley Bridge, near Leeds, and on the 8th inst. it was consecrated by the Bishop of Ripon. The church, which was built from designs prepared by Messrs. Kendall & Bakes, architects, Leeds and Idle, is in the Early English style, and will accommodate 300 persons. It consists of nave and chancel, with an organ chamber on the north side and a clergy vestry on the west. The main entrance is in front, facing the road, and over it rises the tower and steeple to a height of 80 ft. It is intended to place a peal of six bells in the tower. The pews, choir stalls, the vestry screen, inner doors, and inside roof timbers are of pitch-pine. The outer doors are of oak. The windows are leaded, and filled with cathedral glass. The church and churchyard cover 2,000 square yards. The cost of the church has been 3,000*l.*

NEW CO-OPERATIVE BUILDINGS, GREENOCK.—The memorial-stone of the Greenock Central Co-operative Society's new buildings, at the corner of Roxburgh and Mearns streets, was laid on the 11th inst. In this contract the Society is building three tenements and a bakery, at a cost of between 10,000*l.* and 11,000*l.* The first and second tenements have each a frontage to Roxburgh-street of 41 ft., and the third has a frontage of 39 ft. to Roxburgh-street, and 64 ft. to Mearns-street. Large shops are being provided for the various departments of the Society. The first floors of the first and second tenements are being reserved as show-rooms and work shops for the dressmaking and millinery departments. Altogether, the shops contain 4,000 superficial feet of floorage, while the show and workrooms contain about 2,000 superficial feet, and cellars to the extent of over 1,600 superficial feet will be provided under grocer and butcher shops. The upper floors of the three tenements are divided into houses of two and three apartments. The architect is Mr. W. Burns Stewart, Glasgow, and the following are the contractors:—Masons, Messrs. J. & R. Kirk; joiner, Mr. Gavin Paterson; plumbers, Messrs. Crawford & Kerr; slaters, Messrs. Main, Bong & Black; plasterer, Mr. James M'Creadie; gas fittings, Mr. Dugald M'Ewing; glazier, Mr. Matthew Tylter—all of Greenock; iron, Messrs. Bladen & Co.; tiles, Messrs. Galbraith & Winton; and asphalt, Val-de-Travers Company—all of Glasgow. Messrs. Wm. Morrison & Sons, Leith, are the engineers, and Messrs. Duff & Henderson, Glasgow, are the measurers.

FOREIGN AND COLONIAL.

FRANCE.—Seventy-five artists have taken part in the competition for the decoration of the Salle des Banquets at the Paris Hôtel de Ville. The designs are exhibited in the Palais des Arts Libéraux on the Champ de Mars. The Académie des Beaux-Arts has awarded the Achille Leclère prize to M. Henri Sirot, pupil of M. Moyaux. The subject was a design for a Bourse de Commerce. The French Society of Painter-Engravers will open their annual exhibition on April 7, in the Rue Durand-Ruel; it will remain open till April 28. The exhibition of the "Peintres Symbolistes et Impressionistes" is open in the same locality. M. Albert Tissandier, architect, has been commissioned by the Government to make archaeological explorations in Cambodia and Java. A Fine Art exhibition is to be opened at Angoulême on May 7, to remain open till July 9.—A competition has been opened at Angers for the erection of a monument to General Cathelineau, the celebrated Vendean leader, in the church of his native town Pin-en-Mauges.—The designs sent in for the monument to be erected at St. Quentin, in memory of the Siege of 1557, are on view in the Salle Vauban at St. Quentin. The competitors are M.M. Deloye, Hiolain, Puech, Doublerand, Theuissen, Croisy, Cordonnier, Suchetet, and Damé.—The death is announced of M. Ferdinand Mazzoli, a talented archaeologist and designer. He was born at St. Petersburg in 1821, but had lived at Toulouse from an early age, and adopted the profession of architect. Devoting himself mainly to the picturesque illustration of architecture, he reproduced in a great number of compositions, the Roman monuments of the South of France. He also produced a valuable and curious set of illustrations of the ancient city of

Carcassonne; and also illustrated the numerous archaeological monuments at Toulouse. He was a great collector of objects of art, especially coins.—We may also notice the death of M. Henri Schelling, a painter of anecdotic scenes and portraits, born at Frankfurt in 1814, but who at an early period took up his abode in Paris.—M. Puvis de Chavannes has been commissioned by the department of Fine Arts, to execute in the Panthéon the large mural painting formerly assigned to Meissonier. The subject is the revictualing of Paris. The exhibition of the Spitzer collection was opened on Sunday last, at 33, Rue de Villejust.—The picturesque little town of Rueil, near Paris, is organising its own art exhibition, which will shortly be open in the rooms of the Hôtel de Ville there.—It is proposed to hand over to the authorities of Toulouse the old buildings of the tobacco manufactory, which are the property of the State, for the purpose of installing there a School of Art, of which Mr. J. P. Laurens will be the director.—The railway company "de l'Est" is about to take the enlargement of the station at Bar-le-due, on which about six million francs are to be expended.

SCANDINAVIA.—The excavations for the new Town Hall at Copenhagen have been commenced, and the work is to be completed by May's next.—A new church has been completed in Copenhagen, the architect being Herr Clemmensen; and in the new Church of Jesus, built by the well-known Copenhagen brewer, Mecenas von Jacobsen, twelve Munich stained-glass windows have been inserted.—The venerable Bjørnede Church, near Sorø, over 700 years old, has been successfully restored.—The work of constructing the new "free" harbour at Copenhagen is rapidly progressing.—In an article in *Ingeniøren*, the leading Danish technical organ, Dr. S. Engelstad urges the reformation of the sewerage system of Copenhagen, i.e., the emptying of the sewers outside the harbour, and the introduction, as far as possible, of water-closets on English principles. He shows that a cholera epidemic like that of 1833 costs the Municipality far more than the carrying out of the reforms suggested.—The Norwegian Society of Engineers and Architects has appointed a committee to consider the new building law which is to be introduced in the present Storting. It is urged that a complete re-model of the projected law is necessary, and that building inspectors should be appointed.—It has been decided to build an art and industrial museum in Bergen, at a cost of 200,000 *ks.*, the Corporation providing the site gratis.—A handsome new church has been finished in Christiania, called the Church of St. Paul. It is built of red tiles, the style being Gothic. The designer is the City Architect, Herr Henrik Bull.—The building committee of the projected new Houses of Parliament in Stockholm has decided to move the building 20 ft. further east, as otherwise the new structure would obscure the full perspective of the Royal Palace, and has to that end called upon the Academy of Fine Arts to express an opinion whether the change would affect aesthetically the beauty of the new building at the back.—The new city electrical works in Stockholm have been completed by the architect, Herr F. Boberg. The building was commenced at the end of 1890. The existing machinery only suffices to feed 5,000 lamps, but when completed 30,000 lamps may be maintained.—The entire interior of the Dramatic Theatre, Stockholm, has been coated with a fire-proof substance, invented by the Swedish Colour Fire-Proof Factory, being the first theatre in Sweden thus protected.—The cement companies in the Islands of Oland, Gothland, and Scania have been amalgamated under the name of the Swedish Cement Company.

MISCELLANEOUS.

INSANITARY SCHOOLS IN LONDON.—The London School Board having submitted to Mr. E. R. Robson, Architect to the Committee of Council on Education, a copy of the report of the Board's Assistant Architect for buildings upon the condition of the Waldron-road School, Tooting, which was built while he was Architect to the Board, Mr. Robson has (according to the *Times*) replied as follows:—

"A reference to the records of the Board will show that at the time the Waldron-road school was building there was an enormous quantity of work in hand, and plans for new schools were constantly being submitted to the Works Committee. I have not now access to those records, but I hope the Board will call for a return of the work in hand in 1884,5, when the Waldron School was planned and erected, in order that the present members may have a better idea of the amount of work which was then being done by me as the Board's Architect. A comparison also between the cost of the Architect's department then and now will show the relative amount expended in supervision compared with the amount of work being executed. I regret as much as anyone that defects should be discovered in the schools built while I was Architect to the Board. But I am afraid that I can render no assistance to the Board in finding any further explanation of the defects than the obvious one of the inadequate supervision by competent officers of the buildings themselves as they are being erected is a necessary security for thorough work. Sanitary requirements as to drains are much more exacting now than they were ten years ago. A period of

neglect to make due provision for schools to meet the growth of London must be followed by a period of haste and need to overtake the results of that neglect, and such periods of excessive pressure are less favourable to good work than a steady, continuous provision of schools especially in the suburbs, where schools should be erected a little in anticipation of the actual population, and in view of imminent building operations. I must remind the Board in conclusion that they have themselves threatened proceedings against me, and not much more active and adverse legal opinions, and that, while I should be glad to confer freely with them as an old servant of theirs in the interest of the work I carried on under them, I feel a difficulty in entering into a correspondence which may possibly be sought to be wrested to my disadvantage."

THE ENGLISH IRON TRADE.—During the past week there have been indications of what is believed to be a permanent improvement in the Cleveland pig-iron market, and this has given a slight impetus to business in the crude material in several other districts. The finished-iron branch, however, remains quiet, and not much activity has been witnessed either in tin-plates or in the various departments of the steel trade. Shipbuilders and engineers are dull. The coal trade shows a little more movement.—Iron.

ARCHAEOLOGICAL DISCOVERY IN ARGYLLSHIRE.—Some days ago, says the *Glasgow Herald*, while workmen were engaged levelling ground at Glenrannish, near Campbelltown, they made a rather interesting find. Whilst digging under the surface they came upon several rough blocks of red sandstone which, on being lifted, revealed what turns out to be an ancient stone cist containing a cinerary urn of baked clay. All that the urn contained was a little earth. No flints or other relics were found, notwithstanding that a very careful search was made. The cist, which was formed of slabs of red sandstone and schist, in the form of an irregular square, was 3½ ft. in length by 2 ft. 3 in. in breadth at the north-west end and 2 ft. 10 in. at the south-east end, this being the direction in which the cist lies. The depth was 2 ft. 5 in. At the bottom of the cist there was a quantity of loose earth in which the urn was partly buried. The urn, which is ornamented, will be placed in the local museum.

THE SANITARY INSTITUTE, PARKERS MUSEUM, MARYLEBURY STREET.—The ordinary general meeting of the Sanitary Institute was held at the Parkes Museum on Wednesday, March 8. Sir Thomas Crawford, K.C.B., in the chair. The Council presented a lengthy report of the work of the Institute during the year 1892, which showed that the number of members and associates had increased to a total of 1,288. Thirty-nine lectures had been given in London and ninety in the provinces, and also a number of conferences and other meetings. Twelve examinations had been held, 548 candidates were examined, 335 certificates were awarded. The Duke of Westminster was elected President of the Institute for the ensuing year.

TRADE SMOKING CONCERT.—The Messrs. W. Brassey & Son, builders, of 47, Old-street, E.C., held their sixth annual smoking concert at the "Salutation," Newgate-street, on Saturday last, a very pleasant evening being spent by the company present, thanks to the excellent programme provided and arranged by the hon. sec., Messrs. Morrison and Barnes. Mr. R. Fraser was chairman, Mr. D. Linton vice-chairman.

A TRADE REJOICING.—About sixty members of the staff in the employ of Messrs. Wm. Cubitt & Co., Gray's Inn-road, were entertained on the "Salutation," Newgate-street, to Mr. Benjamin Hadden, jun., in celebration of his marriage, which took place on that day. The chair was occupied by Mr. W. Cornwell, who after the usual loyal toasts had been duly honoured, proposed the toast of the evening "Health and prosperity to the bride and bridegroom," which it is unnecessary to state was received with great enthusiasm. A very good programme of music, with a few other toasts, brought the evening to a close.

CAPITAL AND LABOUR.

END OF THE STRIKE OF BUILDING-TRADE LABOURERS AT PORTSMOUTH.—The *Portsmouth Evening News* says that the final meeting of the Master Builders' Committee and the delegates representing the Labourers' and Bricklayers' Societies took place on Monday evening last, when the new code of working rules, which had been previously adopted by mutual consent, was formally signed by all concerned in the settlement of the strike. The new rules, which now come into operation, provide for the payment of 5*d.* per hour to labourers, and 7½*d.* per hour to bricklayers all the year round. The majority of the workmen resumed their duties on Tuesday morning, but the employers of one firm, to the number of sixty, still remain out, in consequence of certain difficulties which have arisen between them and the foreman, who will be waited upon by the trades union officials, in order that a definite understanding as to the matters in dispute may be arrived at with the least possible delay. It is stated that the Labourers' Union continues to increase rapidly in point of numbers. The committee purpose taking steps to organise the labourers of Gosport at an early date.

[illegible]

LONDON.—For alterations, additions, decorations, and sanitary work at the Laurels, West End Lane, for Mr. H. L. Sternberg. Mr. L. Solomon, architect, 55, New Broad-street, City.—

Vernal & Griffiths	£377 0 0
A. A. Beer & Co., Kingston (accepted)	377 0 0
LONDON.—For providing and fixing heating apparatus on the low-pressure hot-water system (with the necessary boiler) for the Swan-street School, Minorities, for the School Board for London. Mr. T. J. Bailey, Architect.—	
T. Potter & Sons	£179 0
W. H. Engineering Co. Limited	320 0
W. G. Cannon	248 1 1
.....	£320 0
.....	£248 1 1

* Recommended by the Works Committee for acceptance.

LONDON.—For repairs to house, 124, Kennington-road. Mr. H. Stock, architect.—

J. Bulley	£435
Richard & Renwick	384
J. Ford	397
A. Stephens	363
.....	£435
.....	£384
.....	£397
.....	£363

LONDON.—For laying out the cemetery-ground, Enfield High-way cemetery No. 1, for the Enfield B.M. Board.—

J. Inwood	£824 0 0
S. Hipwell	848 0 0
B. Cooke & Co.	750 0 0
J. Moxon	658 4 7
G. Impey	636 9 11
Geo. Bell	627 0 0
W. T. Williamson	599 0 0

* Accepted.

LONDON.—For erecting a cookery centre, &c., in connexion with the Raywood-school, Battersea, for the School Board for London. Mr. T. J. Bailey, Architect.—

B. E. Nightingale	£284
J. Shillite & Sons	820
James Smith & Sons	750
J. Willmott & Sons	739
T. Treasure & Son	729
F. J. Cochrane	729
J. Marsland	729
.....	£284
.....	£820
.....	£750
.....	£739
.....	£729
.....	£729

* Recommended by the Works Committee for acceptance.

LONDON.—For erecting new water-closets for all departments of the Summer-school, Fencham, and for drainage and sanitary works, for the School Board for London. Mr. T. J. Bailey, Architect.—

L. H. Mallett	£1,157
R. E. & Son	1,100
Holloway Bros.	1,080
W. & H. Castle	1,071
.....	£1,157
.....	£1,100
.....	£1,080
.....	£1,071

* Accepted by the Works Committee.

LONDON.—For the erection of a pair of semi-detached villa residences, Stanhope-road, Crouch End, for the executors of the late Mr. Charles Turner. Mr. Percy B. Tubbs, architect.—

Faulkner	£1,687
Nightingale	1,687
Langham	1,624
Lawrence & Son	1,581
.....	£1,687
.....	£1,687
.....	£1,624
.....	£1,581

LONDON.—For building show room and workshop at 174, Upper-street, Islington, for Messrs. Lupton Bros. Mr. J. Harrison, architect.—

Cole	£371
E. Houghton & Son	371
.....	£371
.....	£371

LONDON.—For the erection of a boundary-wall at the Infirmary Archway, &c., for the Guardians of the Highbury Union. Mr. H. Saxon Smith, architect.—

Dove Bros.	£1,055
J. W. Woodhall	1,055
G. J. Jones	1,055
W. Handford	1,055
.....	£1,055
.....	£1,055
.....	£1,055
.....	£1,055

* Accepted.

LONDON.—For pulling-down and rebuilding Nos. 32, 34, 36, and 40, Baker-street, Whitechapel, for the Society of Friends. Messrs. Edward Saunders & Son, architects. Quantities supplied by Mr. W. C. Phillips.—

Wire & Forest	£2,880
Woodward & Co.	2,759
Cox	2,759
Hatley, Son, & Holmsted	2,759
.....	£2,880
.....	£2,759
.....	£2,759
.....	£2,759

LONDON.—For erecting new mortuary, corner of court, and d. manifesting station, at No. 67, Horseferry-road, Westminster, for the Vestry of St. Margaret and St. John, Westminster. Mr. R. W. Wheeler, Surveyor. Quantities supplied by Mr. Walter H. Hewish.—

Williams & Richards	£5,662
Smith & Sons	5,662
Neave	5,662
Heckins & Walshe	5,662
Holloway Bros.	5,662
Holliday & Greenwood	5,662
Brinkell	5,662
.....	£5,662
.....	£5,662
.....	£5,662
.....	£5,662

PITFORTH (Sussex).—For alterations to the workshop, for the Union Guardians. Mr. H. Howard, architect. Little-oughton.—

T. M. Marshall	£998
J. Peters	891
.....	£998
.....	£891

* Accepted.

PONTPOOL.—For the erection of new banking premises, Commercial-street, for the London and Provincial Bank, Limited. Messrs. Seward & Thomas, architects. Quantities supplied by the architects.—

J. D. Williams	£1,562
H. Webb	1,562
Stephens, Baisow & Co.	1,562
D. Jones	1,562
Hatherly & Carr	1,562
Leisman	1,562
G. Rutter	1,562
.....	£1,562
.....	£1,562
.....	£1,562
.....	£1,562

* Accepted.

PONTPOOL.—For the erection of public abattoirs, for the Local Board. Mr. Edward Rees, Surveyor. Local Board Offices, Pontypool. Quantities by the Surveyor.—

William Davis	£7,079 11 8
Howell Powell	7,079 11 8
M. Julian	7,079 11 8
David Jones	7,079 11 8
D. C. Jones	7,079 11 8
C. Gardner	7,079 11 8
.....	£7,079 11 8

RUSHBROOK (Co. Cork).—Accepted for the erection of a villa residence (exclusive of plumbing and drainage). Mr. Jas. I. Mullen, architect, 38, South Mall, Cork.—

Denis Creedon, Fermoy, Co. Cork	£1,200 0 0
.....	£1,200 0 0

RUSHBROOK (Northamptonshire).—For the improvement of High street and Newton-road, for the Local Board. Mr. Wm. Pate-Surveyor, Local Board Offices, Rushden.—

C. Bayes & Son	£245 0 0
Robert Marriott	245 0 0
Wm. Wilmott, Rushden	245 0 0
.....	£245 0 0

SILLOTH (Cumberland).—For the erection of a house, Skin-burness, for Mr. Jno. Glaister. Mr. G. Armstrong, architect, 45, Leith-street, Carlisle.—

For the whole.—T. Longcake	£697 13 6
Mason and Bricklayer.—L. Ferguson, Workington	230 0 0
Carpenter and Joiner.—J. R. Thompson, Silloth (accepted)	169 0 0

TOTTENHAM.—For making up Park, Winchelsea, Seaford, and Foster roads, for the Local Board. Mr. J. E. Worth, Engineer, Coombes Croft House, High-road, Tottenham.—

W. T. Williamson	£1,019 6 0
J. Neave	1,019 6 0
Porter, Hart, Tottenham	1,019 6 0
Wm. Griffiths	1,019 6 0
Thos. Adams	1,019 6 0
A. T. Catley	1,019 6 0
J. Mowlem & Co.	1,019 6 0
Thos. Rowley, Tottenham	1,019 6 0
William Ravey, Walthamstow	1,019 6 0
Sidney Hudson	1,019 6 0
.....	£1,019 6 0

WARWICK.—For the erection of a workshop, Westgate School, for the School Board. Mr. J. H. Moore, architect, 2, Northgate-street, Warwick.—

E. Eyres	£300 0 0
J. Chaplin & Sons	300 0 0
.....	£300 0 0

WHITTE HAVEN (Cumberland).—Accepted for alterations at the Oldfield Hill Messrs. Moffat & Bentley, architects, White Haven.—

Chapple & Son, Mon-row	£241 10 0
John Brown, Scotch-street, Whitehaven	84 0 0
.....	£241 10 0

WIGSTON MAGNA (Leicestershire).—Accepted for the erection of fourteen houses for Mr. A. Lee. Messrs. Miles & Bessley, architects, Leicester.—

Charles Hirst, Wigston	£2,170 0 0
.....	£2,170 0 0

WITTINGTON (Lancs).—Accepted for sewerage, draining, paving, &c., Ogden and other streets, Didsbury, Wittington, and Thornton-cum-Bardley, for the Local Board. Mr. A. H. Mountain, C.E., Surveyor, Town Hall, Wittington, Lancs.—

Ogden-street.—Worthington & Pownall, Manchester	£386 2 0
Quaker-street.—Worthington & Pownall, Manchester	450 0 0
Crane-street.—Worthington & Pownall, Manchester	553 12 11
Hard-street.—Worthington & Pownall, Manchester	695 7 8
Davenport-avenue.—Worthington & Pownall, Manchester	921 16 8
Brundell-road.—Worthington & Pownall, Manchester	948 0 0
Passage (H)—James Naylor, Hulme, Manchester	149 5 0
Passage (H)—Geo. Clarke, Hulme, Manchester	495 14 6
King-street.—M. Naylor & Co., Hulme, Manchester	100 3 8
Passage (H)—M. Naylor & Co., Hulme, Manchester	248 3 8

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The Builder.

VOL. LXIV. No. 2516.

MARCH 24, 1895.

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New Bank Premises, Berlin.—Messrs. Ende & Boeckmann, Architects	Double-Page Ink-Photo.
New Premises, Southampton-Buildings, Holborn.—Messrs. C. J. & C. H. Shoppee, Architects	Double-Page Photo-Litho.
Convalescent Home, Chatham.—Mr. John Belcher, F.R.I.B.A., Architect	Single-Page Ink-Photo.
House at Royston, Herts.—Mr. John Belcher, F.R.I.B.A., Architect	Single-Page Ink-Photo.

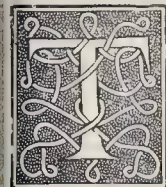
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The Work of Surveyors, Urban and Rural.



HE modern Surveyor is a multi-form and complex product, rejoicing in a variety of sub-titles, and absorbing many classes of work. The very term "surveyor" is primarily a mystification, for there are surveyors of taxes, of customs, of ships, of land (Ordnance Survey), and so on; and we have our national Surveyors' Institution, whose chief functions are to perfect the management of estates of all kinds.

Mr. Austin Byrne's extensive Treatise, and Mr. Boulnois' Handbook, of which the titles are given below,* have together thrown some additional light on the magnitude of the work which is now expected both from an Urban and a Rural Surveyor, and their perusal brings us very much into contact with the responsibilities for good and evil, for economy and waste, both of money and life, which attach to such an office, whether it be termed, on the one hand, Town or Borough Surveyor, or Borough or City Engineer (Mr. Boulnois' present title), or, on the other hand, District or County Surveyor. The title County Engineer, has not, so far as we are aware, yet been adopted, probably from the fact of most of the gentlemen who held the office of County Surveyor, when the Local Government Act of 1888 was passed, having had to perform as best they may the engineering work which has devolved on them.

It is expected of the modern surveyor, *i.e.*, of the description now referred to, that he shall be an architect, a sanitary engineer (well versed in nuisances and the laws thereon), a quantity surveyor, a valuer, a landscape gardener, a bridge and highway

engineer, sometimes a dock and irrigation engineer, a master of gas and electricity, &c. He is also expected to be as artful as a contractor in finding out the cheapest markets for materials, and in the application of labour, both human and machine, to the greatest profit for the public body to whom he is bound. For bound he is by one of the most severe ties conceivable, and Mr. Boulnois fairly places this point before us in the transcript given by him of the "Duties of the Surveyor," as laid down by the sub-committee of the Council of an important borough. To this sub-committee had been delegated the mission to find a surveyor, and they therefore drew up a list of three and thirty duties which he was to perform; no particular exception could be taken to the actual duties, so-called, which pretty well covered the whole ground, but included in them occurred the following clause:—"To devote the whole of his time to the duties of his office, and not to be engaged in any other office, business, or employment whatever." It appears, also, that in some recent cases where a surveyor was wanted, to this was added, that "any fees received by him as a witness or in any other capacity, will have to be paid to the Council."

Consequently, whenever the opinion of a Borough Surveyor so appointed may be required, as that of a leading professional authority on matters probably of great public concern, this opinion is not to be his own property, but that of the borough. It is not altogether an easy point to decide. On the one hand, the "public" want their work well done, and think they have a right to the whole of their surveyor's time, and so they have, if they choose to pay fairly for it; but the stipends offered are almost invariably far below those which most and possibly the best men could be contented with if they are to be absolutely debarred from earning a single farthing beyond the stipulated wage, and are even to have their professional opinions farmed out. Therefore in such cases the mouth of a Borough Surveyor would generally be closed, for it is not in the nature of the general run of men, *i.e.*, men of

business, to risk the expression of an opinion on professional matters without tangible compensation; and though his speech might have been as silver to the public, his silence would seem to be gold to himself, for it would be an economy of time. It may indeed be the case that the stress of competition and the strain for life may tempt and, indeed, force men of a naturally independent spirit to accept odious conditions sooner than starve, but we question whether the method is one likely to attract the best men or whether the public service is thereby benefited.

The idea appears to be founded on the assumption that the surveyor would be too diligent about his private business to attend sufficiently to his public duties; but as he is generally liable to be severed from connexion with his Council at short notice if he does not satisfy its members, it may be taken for granted that a man of ordinary prudence—and to hold such an office long requires a man of extraordinary prudence—would set a reasonable limit on the time he would so expend, and would be careful enough to find all the time necessary for his duties to the borough. The position itself is an innovation, for until recently the Borough and the County Surveyors were usually architects with a private practice, frequently members of an old-established firm, held in high local respect, and they managed to dovetail in their work so as to give a sufficiency of satisfaction to their employers. But where this onerous clause is inserted, a man is expected to relinquish, *in toto*, the business with which he is connected (and in which his place would have to be filled up), to take an office where no provision exists for a pension or superannuation, and from which he is liable to be removed at the caprice or from the animosity of a clique of masters. The opulent tradesmen who usually form these councils rarely suspect the depth of anxiety which must underlie the smile of conciliation which their surveyor wears on board days, and although it may be said that the most interesting and often the most useful lives are those which are chiefly made up of anxieties, it certainly seems that in

* "A Treatise on Highway Construction," by Austin T. Byrne, C.E.—Wiley & Sons, New York. "The Municipal and Sanitary Engineers' Handbook." Second Edition, by H. P. Boulnois, C.E.—Spon, London and New York.

the case of a Surveyor the more anxiety of this kind a Council can remove from his mind, the more freely can his mind be devoted to his actual work. The State recognises fully the value of this axiom, and the authorities of some counties do the same with regard to police. And yet we constantly notice that in the conditions of engagement of a surveyor it is especially stipulated that anything in the shape of a pension is distinctly barred. On the whole we cannot but believe that this is a short-sighted policy, and that a town council would be perfectly justified from the broadest point of view in providing for their surveyor's future, subject, of course, to proved misconduct. With such provision, a lesser salary would be acceptable, and the best class of men would not be deterred from placing themselves in competition for such an office. For exceptionally large works, a temporary increase of staff should be allowed to him, and a donation of some kind made on their satisfactory completion. By such means a link would be forged between a surveyor and his council of masters which would strengthen the feeling of responsibility, and relieve the surveyor's office from the condition of an irksome and anxious bondage.

Before taking leave of this branch of the subject, we cannot refrain from alluding to Mr. Boulnois' suggestions respecting the best mode to be adopted to get a municipal surveyorship. If canvassing is not to be prohibited, the members of the corporation are to be invaded in every possible way and at every probable turn, formally and informally, with patient tact and the aid of subtle hints, and so on. It is suggested that all this is out of kindness to the councillors, so that they may not vote in the dark, and he really seems to think that a member would welcome such an opportunity. How would this act? Does the would-be surveyor at all realise the flood of applications for such appointments which shower on the head of the town clerk? Cannot he realise the condition, bordering on insanity, to which an ordinary councillor would be reduced if he attempted to administer ease to his conscience by striving, with the aid of a short personal examination, to select the best man from a host of strangers? It is not at all unlikely that every stranger who attempted to influence a councillor in the manner suggested would be hopelessly excluded from selection. The fact is that if a thoroughly good local man with friends in the Council is an applicant for such an office, the legion are nowhere. But they cannot be expected to know who is and who is not an applicant, or how the filling of such vacancies is sometimes most conveniently arranged before they actually occur. It is an old story, though, how much greater sometimes (or often) is the reputation of a prophet in every city but his own, so the applications for surveyorships are not likely to diminish. The simplest plan is to prohibit any sort or form of canvass, and let men procure a limited number of the best possible testimonials; they must then trust to that which is generally little more than what is termed a chance.

Mr. Boulnois' work contains an admirable series of commentaries on the Public Health Act of 1875, that great Act which has done so much for the welfare of the people of this country, but which has not succeeded in keeping away the plague of influenza, whatever it may do (or may have done) as regards cholera. With the working of this Act Municipal Surveyors and Engineers have necessarily had very much to do; with them it rests to drain the town, and to drain it in such a way that disease is decreased and not increased; they have to wear daily and hourly the cap of consideration, so as to effect this very difficult matter at such a cost as the inhabitants can bear; and this again is, and always must be, a problem very hard to solve. If the rates that have to be levied to pay the interest on the cost of such works rise beyond a certain point, the town becomes, generally speaking, no longer a habitation except for the richest and the

poorest classes—i.e., for those who live by charity and for those who practise it. We of course exclude the business centre of every city, which ceases to be a habitable quarter—i.e., a place of habitation both by day and night.

The class which comprises the bulk of the workers has consequently to live on its outskirts, and come into the town to their work by the readiest and cheapest means of locomotion; and though the process is of general benefit to them, for they live more economically, and get a larger supply of air, which arrests the deterioration in physique of the human race, it represents an extraordinary consumption of time. And so the towns expand, and, whatever may be said about the expansion and growth of towns being due to agricultural depression driving rural labourers to the towns for work, we should never lose sight of the fact that it is the high rates in towns which drive to suburban residences the people of all classes who labour, and who form the mass of the population. It will, therefore, be a logical conclusion that the Public Health Act of 1875 has had more to do than has been generally recognised with the growth of towns into cities and of villages into towns, and with their growth has grown the Town Surveyor, especially in his office as a Sanitary Engineer. It is within the limits of his power to scheme for pure air, pure water, and general cleanliness, and place before his masters the cost of providing them. Subsidiary to and in alliance with the Public Health Act, we have the Acts for regulating Artisans' Dwellings, for Housing the Working Classes, for Improving Lodging Houses, for Utilising Disused Burial Grounds and Open Spaces, and for the construction of buildings generally so that they may neither be a source of danger to their occupants or their neighbours. Now pure air cannot at all events be expected unless the sewage is satisfactorily disposed of, and the methods which have so far been adopted in this country with that object are eight in number, as follows:—

1. Passing the sewage in its crude state into the sea or tidal river.
2. Passing the sewage in its crude state over large tracts of land: this is called broad irrigation.
3. Passing the sewage in its crude state on to small tracts of land previously prepared by deep drainage: this is called intermittent downward filtration.
4. Mechanical subsidence of the sewage in large tanks, the effluent passing on to land or into a river.
5. Mechanical filtration of the sewage, the effluent passing on to land or into a river.
6. The introduction of lime or other precipitant into the sewage, which is allowed to settle in tanks, the effluent passing on to land or into a river.
7. The combination of filtration with precipitation, the effluent passing on to land or into a river (Ferozone Process).
8. Treatment by electrolysis, or the application of electricity (Webster process).

Into the respective merits of these various methods we need not enter here; enough has been said of them at various times in our columns, and cartloads of literature on the subject are accessible to the special reader; but we may remark, firstly, that several hundred patents have been taken out in connexion with method No. 6 alone; secondly, that the idea of converting sewage into gold is pretty well exploded; and thirdly, that the difficulty which has yet to be more fully combated is the disposal of that "slimy, glutinous, albuminous, offensive mixture technically known as sludge," and this in connexion both with sewage works on land and in sea and river.

But no system of sewerage can be relied on unless the water supply, both natural and artificial, be considered on parallel lines with it. The two go hand-in-hand, and we are, therefore, a good deal surprised to find the almost entire omission in Mr. Boulnois' book

of even an allusion to this great matter, which so much engages the attention of most Municipal Engineers. The fact that water is frequently supplied to towns by private companies should not be a cause for such exclusion in such a work, for in many cases the corporations are providers of water; and, as we know, even in the capital itself, immense efforts are being made by the new governing body to obtain the control of this element of health, and to deal with the most gigantic problems of sanitary engineering that have ever yet had to be faced.

Next to these comes cleanliness, which introduces us to the Surveyor, firstly, as a Sanitary Inspector or Inspector of Nuisances, concerned with the state of the houses and their yards, &c., and secondly, as the custodian of the streets and open spaces, as the Surveyor of the condition of their surfaces, so that dust shall be reduced to a minimum, mud and snow removed as soon as possible after accumulation, and scavenging generally effected. Here the author of "Dirty Dust-Bins and Sloppy Streets" is quite at home, and his work is replete with sage advice on many matters which most people do not like, but which add much to our discomfort and ill-health if at all neglected. One considerable cause of disease is the neglect of house-cisterns, and the absence of or removal of the covers to them, whereby foreign objects fall in and decay, such as "rats, mice, and, in one case, a sirloin of beef, and, in another case, a plumber." In the chapter on "House Drainage," an excellent list of the twelve essential requirements of all good house drainage is given, which a student would do well to commit to memory; whilst, on the other hand, the extraordinary difficulties in the way of taking sufficiently rapid action in dealing with local sanitary defects are very clearly explained. Section 41 of the Public Health Act of 1875 is that which is intended to deal with such cases. No doubt from a legal point of view the clause is admirably draughted, and the right of the public to be lords of their own castles is, within certain limits, very right and proper; but the process requires to be simplified, both for the sake of the patient and the impatient, i.e., the surveyor and the tenant, and this may be read either one way or the other as may seem appropriate.

Amongst the heterogeneous mass of things with which a surveyor has to occupy himself come public abattoirs, which require quite a special study to provide what is best. All sorts of curious details relating to butchers and their ways, beasts and their habits, have to be mastered before a thoroughly satisfactory design of an abattoir can be prepared. But, as Mr. Boulnois says:—

"There can be no doubt that whereas private slaughter-houses are frequently a most injurious nuisance to the neighbourhood in which they are placed, owing to their situation and construction, and a visit to one of them is likely to give a strong impetus to vegetarianism; the public abattoir, on however large a scale, if properly constructed and managed, need be no nuisance whatever, and every town in the kingdom should endeavour to obtain one, not only on account of the nuisance caused by private slaughter-houses, but for the incentive which is given to butchers to abstain from slaughtering diseased or unwholesome animals, the prevention of cruelty, and the material benefits derived in a proper establishment for the best methods of dressing the meat."

The Surveyor has to deal with dead men as well as dead beasts, for mortuaries come within his ken, and after that he has to provide a proper cemetery for burying his population. Of the former there appear to be four classes, each of which require different arrangements, more or less repellent, but nevertheless highly essential, and with regard to the latter it may justly be said that a good cemetery is not an easy thing to make, and when made is not easy to keep so that the mind is not offended or the eye displeased. But there are other very practical matters in con-

nexion with cemeteries which the Borough Surveyor may have to consider: their position with reference to houses of various classes, their effect on rateable values, the geological section (with reference to sources of water supply), and other important points. From cemeteries it is but a step to crematories, of which on several grounds, in fact seven, Mr. Boulnois is a strong advocate, and his remarks are worth reading, though he almost entirely eliminates sentiment from consideration. He takes what is termed the practical view of the case, which may be subdivided between insalubrity, waste of land, and the abolition of sectarian squabble. And he certainly does quote a somewhat startling account of the state to which the soil of a cemetery may arrive; he says:—"A recent investigation was made in the cemeteries of Rio de Janeiro, upon earth taken about spade-deep from graves where victims of yellow fever had been buried some twelve months previously, and this soil was found to contain 'myriads of microbes' selfsame with those present in persons stricken with the same pest at the time of the excavation. A healthy guinea-pig was incarcerated in a space over which earth taken from a grave was sprinkled, and in five days the animal was dead, its blood being found to be literally crammed with the germs of the disease in various stages of evolution."

The destruction of town refuse by fire is the most satisfactory mode for its disposal, and we are favoured by Mr. Boulnois with some interesting details respecting the cost of performing this work and the capabilities of the destructors. Each destructor consists usually of a certain number of cells about 9 ft. long and 5 ft. wide (Fryer) covered with a firebrick arch. From a list of thirty-five towns in which these destructors are at work, it appears that such cells can consume about six tons of refuse per twenty-four hours. The cost varies considerably, but averages about 52½ p. per cell for construction alone. The cost of destruction averages a little under 1s. per ton, varying from 6d. in Batley to 2s. 3d. in Whitechapel. The economics of the case are as follows:—

1. Amount of refuse per head = '39 ton per annum.

2. Cost of collection = 1s. 6½d. per head per annum.

3. Cost of destruction = $11\frac{1}{2} \times '39 = 4\frac{1}{2}$ d. per head per annum.

∴ Cost of scavenging per head per annum averages 1s. 11½d., or say 2s. + interest on cost of works. Which means that this part of the cleanliness for a town of 100,000 inhabitants costs on an average no less than about 10,000l. a year, a serious item in the balance-sheet.

One of the very largest items of expenditure with which Surveyors are charged is that connected with the "highways" and their coverings, and a great deal of good judgment and sound knowledge is necessary to expend to the greatest advantage the large funds required for these works. In original construction, as in maintenance, the difference in cost for equally efficacious measures is amazing. Mr. Boulnois has a good deal to say on these matters—*i.e.*, on traffic, on macadamised roadways, on wood, asphalt, and pitched pavements, on footpaths and kerbs, &c., but Mr. Byrne says a great deal more, having compiled a work in which he acknowledges his indebtedness and thanks to the authors of over a hundred sources of inspiration, including the writings of Mr. Boulnois himself. There is no difficulty in finding out what is wanted; the type is clear and good, the illustrations satisfactory. Extending to nearly 700 pages, including those required for a complete index, it is not likely that much has been omitted. The best experiences of England, France, and Germany have been combined with those of American states and cities to make up this treatise, and it bears a good deal of reading. In the Historical Sketch we notice that "The experience of Europe in road improvement shows that the highways should be

taken as much as possible out of the hands of local authorities, and administered by either national or state governments in accordance with the needs of the people who use the roads; and that as the whole public is benefited by good roads, therefore all should pay for their improvement and maintenance." This is the very thing which is puzzling so many minds at the present time in England, and is the essence of main road and bye road controversy. The rural parochial surveyor has in many cases been centralised out of existence and absorbed by a district surveyor, and in many cases the latter has also been centralised away and absorbed by a county official. It is possible that some may even think that the last named could also be dispensed with, and that the Local Government Board might take the main roads at all events, and possibly all the roads, into their own hands. This might do well enough for continental nations or for American States, but it does not suit people's views in England. If the cost of the roads, both main and bye, was met out of State revenues, which are so largely supplemented by import duties in countries where direct protection of home trade and industries is the accepted policy, it would be sufficiently logical that State officials should manage the roads. But that is not the case at present in England, whatever may be in store for us in the future; and if they were entirely paid for out of county funds received from the Exchequer of the State, then it would again be a logical consequence that the whole of the roads should by authority of Government be managed entirely by county officials; but it is from a mixed purse that the piper is paid, and the ratepayer insists on having something to say to the tune that is paid for. Now the ordinary ratepayer cannot be otherwise than profoundly ignorant of this business, and it is quite an accident if his elected representatives to board or council possess any special knowledge of road or street management: so that the surveyor of highways has a very difficult part to play. The suspicion which is the invariable result of ignorance dogs his footsteps and clogs his action. The surveyor may be thoroughly honest, but is frequently believed to be the reverse, and his life is often far from pleasant. The remedy, or at all events an alleviation of this condition of things, is simpler than would at first sight appear, but it is a measure which no really scrupulous man would avoid taking: it consists in supplying to every one concerned, and on every possible occasion, the fullest information about the minutest details of his work, in removing everything in the shape of mystery, the antagonist of confidence, and in impressing these points on his board or council of masters, so that they shall publish fully their work, and that of the men employed by them. The more he can educate his masters respecting his particular business, and invite their assistance, the easier becomes his work.

And yet there is much merit in this well-known old plan of road and street management. Blunder, as they occasionally may, and indulge, as they sometimes may, in a little bit of what is termed sharpness by some people and jobbery by others, there is, on the whole, a vast amount of sound common-sense ruling the decisions to which these bodies of Englishmen generally arrive, and they not only check each other, but can and do exert a control (which is not infrequently necessary) over the desire of a surveyor to carry out work which would cost more than the ratepayers of a locality could well afford. The surveyor, not being a tailor, is apt to attach too little importance to the measure of the cloth and the size of the coat, too often rejoicing in having received authority to execute work which may, nevertheless, be of very questionable advantage to the public.

The problems of road management in England are ripe for solution, an immense stimulus having been given to the whole matter by the Local Government Act of 1888. They do not lie in a nutshell, but comprise

questions of general policy, of general finance, of local taxation, of local geologic and lithologic circumstance, of the habits and wants of the people, of the various kinds of transport, including that very vexed one of the transport of goods on roads by means of heavy engines: these are problems which are still further complicated by the difference in the conditions of rating to which urban and rural populations are subject, and again by the special legislation which affects the different descriptions of roads. There is another point also which presses very closely on the attention of people at present. Highways are most important feeders of railways, and highways have in many parts of the country been greatly improved in the last decade at a very great cost to the ratepayers, many of whom are producers of something marketable; but whilst the cost of transport by road has, by the increased ease of traction, become somewhat lighter, that of goods by railway has recently been increased, so that the producer is no better off than before, after having been heavily rated for improved roads. If it is an unavoidable policy that the railway rates should be, or nearly be, as recently amended, then relief must be given by larger State subsidies or grants for the maintenance of the highways, and this is probably the soundest policy to pursue.

These problems are being wrestled with earnestly and energetically by many clear-headed and clear-minded men, and their determination may affect very much the position in the future of surveyors of rural highways. The opinion which appears to be gaining most ground is that simplification would be of advantage, firstly, in the matter of management, one organisation in each county (excluding urban districts) being sufficient, cheaper, and less complicated than the present dual arrangement; secondly, in the matter of classification, many holding that the term "main," as applied to some roads, is no longer legally necessary, roads being roads in England whatever may be their size; and thirdly, in the matter of repayment of the cost, *i.e.*, what proportion should be borne by the Exchequer of the State and what proportion by the individual payer of rates for the whole of the roads in each county. How this simplification can be effected if Parish Councils are to be introduced it is not at present easy to see, unless those bodies are exempted from interference with the roads, but as the roads are so very much a matter of local concern, such exemption seems illogical; consequently, all attempts at simplifying the management of the roads of England would, in such an event, be rendered additionally difficult, and retrogression would be inevitable, with the usual concomitants of wasted funds, worse roads, and general discontent.

But whoever may be engaged in inquiring into, or may be desirous of grappling with these difficult problems, will find much to help him in the perusal of Mr. Byrne's Text Book, which is a masterly compilation by a very competent engineer—a member of a profession which will have to be called on more frequently in future for the conduct of a business for which their training and experience especially fits them; for if those problems be solved in the manner indicated above, the work of the Surveyor of Highways will be merged into that of County Engineer, very much on the lines already adopted in several of the counties of England.

GOOD FRIDAY WEEK.—Next week we go to press a day earlier than usual. All communications for the Editor should reach him by *first post on Wednesday morning*, except lists of tenders, which will be received up to 10 a.m. of the same day.

CONSTRUCTIONAL IRONWORK.—Messrs. Dorman Long & Co., of Middlesbrough and Westminster, inform us that they have opened a yard at Nine Elms-lane, Vauxhall, for the purpose of keeping a stock of all the girders they roll and several other sections of steel. They add that all their girders are made from "Siemens Martin" steel.

LIGHT AND AIR AT THE INSTITUTE.

THE discussion at the Institute on the report of the Science Standing Committee on the Law of Light and Air was somewhat wanting in grasp. That report suggested under its ninth head that no building erected after a certain fixed date shall acquire any rights of light. In other words, the committee recommend the abolition of the Law of Light. In its terms that recommendation applies to the whole country, but in the discussion at the Institute it appears to have been considered that it should only be applicable to London, and that the County Council should be asked to bring the proposal before Parliament. Such a limitation is as illogical as it is half-hearted. If it is right that this particular species of property should be abolished, it should be ended in every town in the country. There is absolutely no reason why the legal change should be confined to London. But we are bound to say that it is quite certain that such a measure would never pass through the Legislature unless it were based either on the Report of an influential Royal Commission, or on a general demand of sufficient force and volume to carry a Bill through Parliament. It is disappointing to find a body of able professional men debating the subject in an academic manner, and apparently blind to the great difficulties which are before them. For a great number of years the indefeasible right to light and air, after the lapse of a certain number of years, has been, so to speak, a legal property. An attempt to abolish it might be regarded as an invasion of the rights of property, and unjustifiable, except on strong grounds of public convenience. But at present the committee of the Institute has given no evidence of either a public demand or great public inconvenience resulting from the existing law. It is true, no doubt, that the law as it stands has prevented the erection of the very high buildings which are to be found in America. But there are large numbers of persons who consider that this result of the law is a beneficial one, and that if its abolition resulted in the multiplication of high buildings, it would be a public misfortune. We do not in any way desire to prejudge the question; we simply desire to make it clear that in asking that the easement of light should be abolished, the Institute is preparing for itself a difficult task, and must expect to encounter a very strenuous resistance. When we come to the other part of the report, upon which most of the discussion at the recent meeting of the Institute turned, we are again struck by its boldness. For the committee recommend that as regards disputes in relation to easements of light, the parties should be forced to go to arbitration; in other words, that there should be a compulsory system of arbitration. This has been hitherto unknown. When parties to a contract agree that disputes in relation to it should be settled by arbitration, there is a voluntary submission in the first place. But to declare that two persons, strangers to each other, who happen to disagree about their rights in regard to a particular property shall, whether they like it or not, submit their dispute to arbitration, is a suggestion which is without precedent. We by no means say that such a law would not be best for the persons concerned, but it is likely that the Legislature will ever say that persons are not to seek for redress before a legal tribunal if they wish? Therefore, we regard this proposal as one which it is almost useless to discuss, because we do not consider that it can ever receive the sanction of the Legislature. Looking, however, to the details of the report, we are struck by the fact that while compulsory arbitration is recommended, it would be neither expeditious nor cheap, which should be the chief advantage of arbitration. In the first place the tribunal is too large; in the second, as an appeal is allowed from it, there

would not be that finality which is one of the chief reasons why litigants should go before an arbitrator. As we read the report there is even a final appeal to the High Court of Justice, and once a case arrived there we should expect that it might go up to the House of Lords. Therefore, the report does not even promise finality and economy. But, as we have already said, there are two radical objections of a very practical kind to both branches of the report. To that in reference to the abolition of the easement, that it would be opposed to the whole current of English law for many years, and he regarded as an attack on property; and to that on arbitration, that it seeks to deprive persons, whether they like it or not, of their legal right to resort to a court of law, which is an inalienable though a costly privilege of the English citizen.

NOTES.

IN another column we publish a letter signed by more than twenty Fellows of the Institute, protesting against the course proposed to be taken by the Council in suggesting that after a certain date every person desiring to be admitted a Fellow of the Institute shall have passed such examination or examinations as may from time to time be directed by the Institute. We must say that we are in entire sympathy with this protest. That candidates for admission as Fellows should give satisfactory evidence as to their executed works, and submit photographs or drawings of these for the information of the Institute, as proposed in the first resolution to be submitted to the special general meeting on Monday, is a proposal which is reasonable and practicable; and certainly we are entirely in favour of laying stress, more than has hitherto been the case, on the architectural gifts and acquisitions of a candidate for Fellowship, and not electing any one merely because he is shown to be what may be called a "respectable practitioner." But the idea of instituting a formal examination for the election of a Fellow is absurd; it is introducing a practice which has never been heard of in any Society of this type before, and the passing of such a measure would be a fatal mistake, which would only tend to lower the dignity and standing of the Institute, and to keep the highest class of men out of it.

THE anniversary of Schinkel's birthday (March 13) was celebrated with the usual ceremonies and banquet by the Berlin *Architekten-Verein*. The chief speaker of the evening on this occasion, however, for once refrained from giving his audience the usual memorial paper on some details of the great artist's life, preferring to substitute a highly instructive report on the development of Berlin during the last half century, *i.e.*, since Schinkel's death.* Dr. Holrecht, the City Engineer, was the speaker who may claim the honour of having made the ceremony a more interesting one than usual, and we must congratulate him on the able way in which he treated his extensive theme in the fewest possible words. At the banquet the Government was represented by the Minister of Public Works and the Rector of the Royal Technical College, both of whom made some important remarks on local affairs.

THE landslip at Sandgate does not seem to have increased much since the first few days of the disaster. According to the official report of Mr. Walton, Engineer to the Local Government Board, who was deputed to examine the area affected, the disturbance was felt along the foreshore for a length of about 2,800 ft., and it extended on to high ground for a short distance inland. Between high and low water marks there are

visible signs of a slight upheaval, a layer of blue clay being obtruded through the line of fracture, and fresh water was in some places issuing from the crack. The whole of the ground affected north of the main road appears to consist of a *débris* of a former landslip, and the strata consist of fine loam, greensand, and layers of clay. In all, seventy-four houses have been injured, more or less, some beyond repair, and ninety-four houses have been vacated; the majority of them have little or no foundations. Referring to the probable cause of the disaster Mr. Walton states that the rainfall for February was abnormally copious, as much as 2.31 in. being recorded as having fallen in one week. During the last few months the water in the subsoil has behaved in an erratic manner, springs becoming dry, and so forth. On previous occasions there have been minor subsidences, and several houses were patched up. He arrived at the conclusion that the cause was due to the sudden release of impounded subsoil water. We do not find any evidence, however, that at the time of the disaster more water than usual burst forth from the ground, and we cannot say that the report of the inquiry is as full as could be desired. It is stated that the inquiry was held under very disadvantageous circumstances, as there were no recorded observations of the levels of the subsoil water, no sections of the cliff or of the foreshore, and no geological plan. With reference to the latter, we may remark that an expert should know where to put his hand upon an authoritative geological map of the district, so that is no excuse. We do not know what value the Local Government Board places upon a report drawn up in such a hurried fashion and on such inadequate data as the one under consideration, but for our own part we consider it is almost worthless.

A CASE of great interest to contractors and workmen engaged in the building trades has just been tried at Leeds before Mr. Justice Chitty and a special jury, and the result will undoubtedly supply food for thought for the officers of trade unions. It appears that the workmen in Hull have for some time objected, and with reason we think, to the system of sub-contracting, as it is in their opinion conducive to sweating and jerry-building. In order to stop the practice the members of three trade unions framed a rule, known as "Rule No. 9," and in June, 1892, they succeeded in getting it accepted and signed by the President and several representatives of the Master Builders' Society. Mr. Joseph Temperton, builder and merchant, of Hull, apparently broke this rule, and negotiations between him and the unionists failed to induce him to conform. Thereupon the unionists began an attempt to compel him, and in so doing they contravened the law. The attempt to compel Mr. Temperton is expressed in the following resolution, which was passed by a committee representing the three unions of bricklayers, plasterers, and labourers:—

"Resolved, that this committee advise the three societies to abstain from using any time supplied by merchants who are supplying any builders who are working contrary to the joint working Rule No. 9, and, further, that they refrain from handling or fixing any artificial stone work made by any man who is working contrary to Rule No. 9."

In consequence of this resolution, builders who had ordered materials from Mr. Temperton were compelled to cancel their orders, as union men refused to fix the materials, and Mr. Temperton himself was unable to obtain supplies of lime, as the Hull merchants could not have dealings with him without offending the unions. Under the circumstances Mr. Temperton felt constrained to bring an action against the president and secretary of each of the three trades unions for the purpose of recovering damages and of obtaining an injunction to restrain the unions from pursuing their system of boycotting him. The

* Schinkel died on October 9, 1841.

case was opened at the West Riding Assizes, Leeds, on Friday last, and was not concluded until Tuesday. The judge, in summing up, put the following questions to the jury:—"1. Did the defendants or any of them maliciously induce Brentano, Gibson, and Woods, or any of them, to break their contracts [with plaintiff, for the supply of materials]? 2. Did they or any two or more of them maliciously conspire to induce persons named and others not to enter into contracts with the plaintiff, and were such persons thereby induced not to make such contracts?" The jury, after half an hour's consideration, returned an affirmative answer to each question, and assessed the damages to plaintiff at 250*l.*; and the Judge granted an injunction to restrain the defendants from endeavouring to induce any one to break contracts with the plaintiff, or to prevent persons entering into contracts with him. Counsel for the defendants remarked that there would undoubtedly be an appeal against the judgment. It is not likely, we think, that the judgment will be reversed. If it be upheld, the officers of trade-unions will have to proceed very warily in future.

SIR ALBERT ROLLIT, M.P., who presided over the Annual Conference of the Associated Chambers of Commerce this week, gave expression to a feeling which seems to be spreading in the House of Commons as to the methods of conducting business in that assembly. This feeling is not confined to either political party, and is the outcome of the increasing representation of commercial interests in the House, and the natural impatience with which the commercial mind regards the interruptions and delay to business occasioned by our time-honoured method of procedure. The Railway Commission was also condemned; being pronounced, as at present constituted, nearly useless. It was indicated in our article on Railway Rates last week that this feeling existed, and Sir Albert Rollit declared that it was a matter for consideration whether the Commission should be ended or mended. The railway rates question naturally occupied a prominent place in the speech made at this conference by Mr. Mundella, who remarked upon the striking change effected in the attitude of the companies by the events of the past few weeks. The work of re-revision is going on briskly, and the strain upon the railway officials at headquarters is now being shared by the station agents and clerks, who are finding it very difficult to keep pace with the alterations in rates, classification, and conditions. After spending much time in attempting to familiarise themselves with the new arrangements, they have now to unlearn them again. The task before them, together with the work involved in arranging refunds, and readjusting outstanding accounts, may well induce them to wish, with the public, that the managers had "let well alone."

THE question of erecting a new Royal Library at Berlin has again been the subject of some discussion in the Prussian Upper House. The historical library on the Opera Place, next to the late Emperor William's Palace, has long been insufficient for the demands made on it, and will have to be given up at the latest about three years hence. Much difficulty had been experienced in finding a suitable site for the new building in close proximity to the University, but this has now been apparently overcome by the proposal to pull down the old home of the Prussian Royal Academy, the Royal stables, and the barracks of the Prussian Body Guard, and to utilise the ground for the new library in conjunction with the proposed new headquarters of the Prussian Royal Institution and Royal Academy. Professor Ende, at the request of the Government, has been preparing designs for this site, and it may be interesting to note that the main idea for housing some 5,000,000 books has been taken

from Washington. The situation of the proposed block would be an excellent one. The main frontage, which would be given to the Royal Academy and Royal Institution, would face the principal thoroughfare, Unter den Linden, whilst the side and back façades, given to the library, would face the broad Charlotten and Dorotheen streets.

THIS year Berlin is again to have an International Art Exhibition, which is expected to be an unusually good one. The management of the Exhibition is in the hands of competent artists, who represent the Royal Academy of Arts and the *Verein Berliner Künstler*. This time Professor Becker, President of the Prussian Royal Academy, holds the chair, with Professor Hans Meyer as Honorary Secretary, and Architecture, for once, is well represented in the committee by Professor Ende, the Vice-President of the Royal Academy. The usual outline of the former Exhibition "programmes" has been adhered to, and hence, as far as architects are concerned, there will be special facilities which permit them to submit photographs of their work, and not necessarily only drawings. The Exhibition will be opened on May 14, and will be closed on July 30. Exhibitors have to send in their work between April 12 and 25, after which latter date the hanging committee of 13 members will commence its operations. A number of the medals and diplomas will be given by the Emperor, who will be advised in the distribution by a special committee. It would be well if English architects, as in 1891, would contribute some of their old Academy drawings or other illustrations of modern work. As there are no regulations as to frames, and the expense of freight to Berlin is now nominal, there is no reason why we should not be well represented.

THE *Journal of the Franklin Institute* for February contains a valuable paper upon Manganese Steel by Mr. H. M. Howe, in which the author deals with the properties of hardness and ductility possessed by an alloy of iron containing from 3 to 20 per cent. of manganese. The tensile strength, and more especially the ductility of manganese steel, is seen to vary as the percentage of manganese varies. The steel is made by stirring together the molten thoroughly decarburised product of the open hearth or Bessemer process, and molten, highly heated, rich ferro-manganese. Care has to be exercised to avoid loss of manganese and to keep down the proportion of carbon. When the proportion of manganese rises above 7 per cent., the ductility increases, until the manganese reaches about 13 per cent. Steel containing some 7 per cent. of manganese is so hard that it can be used for cutting iron; and lathe tools made from it have been successfully employed, but steel containing 13 per cent. of manganese is far from hard enough for this purpose. By hardness is meant the resistance to indentation and abrasion. Sudden cooling is found to harden carbon steel greatly, and may make it so hard that it scratches glass readily, while if it affects the hardness proper of manganese steel at all its effect is so slight as to be detected only by delicate tests. Sudden cooling tends to lessen, and if very sudden may quite destroy the ductility of carbon steel, leaving the metal as incapable of receiving permanent set as glass is. Yet the same sudden cooling increases the ductility of manganese steel. Manganese steel, though hard as compared with its ductility, is, however, not as hard as chilled cast iron. The strength and ductility of the steel reach their maxima with about the same percentage of manganese.

THE latest issue of the *Transactions of the American Society of Civil Engineers* contains a useful discussion upon controverted questions in road con-

struction. Mr. James Owen, the author of the paper, maintains that "the minimum grade should never be less than 6 in. in 100 ft., less than that debarring proper flow of water; the maximum grade for ordinary country and general travel should be easy for an ordinary trotting gait, and he argues that steep grades are neither economical nor good construction." "Good enough" roads require "good enough" repairs and probably will not get them. His experience leads him to the conclusion, that it is more difficult to educate a community to the necessities of repairs, than it is to the necessities of construction. The availability of granite depends upon the amount of mica it contains; the more mica there is in it, the less are its wearing qualities, and gneiss should be debarked entirely. The size most serviceable and giving the smoothest roadway is stated to be at $1\frac{1}{4}$ to $1\frac{1}{2}$ in. Large stone involves a rougher road. Small stone, quicker renewals. One great objection to Macadam is, however, the enormous amount of dust in dry weather.

WE have received a circular from the "Wolston's Torbay Paint Company" calling attention to the qualities claimed for their paint, which, as many of our readers are aware, has long had a high reputation. In place however, of passing over the circular with a mere formal paragraph, we have thought it an opportunity to go into the matter a little more fully, and make a chemical examination of some specimens forwarded at our request for that purpose. The specimens examined were No. 1 "Torbay Brown," No. 27 "Purple Brown," and a terra-cotta colour. These have been subjected to careful chemical and physical examination with the result that they are found to be paints of high quality, drying readily, and possessing a good degree both of opacity and covering power. In their power of resisting the action of heat, steam, ammonia, sulphuretted hydrogen and oxidising agents, they were markedly superior to paints of corresponding colours prepared in the usual way. The claims made by the manufacturers that the paints effectually protect iron from corrosion, stand well on galvanised iron or cement, and are unaffected by intense heat, have been proved by direct trial and experiment to be well grounded. The paints also being prepared from natural iron oxide, are non-poisonous and free consequently from any liability to produce "painter's colic" or other ill effects which so often follow the handling and employment of ordinary lead paints. These paints, already well known and largely used, deserve still more extended application where high class and durable compositions are required.

NOW that Sanger's, formerly Astley's Amphitheatre, is to be demolished, a few words as to its former history may be of interest. Philip Astley, born in 1742, began life as a cabinet-maker. Subsequently, enlisting in the 1st, since the 15th, Dragoons, named after General Elliott (afterwards Lord Heathfield), he served for seven years with great distinction, and on quitting the regiment was presented with a charger by Elliott. With this horse and another he gave exhibitions at Glover's Halfpenny Hatch, by St. John's Church, in the Waterloo-road, and worked, betimes, at his original trade. He then took part of a large timber-yard, by Stangate, at the eastern end of Westminster Bridge (the present site), and also gave evening entertainments at 22, Piccadilly. W. Capon's two water-colour drawings (1777) of the open air circus, "Astley's Riding School," belonged to the Stowe collection; they are now in the British Museum. Having become mortgagee of the entire ground (1780) he covered it over, using the materials of the hustings that had been built in front of St. Paul's Covent Garden, for a famous Westminster election, and re-opened it by name of the "Amphitheatre Riding

School." That structure, enlarged four years later as the "Royal Grove," was burnt, together with nineteen houses, in August, 1794; rebuilt as the "Royal Amphitheatre," the house was again consumed in a more extensive fire on September 2, 1803. At this time Astley found a rival in C. Hughes and C. Dibdin's "Royal Circus," afterwards opened by T. Dibdin (1816) as the Surrey Theatre. He had great enterprise, building, it is said, nineteen houses of entertainment—including those in Paris and Dublin, with the Olympic Pavilion, which he sold to Elliston—and, as we gather, was his own architect. Astley died in Paris on October 20, 1814, and was buried in Père la Chaise Cemetery. At his son's death in 1821 the circus passed to W. Davis, to whose time the charger survived, and then, in 1824, to Andrew Ducrow, who died in 1842. On June 8, 1841, the house, which contained a large amount of ship timber, was burnt, and rebuilt with a capacity for 2,500 persons, for W. Batty, lessee, by Haward & Nixon, from the designs of Usher, the ring-clown; *teste* Brayley's "Surrey." To Batty succeeded W. Cooke; D. Boucicault converted the house into the "Theatre Royal, Westminster." The lease next passed to E. T. Smith, and in 1873 was acquired by Mr. George Sanger. In Britton and Pugin's "Public Buildings of London," vol. i. (1825), is a view of the then interior, drawn by H. Ansted: the Crace collection contains some views of various dates, comprising the two by Capon; D. Havell's of the building of 1792 (from Brayley's "Theatres of London," 1826, 4to.); Miller's of the building after the fire in 1841; Shepherd's of the east front, as built, *circa* 1846, in what is now Lambeth Palace-road; others will be found in the "Crowle" Pennant.

BUILDERS and contractors, who are constantly having to send large quantities of goods by rail, are more practically interested than most classes in the question of railway charges, and they will therefore read with satisfaction the following letter addressed to Messrs. Adamson & Sons, contractors, of Ealing, by one of the large railway companies, and which has been sent to us for publication:—

"London and South-Western Railway, Waterloo Station, March 16, 1893.

GENTLEMEN,—With reference to the Memorial signed by yourselves and 115 other firms of London builders, I have much pleasure in informing you that it has now been decided to re-adopt the old rates and conditions, viz., 16 ft. to the ton for Portland and Bath stone traffic in Class B, and I trust this will be satisfactory to you.—Yours, &c.,

CHAS. J. OWENS, Goods Manager."

This is practically a confession that one railway company at least has felt its new position in regard to charges to be untenable; and it seems not improbable that this example will be followed by other companies.

HACKNEY COMPETITION FOR PUBLIC BATHS AND WASHHOUSES.

THIS competition has recently been decided by the Commissioners of Public Baths and Wash-houses for the parish of St. John, at Hackney. It was limited to seven architects, who were specially invited, and of these the names of those who were successful alone have reached us. The first premium of £50 was awarded to Messrs. Harner & Pinches, for designs under motto "Compact;" the second was allotted to Mr. F. J. Smith, whose motto was "Otter;" whilst Messrs. Spalding & Cross received the third premium of £20, their design bearing the motto "Practical."

The printed conditions issued to competitors are reticent as to who was to make the award, but we are informed that the Commissioners were confident of their powers of selecting the best design, as they had visited nearly all the public baths and wash-houses in the metropolis, and that though Mr. Thornton Green, surveyor, of the Poultry, advised in the matter, the award must only be attributed to the Commissioners. It is a matter of some surprise, therefore, to us

that we are able to endorse the award. It appears to have been made to a design which has distinct practical advantages over the others exhibited.

The site is an extensive one, on land at the back of buildings facing Lower Clapton-road and Clapton-square. There is one narrow frontage adjoining the Portland Arms in the Lower Clapton-road, and two of about 25 ft. width in Clapton-square, but one of these frontages in Clapton-square, with the north portion of the site, was reserved in the conditions for future extensions. The accommodation asked for in the particulars was extensive in character, and included a first-class swimming-bath, with water area of 120 ft. by 40 ft., a second-class swimming-bath of 90 ft. by 35 ft. water area, and a ladies' swimming-bath of 80 ft. by 30 ft. water area. The private baths were to include fifteen men's and six women's first-class baths, and forty men's and twenty women's second-class baths, with the necessary establishment laundry, boiler-house, engine-room, and engineers' workshop. The front block was required to face Clapton-road, and here provision was to be made for the main entrance, board-room, clerk's office, and a residence of eight rooms for the superintendent's use. The only remaining point in the conditions that needs to be referred to is the provision of a temporary floor for the largest swimming-bath, with two artists' rooms, so that in winter a hall for entertainments would be available.

Brief reference only can be made to the designs, which were on exhibition at the Hackney Town Hall on Thursday, Friday, and Saturday of last week.

The motto of Messrs. Harner & Pinches, "Compact," represents one of its distinguishing features, for this design is superior to the others exhibited in its general compactness, the absence of long and tortuous corridors which make administration difficult and expensive, and the provision of one ticket-office for the entrance to all departments. A considerable portion of the site to the north has also been left for future extensions. The ladies' swimming-bath has been arranged with its axis pointing towards Clapton-square. The two remaining swimming-baths, men's first and second-class baths, are at right-angles to the first, with their axis pointing towards the Clapton-road entrance. They are parallel to each other, and between are placed the men's second-class private baths. The men's first-class baths are placed in the south-east corner, whilst artists' rooms are placed on the east boundary, adjacent to the large swimming-bath. The establishment laundry is placed on the Clapton-square frontage, adjacent to the ladies' swimming bath, and at this point a convenient entrance for stores of all kinds is arranged. The entrance is planned in a convenient way, with a central ticket-office and men's and women's corridors on either side. Behind the office are found superintendent's office, cloak-rooms, refreshment-room, all easily accessible from either corridor. The entrance block on the first-floor has clerk's office, waiting-room, and board-room, and the upper portion of the building is arranged as a commodious dwelling for the superintendent. It is proposed to light the baths by electricity, generated upon the premises. The total cost is estimated at 35,000*l*.

Mr. F. J. Smith's designs, which have received the second premium, under motto "Otter," show the women's swimming-bath and men's first-class swimming-baths, with their axes to the Clapton-road, but the placing of the second-class bath at the end of the former creates an inconvenient length of corridor. The elevations are kept very plain in detail, and their proportions leave something to be desired.

Messrs. Spalding & Cross, who gained the third premium, with designs under motto "Practical," submit the best elevations in the exhibition; they are in good taste and proportion, and show pleasant variety of line. The plan has one or two weak points, one of which is the length of corridor.

The plans submitted under motto "Relsah" are devoid of character and poor as to elevations. The long lengths of tortuous corridors would make administration arduous. The author of this design appears to have adopted as his motto the name of one of the commissioners spelt backwards.

The author of the design under motto "Ariston men huder" has made a feature of a bath arcade at the Lower Clapton-road entrance, with shops on either side throwing the bath entrance well back. The author of plans under motto "Plan" has aimed at simplicity, and his plan has several good points on this score. The position of the laundry

on the east side in a somewhat inaccessible position is against it, as well as the tameness of the elevations. This competition is almost unique in the smallness of the frontages and the consequent lack of opportunity for the display of design in elevations. The award appears to us to have been made to the most deserving set of designs.

COMPETITIONS.

NORTHAMPTON INSTITUTE, CLERKENWELL.—This important competition, after some delay, has been decided in favour of Mr. E. W. Mountford. The three other competitors were placed in the following order: Mr. Rowland Plumble; Mr. Campbell Jones; and Messrs. Roger Smith & Son. Mr. Charles Barry acted as assessor.

ST. LAWRENCE'S, AMPLEFORTH.—Mr. Bernard Smith, of London, has been selected as architect for the new monastery, church, and additional collegiate buildings which the Prior and Council of St. Lawrence's, Ampleforth, contemplate building. There has been a competition, limited to old boys and architects who have done work for the priests of St. Lawrence on the mission. The new works proposed to be carried out are on a very extensive scale, but we reserve further remarks on the scheme until we publish the drawings, which we shall be able to do shortly.

ARCHITECTURAL SOCIETIES.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—A meeting of this Association was held on Tuesday last, the President, Mr. W. Hale, being in the chair. A report was presented by the Council on the Building By-laws of the City and their administration, and the secretary was instructed to communicate with the Public Works Committee with a view to obtaining some modifications therein, and in the methods of administering them, which it is thought would lead to much improvement in working. Mr. Herbert R. Lloyd brought under the notice of the meeting the clause in the conditions of competition issued by the Committee of the new Municipal Technical School, referring to the award of premiums, and reserving to the Committee the right to employ an architect other than one of the competitors to carry out the works, and the secretary was instructed to communicate with the committee, pointing out that the clause is derogatory to the profession and likely to prevent some of the invited architects from competing. Mr. J. Ward read a paper on "The Open Fire-place, Past and Present," in which, having dealt at length with the history of the development of the fire-place, from the early open hearth to the modern form of grate, he claimed that for hygienic, æsthetic, and social reasons alike the open fireplace is the best method of artificial heating, and that the best form of grate is that which gives out the greatest amount of radiated heat with the least consumption of fuel. Having dealt in detail with various forms of grate in use at the present time, he quoted the laws laid down a century ago by Count Rumford, and more recently advocated with much vigour by Mr. Pridgin Teale, and advocated from the data thus obtained and from the results of experiments which he had himself carried out, that the points to be aimed at in the construction of the modern grate, are a minimum of metal work, the least possible interruption by bars of the direct radiation of the heat, and the use of fire brick back and sides so arranged as to throw the heat as widely forward into the room as possible. The author concluded his paper by an enthusiastic description of the various advantages possessed by the open fire-place over all its rivals. The paper was illustrated by a large number of designs and diagrams, and by examples of grates.

LIVERPOOL ARCHITECTURAL SOCIETY.—A special meeting of this Society was held at the Library, Cable-street, Liverpool, on Monday last, Mr. A. Harrison occupying the chair, when a paper was read by Mr. R. J. Angel, entitled, "A few notes on hot-water supply." The lecturer's remarks were illustrated by diagrams.

THE ENGLISH IRON TRADE.—Business in crude iron is again quieter, the temporary spurt having fallen away, and in Cleveland, prices have reverted to their old level. Finished iron continues to be dealt with only in hand-to-mouth quantities; but tinplates display a little more activity. The steel trade remains depressed. Shipbuilders are very dull; but in a few districts engineers report a slight increase in work. The coal trade is quiet. —*Iron.*

ON THE USE OF THE WESTERN AUSTRALIA WOODS, KARRI AND JARRAH, FOR WOOD PAVING.*

The expenditure on the paving of streets is so considerable, that any information which can be laid before this Association in reference to materials that can be economically used for such work, will no doubt be welcomed.

The Vestry of this parish has alone spent £36,542 2s. 6d. on 74,370 square yards of wood paving during the last seven years, and further large sums will have to be spent shortly for new works and repaving.

The present practice is to use creosoted deal blocks, costing about 12s. a yard, including 6 in. of Portland cement concrete underneath, these blocks being, on account of their greater durability, cheaper and more sanitary than plain deal blocks.

In June, 1889, a trial strip of Jarrah was laid in Lillie-road, 6 ft. 6 in. wide. This strip is now, after three and a-half years' wear, $\frac{3}{4}$ in., $\frac{3}{4}$ in., and 1 in. above the plain deal blocks adjoining, although four of the Jarrah blocks show signs of wear or decay to the extent of $\frac{3}{4}$ in., $\frac{3}{4}$ in., and $\frac{3}{4}$ in.; also in February, 1892, about 542 square yards of Jarrah wood were laid in Jerdan-place, at the cost of 19s. per square yard.

cisely 9 in. long or 3 in. wide, although 1,000 of them would cover a larger area than 1,000 exactly the size specified. The slight variation is due to imperfect sawing arrangements in Australia.

At higher prices they can both be delivered the precise sizes required.

The woods belong to the same class of tree, and appear from the plan of the forests which have been shown to me to grow side by side. Their appearance is very similar, and their similarity would also probably extend to their durability, and to the special immunity from decay which has been claimed on their behalf. As far as the experiments hereafter referred to have extended, one great difference appears to be that Karri sinks in water and Jarra floats, showing Karri to be denser.

Great virtue is claimed for Eucalyptus oil, — prepared from a tree of the same class (*Eucalyptus Globulus*) — as an antiseptic, and it has occurred to me that perhaps the lasting properties of these woods may be to some extent due to the presence of this oil.

The following information is placed in a tabular form for purposes of comparison. The figures are obtained from "Timber and Timber Trees," written by Mr. Thomas Laslett, Timber Inspector to the Admiralty:—

Table I.—Averages.

Description of Work.	Deflection in inches.				Crushing strains.			
	With apparatus weighing 390 lbs.	After weight removed.	At right of break ing.	Weight in lbs. required to break each piece.	Weight in lbs. required to break one square inch.	Tensile Experiment. Direct Cheson in lbs. per square inch.	In Tons.	Crushed at Lloyd's.
Karri	1'01	'04	6'06	862	215	7,070	6 in. cube 185	12 yrs.
Jarrah	3'21	'133	4'71	685	171	2,040	2 in. cube 12'762	12 yrs.
Teak	1'65	'83	5'37	912	228	3,301	2 in. cube 11'35	14 yrs.
English Oak ..	3'37	'189	7'35	776	193	7,571	2 in. cube 13'625	9 yrs.
Fir	1'62	'066	5'14	876	219	3,231	2 in. cube 12'687	...

Karri wood (*Eucalyptus diversicolor*) is abundant in Western Australia, growing in forests intermixed with Jarrah and Red Gum, and can

The results in the following table are obtained from experiments made with blocks shown to you to-day:—

Table II.

Description of Work.	After being kept in office several weeks near fire shewed.	Contents of blocks dry.	Weight dry.	Weight in lbs. per cube foot.	Specific gravity.	Increase in weight in 72 hours immersion.	Increase in bulk of specimen after immersion.	Proportionate increase in bulk from expansion after immersion.
Karri blocks 9 in. x 4 in. x 3 in. ...	Numerous small cracks.	c. in. 418'6	lbs. ozs. 15 4	62'911	1'0077	lbs. ozs. 2 13	in. 9'7	'0231
Karri block 9 in. x 5 in. x 3 in. ...	...	...	...	65'0	1'0412	...	...	...
Jarrah blocks 9 in. x 4 in. x 3 in. ...	Some fine cracks.	434	13 13	51'96	'832	4 12	16'0	'0368
Jarrah block 9 in. x 5 in. x 3 in. ...	...	...	...	56'0	'897	...	...	...
Deal blocks 9 in. x 4 in. x 3 in. ...	Large openings extending across blocks, and blocks warped.	432	8 4	33	'52	5 12	10'	'023
Deal creosoted blocks 9 in. x 4 in. x 3 in. ...	A few slight cracks.	440	11 4	45	'72	4	25'	'056

be delivered at our wharf, close to Putney Bridge, in blocks 9 in. by 3 in. by 4 in. deep, at a cost of 185s. per 1,000. This wood does not appear to have been known in this country until the end of 1892, and it is possible that some of it has already been laid under the name of Jarrah.

Jarrah wood (*Eucalyptus marginata*) also growing as above, can be delivered at our wharf, in blocks 9 in. by 3 in. by 4 in. deep, at a cost of 207s. 6d. per 1,000.

This wood has already been considerably used for wood-paving for some years in London.

The blocks of both these woods at the prices quoted are guaranteed 4 in. deep, but not pre-

Table III.—Cost of Repaving Fulham-road, Concrete Already In.

Description of Wood.	Area Square Yards.	Price per Yard.	Total Cost.	Probable duration.	Average Annual cost of repayment of loan at 3½ p.c. spread over period of duration of wood.
Karri Wood, 9 in. x 3 in. x 4 in. deep	12,500	s. d. 10 6	£ 6,562	16	£ s. d. 534 12 0
Jarrah, 9 in. x 3 in. x 4 in. deep		11 6	7,187	14	649 5 0
Deal Creosoted, 9 in. x 3 in. x 5 in.		7 6	4,687	8	680 0 8

The results show Karri to sink in water, Jarrah to float, and that Jarrah absorbs more water and swells more freely than Karri. The author calls attention to the extraordinary expansion of the

creosoted blocks. No doubt these blocks lost a great deal of creosote during the weeks they remained in a warm room, and perhaps the pressure they had been subjected to in the cylinder during the creosoting process in some way accounts for their greater expansion.

Considerable feeling appears to exist in Australia as to the relative capabilities of the two woods, Karri and Jarrah, and a Commission on the subject was appointed in 1887, which arrived at the following conclusions:—

"1. It is very certain that the usefulness and durability of both timbers depends very much upon the locality where grown, and the season of the year in which it is felled. The Commission consider that from November to May or June, or when the sap is down, is the best time to undertake this work; this applies equally to Jarrah or Karri.

"2. From the lengthened tests and life in works to which Jarrah has been subjected, it appears to be a timber suitable for piles in marine structures. Karri piles, as compared with Jarrah, can scarcely be regarded as having passed the experimental stage; and the Commission would suggest that a series of experiments be commenced and continued year by year with both timbers under exactly similar conditions, careful inspection being made from time to time, and true records kept.

"3. From the evidence appended, it appears that the advantages of Karri over Jarrah are:—That piles can be obtained of greater lengths, straighter, they drive better, and resist a heavier strain. For the superstructure of bridges, jetties, &c., or where severe strains or crushing weight has to be considered, Karri, in consequence of its greater strength (see appended Tables) should be preferred and used before Jarrah.

"4. It does not appear from the evidence before the Commission that there is much to choose between the two timbers as far as their anti-rusting properties are concerned.

"5. From the evidence before the Commission, and the appended Tables of Tests, we are of opinion that Karri is most suitable for works of construction, railways, and public works generally; but as regards the timber resisting the action of salt water and sea worms in marine works it has yet to be proved.

"6. It appears, from structures that have been examined, and from the evidence taken, that, as a general rule, round piles should be used in preference to square, and they should be charred and tarred before being driven.

(Signed)

CLAYTON T. MASON, M.Inst.C.E., Chairman.

WILLIAM ROGERS, M.Inst.C.E.

FRED STAFFORD, M.Inst.C.E.

H. ERNEST PARRY, Assoc. M.Inst.C.E.

JAMES GARDINER, Assoc. M.Inst.C.E.

JOSEPH HARRIS, J.P., Inspector of Forests."

Test of Karri and Jarrah as Wood Paving.

In July, 1888, strips of Karri and Jarrah were laid side by side in the King's-road, in front of Messrs. Ransome's premises. These blocks were all exactly 5 in. deep, and Messrs. Ransome have kindly shown me samples which have been retained by them. The Karri blocks were 2½ in. wide, and the Jarrah 2½ in. These blocks have been down now four years and a half without being disturbed, and Mr. T. W. Higgins, the Surveyor of Chelsea, writes me that the Karri is a quarter of an inch above the Jarrah, and the Jarrah is about three-quarters above the yellow deal.

On December 14, 1892, the importers of Karri wrote this Vestry, saying that they would be prepared to guarantee that 4 in. Karri blocks shall last twice as long as the deal blocks (laid in July, 1885, in the Fulham-road), which are not yet taken up, though in a very bad condition. Judging from the blocks in the King's-road the offer appears a safe one, and in the following table the duration of Karri wood is calculated sixteen years.

The importers also claim that a 3½ in. wood block is equal to a 4 in. Jarrah.

In a report to my Vestry, dated January 11, 1892, the following table, showing the relative cost of using the woods named and conclusions appeared:—

* A Paper by M. James P. Norrington, Assoc. M. Inst. C.E., Surveyor to the Vestry of Fulham, read at the recent Metropolitan meeting of the Incorporated Association of Municipal and County Engineers.

Conclusions.

1. Karri is cheaper than Jarrah.
2. Table I. shows Karri to be generally superior to Jarrah, and the equal or superior of

all the other woods given in the table. The fact that Lloyd's already class both woods as nearly equal to teak is a strong certificate in their favour.

3. Both woods belong to the same class, and probably possess a natural oil in some degree equivalent in its action to the creosote forced into the deal blocks.

4. The King's-road experiment shows Karri to be more durable as a paving material than Jarrah.

5. Table II. shows Karri and Jarrah to be both cheaper in the end than creosoted deal, and Karri the cheaper of the two.

6. A hard wood road is superior to a soft wood road for sanitary reasons, as it throws off the wet better, and is dryer and cleaner.

7. If the harder woods are used, the disturbance of traffic, &c., caused by repeated relaying and repairs will be reduced to the minimum.

The London County Council have already offered to lend money for Jarrah wood paving for seven years to the St. George's Vestry instead of five years, which is the usual term for which loans are granted for wood paving works. If the London Surveyors would combine, no doubt the Council could be induced to lend money for paving with these hard woods for terms of ten or twelve years, which, at present prices, would make the annual cost of hard wood paving much lighter than deal.

One objection raised to the hard wood roadways is that they are more slippery than deal. It is admitted that they are cleaner, and as slipperiness is generally the result of dirt, proper scavenging should obviate the complaint.

A further objection is that the hard woods wear, as Mr. C. Mason, the Surveyor of the St. Martin's Vestry, describes it in a letter to me, like "ripples on a sea shore."

In order to overcome this tendency, the wood paving in Jerdan-place is laid quite close-jointed, and I suggest that this tendency can be further overcome by laying the lines of wood diagonally across the road.

In conclusion, I suggest that when Surveyors are desirous of obtaining blocks for wood paving, they should obtain alternative prices for Karri and Jarrah. This course will enable them to obtain the benefit of the competition for the supply of these woods.

THE BUILDING TRADES' EXHIBITION.

The Building Trades' Exhibition, which was opened in the Agricultural Hall, Islington, last week, though very far from being anything like an adequate representation of building trade industries, nevertheless contains a few things worth notice.

Fireproof floor construction is represented by two prominent exhibits, viz., those of Picking's Interlocking Fireproof Construction Company, and Messrs. F. Willis & Astley. Of the former, we gave a detailed description in the *Builder* for November 19 last, p. 399, so that it is not necessary to repeat the details here. In both this system of construction and in that of Messrs. Mark Fawcett & Co. (now so largely used) the fire-clay "lintels" are tubular. Messrs. Willis & Astley's system, which we had not previously seen, consists in making the fireclay lintels in the form of diminutive girders with a wide-bottom flange and a central web, having its top surface in the form of a segmental curve, so that the web is deepest in the centre and diminishes towards the ends. There is no upper flange, and the webs are pierced with three 2 in. holes to allow of the passage of through currents of air, thus enabling the floor to aid in the ventilation of the room below it. Thin sheets of iron plate are laid over the curved tops of the lintel-webs (which are at right angles to the iron joists), and these sheets of iron serve as a permanent centre for arched concrete filling-in. One point of these lintels is that main girders and trimmer-joists can be protected by the overlapping bottom flanges of the lintels, which are, of course, grooved on the underside to afford a key for plastering.

Messrs. H. Cunmuh, Wright, & Co. show their patent corrugated iron laths and sheets for use in combination with concrete, plaster, and other materials. The laths have a double key for holding the plastic material, and the sheets have their corrugations made, not in the usual wavy or undulating forms, but in a series of grooves of dovetail section. The appliances are likely to be found very useful for partition walls and for a variety of other purposes.

It is indicative of the non-representative character of the exhibition that not a single

English building stone, and only one or two of our decorative stones, are comprised amongst the exhibits. There are, however, some excellent foreign marbles and polished granites on view, many of which have only recently been placed on the English market. We noticed a good show of Norwegian marbles from the quarries of Mr. Chr. Anker, of Fredrikshald, which were introduced into this country about a year ago. As is usual with marbles, they bear foreign, usually French or Italian, names—thus the *antique rubané* is a grey and white stone; *jaune rose royal*, pink and yellow with white spots; *vert Canrobert*, dark green; *gloire*, dark pink with white spots; *vert rose*, green streaks with red on white patches; *blanc veine*, white with occasional dark grey streaks; *blanc clair*, light grey; *citron*, yellow; *antique mouche*, white background with very dark, interrupted lineations; *bleu tigré*, white with minute grey specks; *brèche*, pink with variously coloured and grey patches. But the most interesting part of this exhibit was the white Norwegian statuary, which, judging from the samples shown, is a very pure white, devoid of streaks or grey patches. This material presents considerable analogy with certain kinds of Carrara statuary, and is a welcome addition to the market. Messrs. Garstin had a good exhibit, comprising a large number of marbles and polished granites, mostly from the Continent. The majority of these are already well-known and need not be referred to, but we observed two remarkable and comparatively new stones termed "granites" which have come from Norway. One is a dark green stone with small black patches; mineralogically it consists of labradorite felspar in large crystals the cleavage planes of which reflect the light, producing a pearly lustre; a considerable quantity of magnetite is present. The other stone is similar to the last, except that it is lighter in tint, and contains less magnetite. As decorative materials, these will doubtless play an important rôle in a certain class of buildings, for rarely have we seen such gorgeous effects in natural stone. The presence of so much magnetite, however, in the dark variety is a drawback, for it indicates that the stone is not adapted for out-door work, as that mineral disintegrates with tolerable facility in the open air, and produces unsightly brown stains. For indoor work it will be extensively used. Altogether, Messrs. Garstin's was the most comprehensive exhibit of decorative stones. Another stand was devoted to the various kinds of Cipollino and other marbles from Saillon, near Saxon, in Switzerland, which were described a short time since in our columns.* We need only remark now that there was a polished monolith column of the Cipollino exhibited, 15 ft. in height, which is destined to adorn the principal reception saloon of the new Pump Room at Clifton. The circumstance that this column was shaped and polished by hand, and not turned by machinery, is clearly visible on its surface, which is somewhat irregular in places. Speaking generally, the specimens of Cipollino shown were badly polished. Messrs. Braby exhibited several kinds of marble, fitted up as washstands, &c. An Irish flagstone from the quarries of Messrs. John Hampson & Co., at Kilrush, Co. Clare, formed a novel feature, inasmuch as it is desired to induce London Vestries to use it. The material is a fine-grained, dark-grey sandstone, with clearly marked laminae; it is exceedingly compact and rough in appearance, and should wear well. For years it has been successfully used in Dublin, Belfast, and other cities in Ireland, and is said to be 15 per cent. cheaper than York flagging.

Bricks of various makes and for various purposes are exhibited by Mr. T. Freeman, the contents of whose stand are worth attention and examination in detail. Close by there is a good show of wall and encaustic tiles from the Brockley Tile and Mosaic works. Messrs. E. & C. Braby have also a good display of tiles. Messrs. Dick Radclyffe & Co. exhibit a method of constructing walls of buildings for horticultural and other purposes with hollow glass bricks of varied shape and colour. One possible field for the use of this method of construction is in the walls of corridors, where only borrowed lights are available. We believe this is a French invention. Messrs. Joseph Robinson & Co. exhibit specimens of their well-known plaster work. Parquetry is shown by Turpin's Parquet Floor Company and by Mr. H. Bassant. The Patent Cork Pavement Company show specimens of their compressed cork pavement. Mr. E. S.

Hindley shows portable engines; and the Britannia Company, Colchester, show their revolving-table band-saw, for cutting handrail wreaths, &c. There are several "safety" window-sashes, including Ford's, the "Bräloo," and Hough's. The St. Pancras Iron Work Company exhibit iron staircases and pavement lights, and Messrs. Barnards, of Norwich, a small but attractive stand of stoves and overmantels. Messrs. Walter Monney & Co. have a good representative show of builders' hardware, including stoves, mantels, and wall-tiles. A very simple device for enabling long pipe to be bent without kinking, flattening, or marking is shown by these exhibitors. It is known as "Billing's patent device for bending pipe," and consists of a spiral spring which is inserted in the pipe before the latter is bent. Finally we may mention that Messrs. Bedford, Lemeré & Co. have a very good display of fine photographs, including interiors and exteriors of several notable mansions.

The Exhibition will close this (Saturday) evening, March 25.

SCREENS, THEIR TREATMENT AND SYMBOLISM.*

In the treatment of these examples we have the germs of splendid opportunities of this kind of screen design. Constructional screens thus designed have the advantage of being permanent, effective and open, whilst still retaining all the symbolism of the screen.

I have attempted this kind of treatment in a somewhat varied form. First, at All Saints', West Dulwich, which is illustrated on the walls with all detail. I have carried my chancel arch to nearly the whole height of the building, i.e., over 60 ft.; have filled the upper portion with tracery, supported on two moulded shafts; I tie the whole together with a wrought-iron tie screen, with sliding slots to allow for expansion and contraction, elevating my large cross of over 9 ft. high in the centre compartment. Whether this effect is satisfactory I must leave those to judge who best know the church. I can only say that I shall never regret having tried the experiment, for the first time I believe, on so large a scale.

Should the members of the Association like to visit the church during one of their Saturday outings, I shall be very pleased to show them over, and my friend the vicar, who is present this evening, would, I am sure, be equally pleased to see them.

I have again tried this effect in my design for a church at Staines for Sir Edward Clarke, Q.C., which is just going to be carried out. In this the rood is constructed as an actual part of the building.

In designing of stone screens, generally my advice is—don't make them too heavy and massive—don't make them the means of shutting out a good view of the sanctuary. Be careful to have your detail refined without being weak, remembering that the screen is always under close observation. A beautiful lightness and richness can often be imparted by cutting your panel tracery in complete, or nearly complete, relief—and even in very shallow position, apparent depth can be increased by undercutting at the back of your cusping. As regards colouring, I will speak of that later on under decoration generally.

Wood screen work is, again, a large enough subject to be treated entirely by itself. There are so many exquisite examples throughout the country that it is a difficult matter to select the best.

I have chosen subjects for illustrations from various counties, but I must say principally from my native county Devon.

The screens or Devon and Somerset stand, I think, unsurpassed as regards beauty in the wood carver's art, as the Norfolk and Suffolk screens stand unequalled in the richness of their coloured decorations.

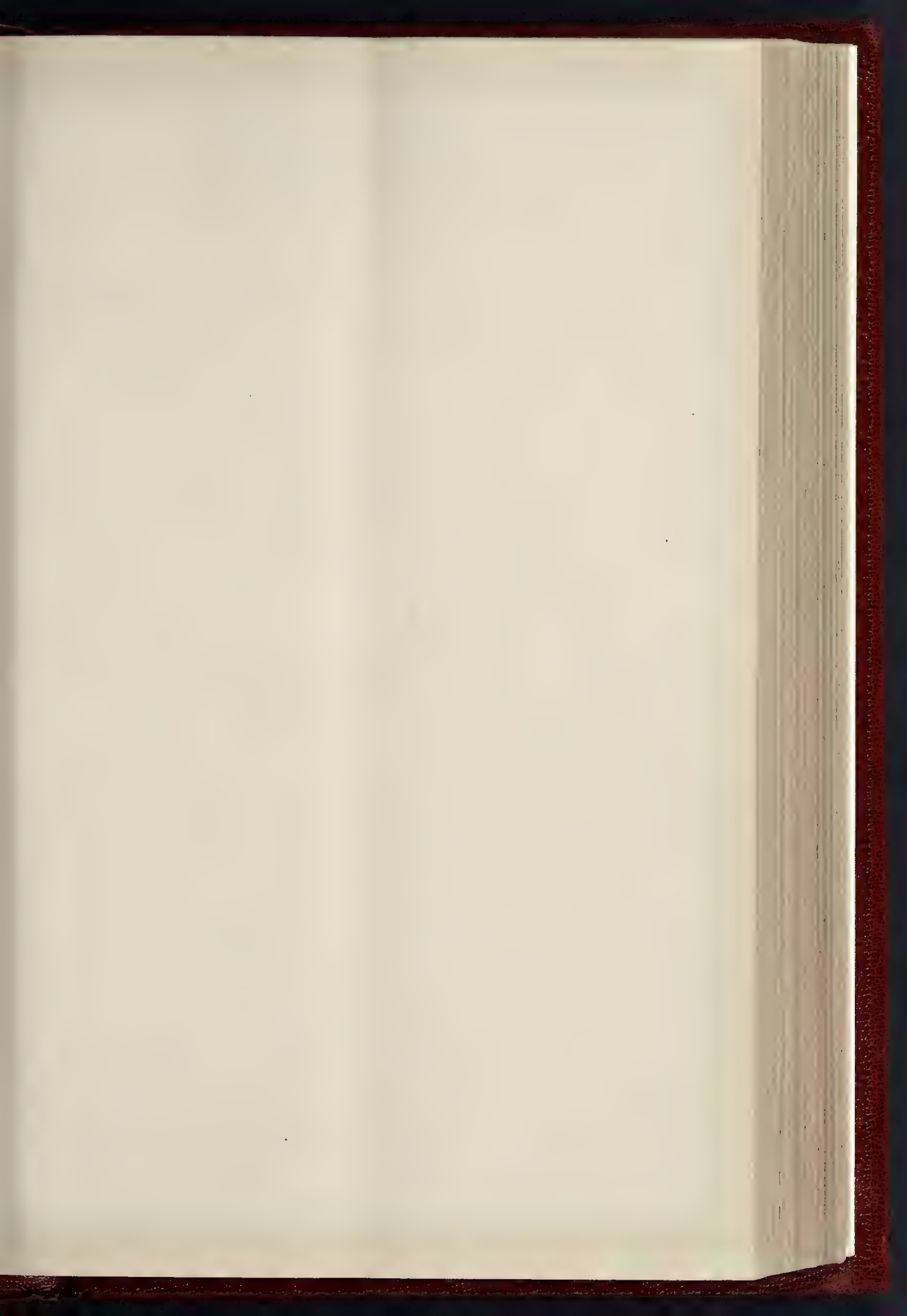
From the selection before you I would ask you to particularly notice the following: Harberton, 1st, for its pure and fine detail; 2nd, the extremely happy way in which the tracery ornament is carried round the columns, giving continuous unity of effect. The screen is brilliant with golden colour, and saints adorn the lower panels. This screen has been restored and restored well.

Staverton, with its magnificently carved rood-loft, is a simply beautiful example of modern carved work.

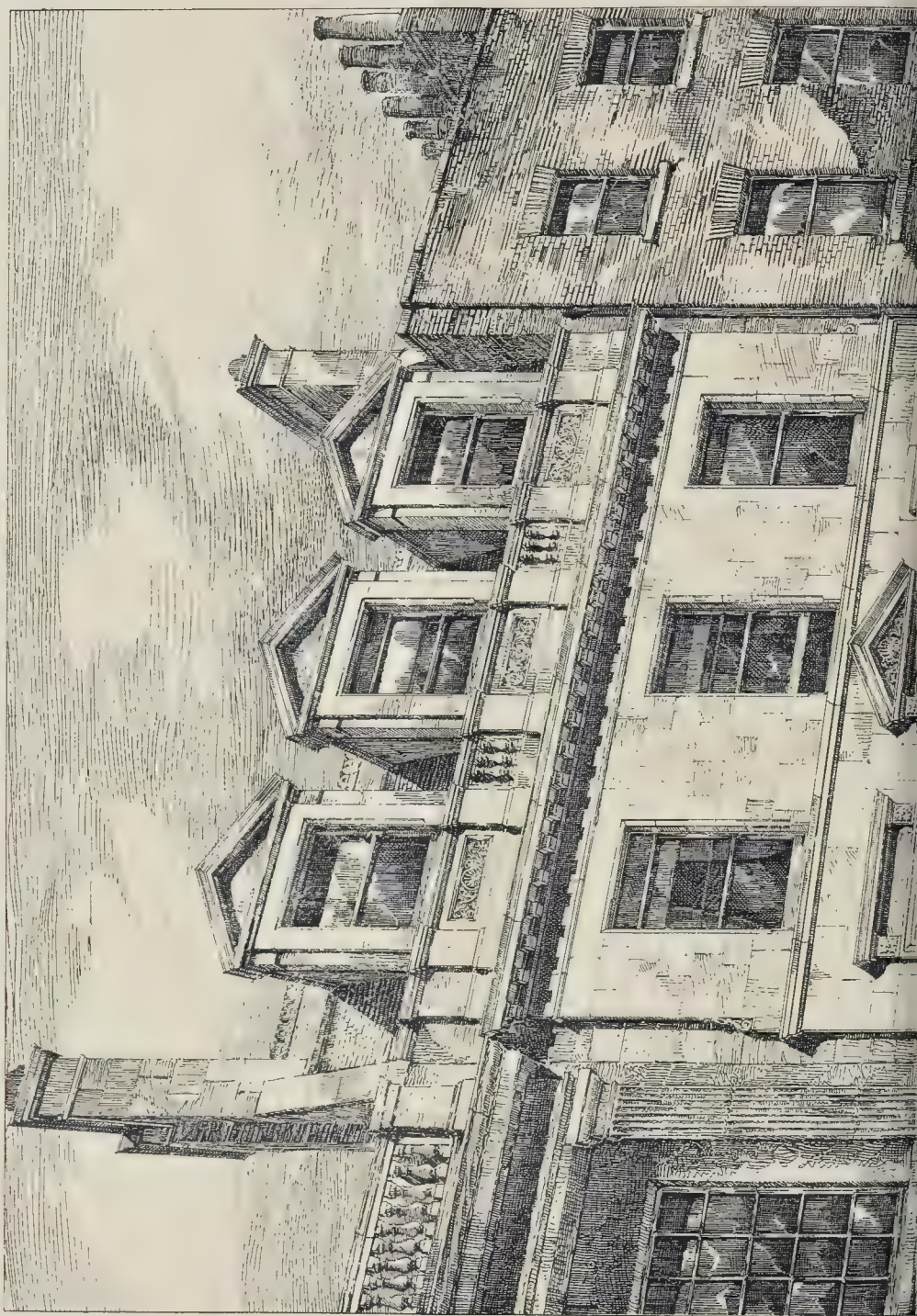
Kenn, with its restored rood crucifix and attendant figures.

* A paper by Mr. G. H. Fellowes Pryne, F.R.I.B.A., read before the Architectural Association on the 10th inst. (concluded from p. 212).

* See *Builder*, vol. lxxiii. (1892), p. 472.



THE BUILDER. MARCH 25. 1893.





No 24 SOUTHAMPTON BUILDINGS
for MESS^{RS} CARPMAEL & COY
Chas J. & C. Herbert Shoppee. Arch^{ts}

Littleham, for the richness of its lower panels. Plympton St. Maurice, restored by the late Mr. J. D. Sedding.

And last, but not least, the elaborate rood and parclose screens at Dartmouth.

Dunster, Somerset, restored by the late Mr. Street (notice especially the treatment of the rood-screen) Newark, the loft at Sleaford in Lincolnshire.

Again, the exquisitely decorated screen at Ranworth, Cawston, and several other screens in Norfolk are remarkable for the richness of their colouring, as is also the beautiful Suffolk examples of Southwold. Lancaster parish church has some very fine screen and canopy work.

East Church, Kent, is a fine example of one of the thirty rood-screens of that county.

The Church of St. Mary, Woodleigh, Devon, where I found the remains of the old rood in the loft of the chancel arch, is an interesting example.

Much beautiful screen work as there is remaining in our parish churches, still, vast indeed must have been the destruction of stone, wood, and even metal screens. Who, with any love for our church or art has not lamented to see the sad results of work wrought by sacrilegious hands at the time of the Reformation?

That violent commotion which c'ethrrow
In town and city and sequestered glen,
Altar and cross, and church of solemn roof,
And old religious house—pile after pile.

In designing wood screenwork be especially careful not to vulgarise or get coarse detail, and never forget material with which you are designing is wood and not stone. The detail of the one will look weak and feeble if applied to stone, and vice versa. Stone detail applied to wood generally looks both coarse and vulgar.

Don't think I am simply asserting a truism, it is really a fault that is fallen into far too often, and I have seen several examples where oak pulpits have been actually copied in stone with simply disastrous effect.

I think it questionable whether it is wise to keep on designing screens with heavy rood-lofts, or our churches. The lofts cannot in most places be used, and to me it seems somewhat purposeless to copy a Medieval idea simply because it is Medieval—by all means have rich canopy work and other elaborate treatment which may suggest itself, but I feel that the heavy rood-loft with its allied front, deep carved cornice, and groming under, seems to unnecessarily block up the church. A clergyman once remarked to me, that when he entered a church of this kind, the heavy rood-loft seemed to strike him like a bar. I can quite understand the feeling.

There have been a large number of very beautifully designed screens in modern times. I illustrate one or two examples, one of a harmlessly simple treatment by Messrs. Bodley & Garner, at the Eton Mission Church, Hackney Wick, and another at Saint Paul's Church, Morton, Gainsborough, by Messrs. Ficklethwaite & Somers Clarke.

The spirit, however, in which the old screens were designed should enter into our modern work. It is summed up in inscription seen on so many screens—

Let fall down thy me and lift up thy hart
Behold thy maker on yond cross all to torn
Remember his wounds that for thee did smart
Gethyn without syn and of a virgin borne.

The rood beam treatment does not seem to have been so common in England as elsewhere. There is a beautiful example of loft thrown cross from wall to without screen under, at Ivesbury, Wiltshire, here illustrated.

Some of the modern rood beams have been nicely treated, and I think in the design for the new church at Miles Platting, Manchester, by Mr. Leonard Stokes, is very finely treated; as is also that in the new Roman Catholic Church of the Holy Rood, Watford, by Mr. Bently, whose work is so truly devotional.

There are two sketches of suggestive treatment recently published in the *Builder*—first, of St. Stephen's Chapel, Westminster, and the high altar screen at Westminster, by Mr. H. W. Brewer, which are well worthy of careful notice.

Before leaving the subject of wood screens, I must refer to the beautiful example of seventeenth century screen at St. John the Divine, Leeds—a screen erected about 1632. The whole of its church is full of beautiful woodwork of that period.

Now as regards metal screen work, a subject again teeming with interest and worthy of the closest study, of which here I can only touch the fringe.

Two of the best known of the many beautiful Gothic examples still existing are perhaps, first, the screen or the tomb rail at St. George's, Windsor; second, the ironwork of Queen Eleanor's tomb at Westminster; and there are other numerous examples of grille work at Westminster and elsewhere. France has many beautiful examples, of which the screen at Amiens is an excellent specimen. The grille at St. Martin's, Brunswick, and Jesuit's Church, Cologne, are but small examples of the quantity of beautiful work to be found in Germany. In Spain we find splendid examples at Seville and Toledo. The finest collection of iron-work for exhibition is perhaps that brought together at South Kensington Museum, where one can study the beautiful examples for many hours.

With regard to design I would say, don't try to produce difficult mouldings in metal work. Imitation of wood and stone treatment in metal, as seen in some iron screens of this century, is utterly wrong. For the ready production and strength good horizontal lines in the upper part lessen the difficulty in making a screen. The insertion of panels in considerable number, which can be perforated or worked to almost any design, give great firmness to the work, and are easily fitted.

Nor in any large work is it desirable generally to use more than one metal. Of course, in small work, which can be got at easily, this remark does not apply. Should variety of effect be required, this may best be obtained by gilding, that is in the case of ironwork.

But brass and ironwork mixed, if not carefully treated often seems to have a patchy effect. Brass when allowed to oxidise for a long time becomes rotten from the zinc used in its manufacture. The brass of the sixteenth and seventeenth centuries stands better than the modern metal, because it was made in a better manner, that is, without so much zinc in it, in fact it was more like bronze. Therefore, if thought advisable to use more than one metal I should advise bronze or copper. Bronze figures can be fairly cheaply introduced with very beautiful effect, and I cannot help thinking that there is a great future for bronze work of this kind, as it is more lasting and often more effective.

There is as good work in these days turned out from the anvil as in past times. Among other modern work, I must especially name the beautiful screen from Mr. Pearson's design at St. John's, Red Lion-square; St. Michael's, Leeds; grilles at Truro; and elsewhere; also the screen at St. Swithin's, Bournemouth, designed by Mr. Norman Shaw.

One of the great faults found in the designing of ironwork seems to be from the general want of knowledge of proportion and sizes of the iron used, and the consequence is that great heaviness and clumsiness is often the result. A good plan is to have a good number of pieces of iron, both square and circular, in your office for reference.

Treat your work simply, without over-ornamentation, always use collars instead of screws, where possible, and don't file up your work on completion.

A paper on the treatment of screenwork would not be complete without some reference to colour decoration.

Ist. As regards stonework, some consider it a sin to use colour for decorated stonework. I am by no means ready to join in this condemnation. Stone screenwork can be decorated with equal value as any other material if it is only treated properly; but it must be treated boldly and without fear, and I must add, with some knowledge of the nature of the colours used. Totnes, as I have before said, is a beautiful example of this kind of work.

The examples that we have of coloured woodwork are so numerous that it is unnecessary to dwell upon this subject beyond saying that one should not be afraid of using strong colours, and not falling into the error of depending upon dull æsthetic colours so much in vogue at present. In the dull light of our churches bright colours well-harmonised are best.

From many examples I have seen, I am fully convinced that the early decorators never feared the use of primaries, or what we might call gaudy colours, but they knew well how to harmonise the colours they used, and where necessary to tone down their colouring to a lower key.

The decoration of ironwork is a somewhat difficult matter, but gilding is, I think, the best treatment. Mr. Pearson shows us the effect of an entirely gilded screen at St. John's, Red Lion-square.

At St. Peter's, Plymouth, I have attained a good effect by first painting the screen in a deep dull red, and gilding on the face only, except in

the case of the collars or bands, where the gilding was carried round.

In the time I have before me it would be useless for me to attempt to go further into detail, or to name the very numerous beautiful examples of screens existing both in England and abroad. My only hope is that the few outlines given as to the history, treatment and symbolism of screens, will be sufficient to inspire and increase our interest in this particular branch of work.

In the limelight views I bring before you, I have chosen examples of considerable interest, most of which you will find well worthy of study, including the rood screen at St. Mark's, Venice; interior of St. Miniato, Florence; the Cathedral, St. Paul's, and St. Jacques, Antwerp; the Cathedral, Bruges; St. Etienne du Mont, Paris; Amiens, Chartres, and Vire; the Cathedral, Ulm; Lincoln, Exeter, Chester, St. Alban's, Manchester, Lichfield, Salisbury, Ely, and Hereford Cathedrals; Dartmouth, and Harberton rood-screens, and some constructional screen work referred to in my paper.

I must give my best thanks to Mr. Walter Millard for lending me his well-known sketches of screen work. I must also thank Mr. Hems, of Exeter, who has done so much screen work in Devon and elsewhere, for the old carved wood and photographs of screens kindly sent. Also Mr. John Singer, of Frome, for the useful photographs of metal screen work here exhibited. In conclusion, I would add just a few remarks on the design of church work and its details generally.

Don't let the purely artistic or æsthetic side be alone your guide in design. Much less allow the assertion of self, or your own individual cleverness, be your main motive. And, above all, don't look upon your work from a merely business standpoint. No; let something higher and more nobly underlie your design. Look for and try to find an underlying symbolism in all church design. This, more than anything else, will give a poetry and devotional effect to your work, that will show itself and make itself felt in every detail.

Feel how great is the honour of being allowed to design a house or any portion thereof for the honour and worship of the Great Architect of the Universe. Let the one great aim and end of your work be summed up in the words, "Ad Majoram Dei Gloriam."

In the discussion which followed,

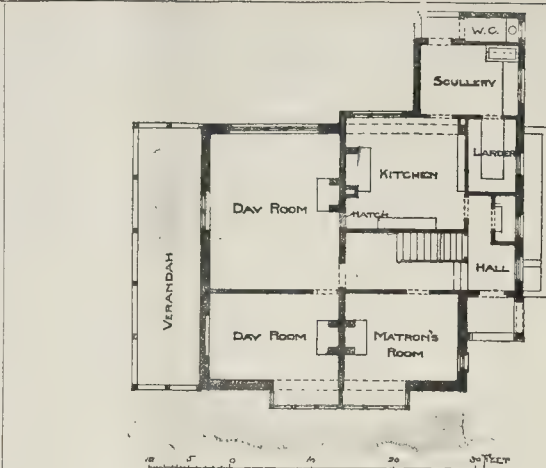
Mr. Walter Millard said he had great pleasure in proposing a vote of thanks to Mr. Pryne, not only for his excellent paper, but for the great trouble he had gone to in bringing the subject before them by means of illustrations and lantern slides. As to the subject itself, it was a wide one, and it was difficult to know where to begin to discuss it. For his own part, he much preferred almost any old screen to any new one. The feature of the old screens was, of course, the means of access to them. If we were not to have rood galleries, and we were not to use them, we did not want any staircases to them, and that fact alone made a great deal of difference in the whole structure of the building. In the majority of the old churches one could find staircases, or traces of them, leading to the rood-loft, and the staircase was, of course, one thing which we missed in modern churches. The thickness of the old screens was another point worthy of note. Many of the old screens were double, and were very fine in effect. The front plane of the tracery was relieved, so to speak, by the shadow underneath, and the effect of that was to make the thing very much more part of the whole building. Of course, if we did not want the screens to carry galleries above them, there was no need for thick and heavy construction, and that was, perhaps, the excuse for using iron so much in the present day, seeing that the screen was nothing more than a railing separating one part of the church from another, and capable of being seen through.

Mr. E. P. Warren said that Mr. Pryne's paper had led them in the most interesting way through a very large and interesting field of study, viz.: From the early Gothic screens to the Classic screens of the Low Countries. He had illustrated and referred to a great many of his (the speaker's) old friends. He (the speaker) had a very strong predilection for screens, and he thought that a church was never furnished without a chancel screen, and that remark applied more particularly to a church which had no chancel arch. It was in churches with a continuous roof, such as St. Peter Mancroft, Norwich, the large churches at Bury St. Edmunds, and other churches of the East Anglian type, that the use of the chancel screen showed itself to the

greatest advantage. In those churches are obtained the full *silhouette* effect, which was to his mind the great beauty of a screen. Just as he considered a church to be unfurnished without a screen, he considered a screen to be unfurnished without a rood. He thought that amongst the many modern architects who had treated screens successfully, none had treated them more successfully than his old master, Mr. Bodley. He thought that one of the most successful modern screens was that in Mr. Bodley's church of St. Augustine, Pendlebury. Another good screen, though on a smaller and humbler scale, was that by the same architect in the Eton Mission Church at Hackney Wick. The whole of the screen was in deal, painted deep red. It was so designed as not to hide the view of the altar—an important point to be observed in the design of a screen—and it gave that sense of security which was one of the objects of a screen, for he did not see what was the use of a screen, unless it gave a sense of enclosure. It seemed to him that one of the great charms of a screen was the *silhouette* effect which was to be obtained by placing an object against the light, and partially hiding and partially revealing what was beyond. People often objected to a screen because it hid the choir. Well, in his opinion, they might vary a familiar old maxim and say, in church, "little boys should be heard and not seen." He thought that the bases of screens, should be 4 ft., or 4 ft. 6 in. in height, as an average minimum. He was glad that Mr. Prynn advocated the use of colour, even on stone. The old stone screens at Stebbing and Bardfield bore evidences of having been coloured; indeed, it was the custom in the old days to colour the whole of the interior of the church, even the tracery of the windows. While speaking of the use of colour on screens, he should like to remark that he did not believe it would be possible to understand the mouldings of some of the screens he had seen, unless it were borne in mind that they were designed to be decorated. With regard to metal screens there were some splendid examples in Europe, many in Spain, and the iron screen round the tomb of Maximilian, at Innsbruck, was a very fine example. One important metal screen which Mr. Prynn had not mentioned was the bronze screen surrounding the tomb of Henry VII. in Westminster Abbey, which he thought must have been embellished with colour and gold. An interesting proof of the use of colour in screens was that afforded by the end of the rood beam discovered in St. Albans Abbey, when it was undergoing one of its spasms of restoration. When the beam was sawn off the end of the beam was left in the wall, where it had remained for upwards of four centuries, and the colour had been well preserved. The colours were by no means primary and glaring; they were soft and beautiful and extremely rich in tone. The medieval usage seemed to have been to use the primary colours—for example: to use vermilion where a red was wanted, and then to varnish the colour down by successive coats of varnish to the tone which they wanted to give it. He could not agree with what Mr. Prynn had said as to the gilding of Mr. Pearson's screen in the church of St. John the Divine, Red Lion-square. He thought that Mr. Pearson had forgotten that his reredos was entirely gilt; and the result of having a gilded screen in front of a gilded reredos was that the *silhouette* effect so desirable in a screen was entirely lost. He thought that Mr. Prynn had hardly been severe enough on the Hereford Cathedral screen, which was one of the most disagreeable and unsatisfactory works of the kind which he knew.

Mr. Leonard Stokes said he had very great pleasure in seconding the vote of thanks to Mr. Prynn for his admirable paper. He thought that a screen could be made a most useful piece of church furniture, and the more general use of chancel screens in churches would perhaps cause clergymen to be less frightened in leaving their churches open for inspection. Mr. Prynn had sub-divided his paper into three sections, treating respectively of stone, wood, and metal screens; he (the speaker) should be tempted to put wood in the first place, and he thought that anyone who was going to make a screen for the first time should be advised to do it in wood. After having executed a few wooden screens, one in stone might be attempted; but metal screens last of all, for he thought they were very difficult to manage with success. Indeed, he did not think that he had ever seen a modern metal screen that he should like to look at twice, although the old metal screens somehow seemed generally very well worth seeing.

Mr. Sydney Vacher, in supporting the vote of



Comalescent Home, Chatham.—Plan.

thanks, said that as to constructional screens of the type mentioned by Mr. Prynn, going up to the roof, he thought it would be a very difficult thing, if not altogether impossible, to arrange the lofty openings so that they should harmonise in their proportions with the arceding of the church.

The Rev. Mr. Beeby, Vicar of St. John's, West Dulwich, said he should be very happy to show the members of the Association his church, so that they could judge for themselves what he could not but regard as the very satisfactory effect of the constructional screen there.

The Chairman (Mr. H. O. Cresswell, President) in putting the vote of thanks to Mr. Prynn, said he had brought the subject before them in a very novel and interesting way. In regard to the question of constructional screens of the type described by Mr. Prynn, he (the President) confessed that he sympathised in the view which Mr. Vacher seemed disposed to take of them. For his own part he had always looked upon a screen as being more in the nature of a piece of church furniture than as an integral portion of the building. With regard to stone screens, he thought that they were always more applicable to large churches and cathedrals. Wood seemed to him the more natural material to use, or metal, if a man knew how to use it, which, unfortunately, not very many did. It had been his good fortune to see, in course of progress, the screen which Mr. Bentley had designed for a church at Watford. He should be very glad if, on some future occasion, the Association would be able to visit Watford to see that church. Last year the Association tour in Somersetshire was taken through a part of the county where they saw a very large number of screens, many of them very fine ones, the rood-lofts in many cases still remaining. One of the features that struck him in regard to those screens was the great breadth of effect which was obtained by carrying them right across the church, and not across the chancel merely.

The vote of thanks having been heartily agreed to,

Mr. Prynn briefly replied, saying that he should be very pleased at any time to show them the church at Dulwich, and he thought that the views of some of them as to the difficulty of treating a constructional screen would be somewhat modified when they saw the one which he had attempted.

The meeting then terminated.

THE ANTIQUITIES OF HEREFORDSHIRE.—The antiquaries of Herefordshire are, says the *Birmingham Argus*, taking measures to preserve the historical relics in which their county abounds by forming a new archaeological society. According to the journal named, it is high time to be doing something of the kind, for not long ago a Herefordshire vicar burned an old Jacobean table which had been not fall into secular hands. "In order that it might be burned for 200 years," in another parish an Elizabethan chalice was discovered in the house of the parish clerk, who maintained that it had been given to him by a former vicar.—We notice from a letter in the *Hereford Times* for the 18th inst. that an archaeological map of the county is in progress.

Illustrations.

FRIEZE, GROCERS' HALL.

F HIS illustration shows a portion of a frieze which has been modelled by Mr. E. Roscoe Mullins for the new building for the Grocers' Hall. The frieze is 2 ft. 9 in. high, and runs round the two drawing-rooms having a total length of 200 ft.

The subject, which was chosen by Mr. H. U. Boyes, the architect to the Company, represents the pageant at the entry of Charles II. into London when there was a procession down Cheapside to which each of the City Companies contributed thirty riders, each with his attendant, the ensign of the company being carried at the head of each contingent. The sculpture refers to the portion of the procession provided by the Grocers' Company.

The frieze will be executed in plaster tinted, low relief (nowhere more than an inch). The illustration is photographed from the plaster model.

NEW PREMISES OF THE "DISCONTO GESELLSCHAFT," BERLIN.

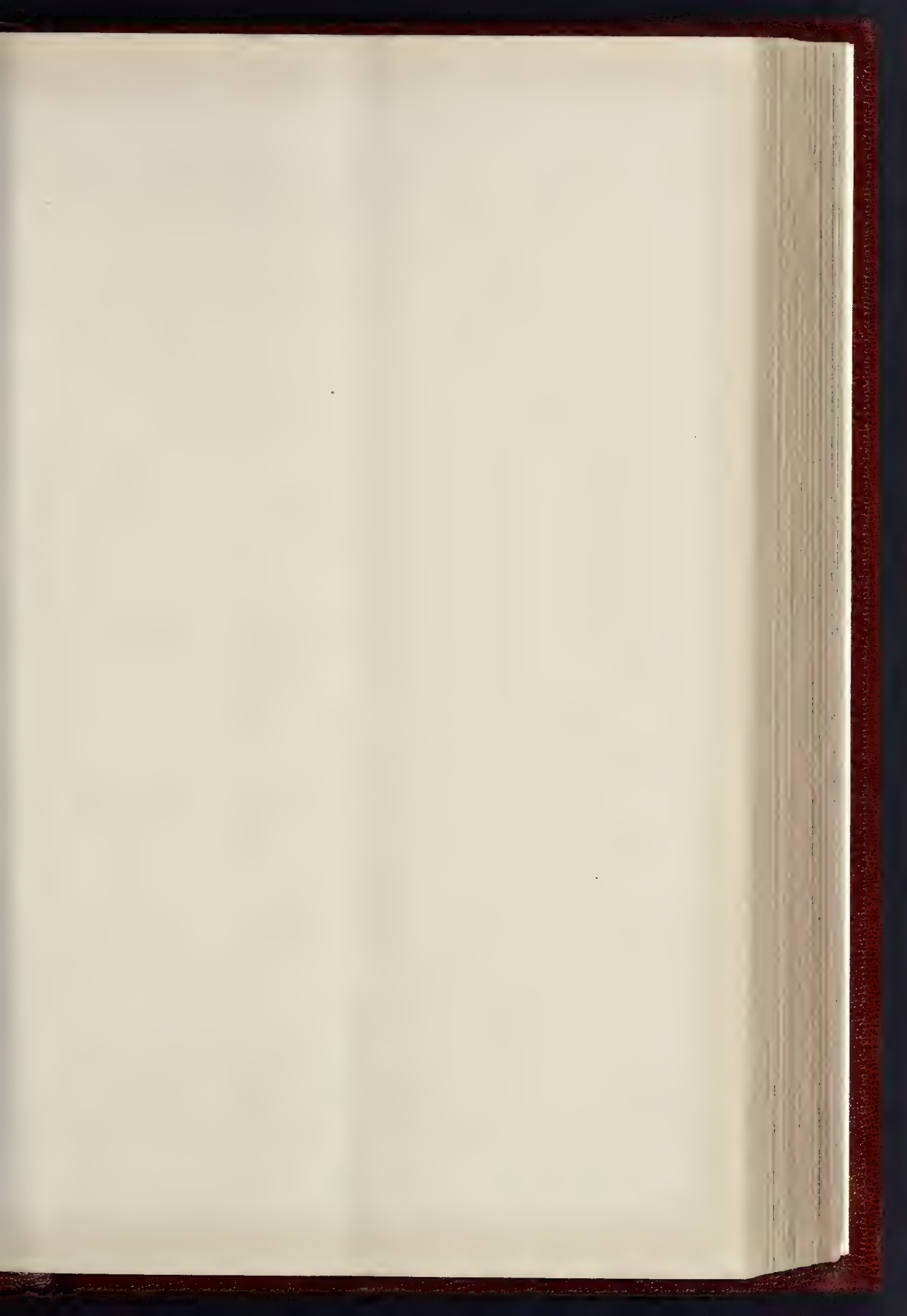
O UR illustration shows an extension to the old Disconto Bank building, which is situated in the historical Behrend Strasse. The façade we illustrate, however, in reality the new rear elevation to the block, faces Berlin's main thoroughfare "Unter den Linden" (which runs parallel to the street) and has a most prominent position there as neighbour to one of the late Emperor William's palaces.

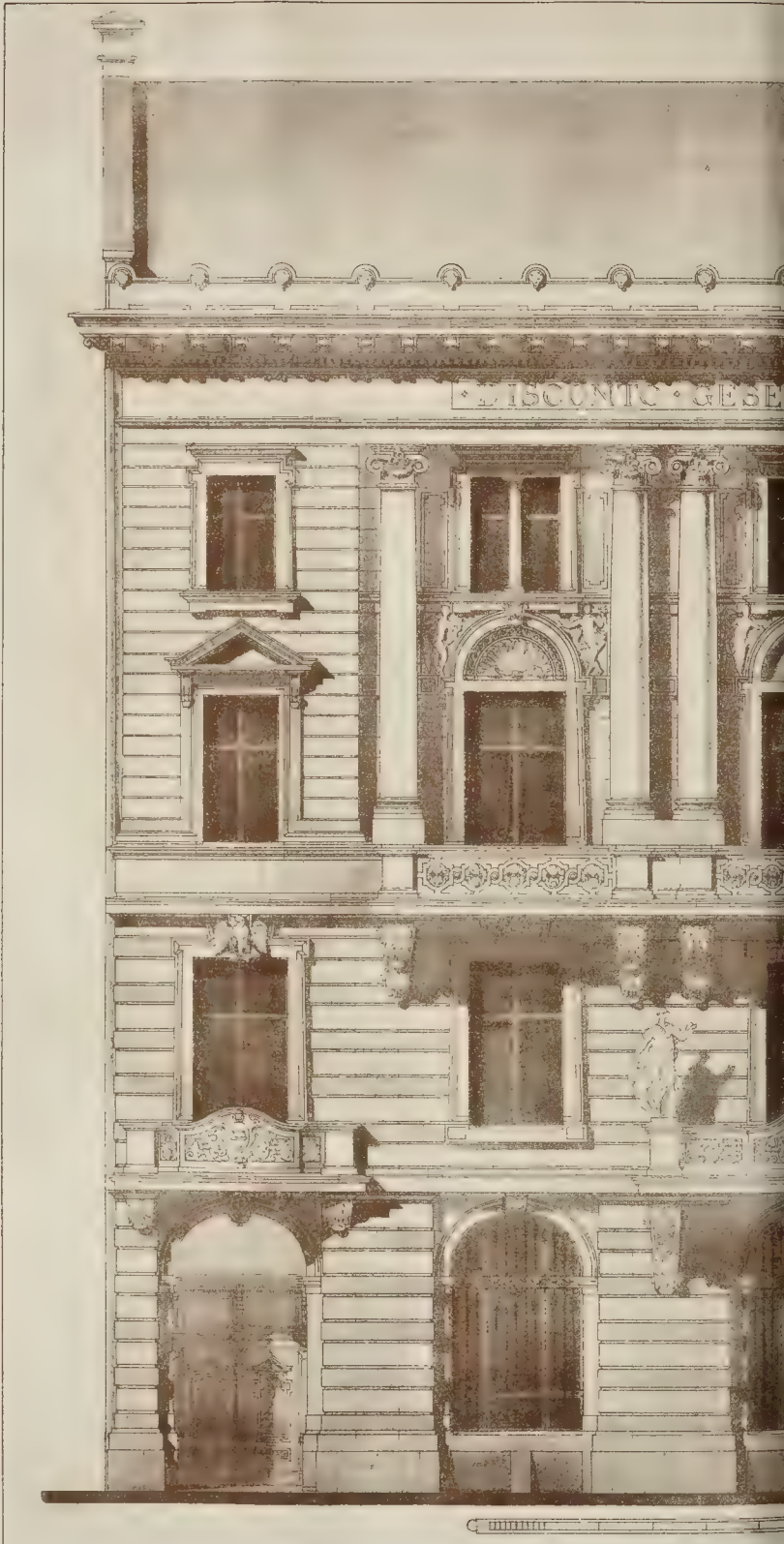
The plan of the new premises scarcely calls for attention further than to remark that the ground floor is used for transaction of business with customers, that the first floor is occupied by the managing directors and their private secretaries, and that the whole of the second and third floors have been given to the clerks of the bookkeeping department. The basement floor is taken up by some extensive strong rooms, part of which are for the use of the general public on a system not unlike that adopted by our safe-deposit companies.

The material used for the façade is a dark red freestone of most agreeable colour, and the plastic and wrought-iron ornaments to it have been picked out with gold in the old Danstic style.

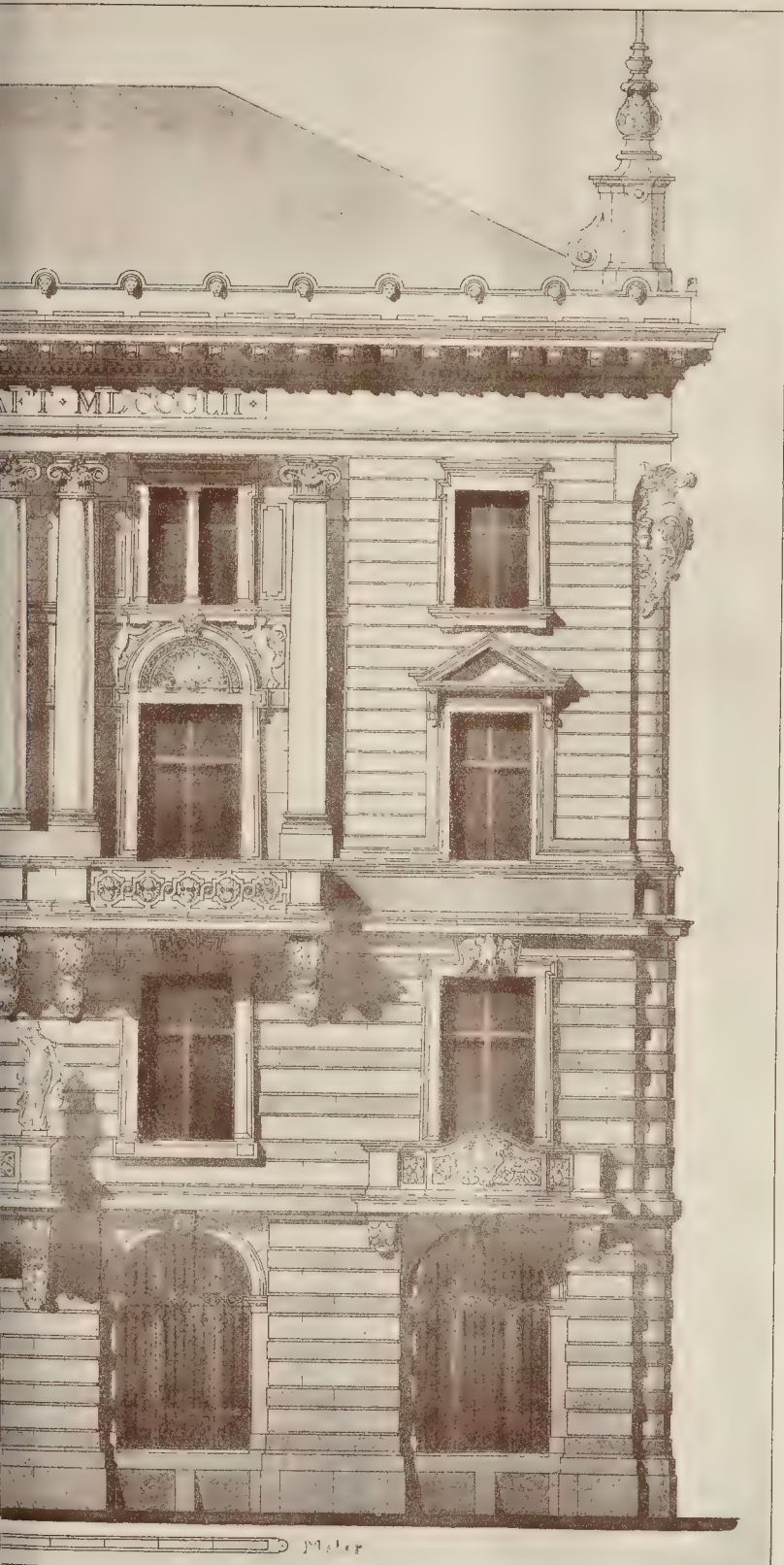
The architects are Messrs. Ende & Boeckmann, or, as German courtesy has it, "the senior assistants 'Regierungs-Baumeister' Hartung and Herr Kleinert, under the supervision of their chief Messrs. Ende & Boeckmann." It appears that in large architects' offices in Germany it is the usual custom, where a building has been practically worked out by an assistant architect on the staff of the firm, always to give his name in conjunction with that of his principals; a practice which is well worthy of imitation in this country.

Though the façade shown here has rather a one-sided appearance, from its being an extension to an existing building, it is nevertheless of some special interest, as it forms a very typical example of the style of street architecture now in favour in Berlin, for buildings where limitation of expenditure is no special object.





NEW BANK PREMISES, BE



INK PHOTO SPRAGUE & CO. 85 EAST HARDING STREET FETTER AND CO.

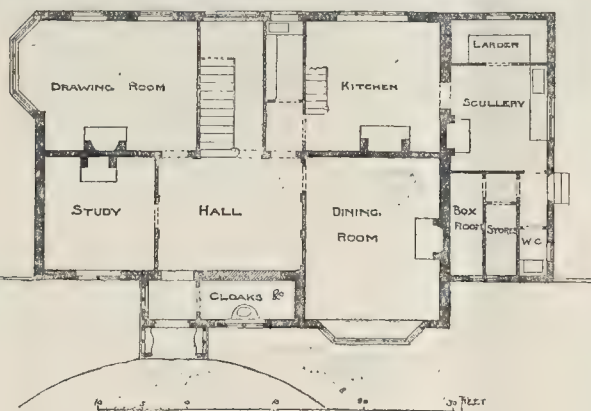




PART OF FRIEZE FOR GROO



TERRACE



House at Royston.—Plan.

No. 24, SOUTHAMPTON BUILDINGS.

This building, which adjoins the Patent Office, has been rebuilt for Messrs. Carmichael & Co., the well-known patent agents, whose offices have occupied the same site for upwards of sixty years. The front of the building is executed in Portland stone, the doorway being in polished granite, the entrance hall is paved with marble mosaic, the staircase is of walnut with teak treads, and the building is lighted with the electric light throughout.

The works have been designed by and carried out under the superintendence of Messrs. Charles J. & C. Herbert Shoppee, architects. The contractors for the general works were Messrs. H. Burman & Sons, of Sharnsted-street, Kennington Park. The granite was supplied by Messrs. J. Whitehead & Co., the mosaic paving in the entrance hall by Mr. J. F. Ebner, and the electric lighting has been carried out by the "Brush Electric Light Company."

CONVALESCENT HOME, CHATHAM.

This house has been lately erected to be used as a small Convalescent Home upon an open country site near Chatham, by Mr. George Winch. It is intended to accommodate five patients, with rooms for the matron and servants' offices.

The work was carried out by Mr. Filley, builder, of Chatham, the materials being red brick rough cast, plastering and plain tile roofs. The architect is Mr. John Belcher, and the drawing was exhibited at the Royal Academy exhibition of last year.

HOUSE AT ROYSTON.

This house has been lately erected at Royston for Mrs. E. Barley by Messrs. Gimson & Co., builders, of that town, the materials employed being red brick and plain tiles for roofs and cladding.

The architect is Mr. John Belcher, and the drawing was exhibited at the Royal Academy of last year.

ARCHÆOLOGICAL SOCIETIES.

DUMFRIES AND GALLOWAY ANTIQUARIAN SOCIETY.—At the last meeting of the Dumfries and Galloway Antiquarian Society there was read a paper by Mr. John T. Johnstone, Moffat, on "The Roman Road in Upper Annandale." Mr. Johnstone stated that three sections of the road had been opened up to the west and north of the town of Moffat, the principal excavation being made on the Chapel Hill. The road, according to the *Esksdale Advertiser*, was found to be 21 ft. wide, with a whinstone kerb along each side, from foundation to crown it was 23 in., exclusive of the turf covering it. As a foundation, there was a layer of clay, with stones bedded on its face, 6 in. deep in the centre, and tapering to 4 in. on the sides, the stones being undressed and dressed from 1 in. to 1½ in. into the clay. Then came a layer of stones, 11 in. deep, with spaces filled up with "till," the stones being the average size of a boy's head. On the

top was a layer of smaller stones some 4 in. deep, forming the surface of the roadway. There were some variations in other parts.

ESSEX ARCHÆOLOGICAL SOCIETY.—A half-yearly meeting of this society was held at Colchester a few days since, Mr. G. A. Lowndes, President, in the chair. It was decided to hold a meeting in May at Castle Hedingham, and to hold the annual meeting in July at Southend. The sum of £50 was voted towards the purchase of Mr. George Joslin's private museum of antiquities. Mr. Henry Lever, F.S.A., read a paper on "Recent Discoveries of Roman Remains at Colchester Castle." A résumé of the paper appeared in the *Essex Telegraph* for the 14th inst.

WORCESTER DIOCESAN ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY.—The annual meeting of this Society was held on the 14th inst. The report was read and adopted, and, after formal business, some interesting details of the success of the Worcestershire Historical Society were given by the Rev. J. B. Wilson, the number of subscribers having reached 200. Hopes were entertained that the map showing the landholders at and after the date of the Domesday Book would be shortly undertaken.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday afternoon last at Spring gardens, the Chairman, Mr. John Hutton, presiding.

The Blackwall Tunnel.—Some discussion ensued on the report of the Special Committee (consisting of the Chairman, Vice-Chairman, and Deputy-Chairman) appointed in December last to consider certain suggested alterations in the construction of the Blackwall Tunnel, by which the "cut and cover" system is to be substituted for the compressed air system, which was a part of the original contract in a section of the work, and also as to additional works connected with the lining of the tunnel. The Committee contended that the deviations from the original contract ought to reduce the cost very considerably, but the contractors declined to enter into any negotiations in that direction. The Committee recommended:—

(a) "That as regards the substitution of cut and cover for compressed air, the Council do not sanction any alteration in the original contract for the construction of the Blackwall Tunnel without a new contract for the same being entered into.

(b) That the Council do instruct the Bridges Committee to further consider the matter of the substitution of concrete for brick lining, there being no immediate necessity to arrive at a decision."

Mr. Campbell moved, as an amendment:—

"That before the Council interferes in the manner suggested, counsel's opinion be obtained as to the legality, with reference to the terms of the contract, of such interference."

Mr. McCall seconded the amendment, which, after a division, was negatived.

Mr. Rhodes moved a further amendment:—

"That, the questions at issue being for the most part those of modification of construction and of the prices relative to such changes and the methods of carrying such out, it be referred to the arbitration of an eminent engineer or of two eminent engineers, who shall give an absolute award

on the premises, and that Messrs. Pearson be invited to concur in this arrangement."

Mr. Arthur Arnold seconded the amendment, which was supported by Mr. Burns, but ultimately withdrawn.

Sir John Lubbock urged that the Council should not express an opinion upon the report, but send the whole thing, together with the documents, to Sir Benjamin Baker to report. He moved accordingly.

Mr. Harben seconded the amendment.

The Chairman said he was very confident the Council would effect a saving if the matter was looked into, and he hailed the amendment with very great satisfaction.

The amendment was agreed to.

The Erection of Working-class Dwellings.—The debate was resumed on the report of the Public Health and Housing Committee with reference to the erection of working-class dwellings. The recommendation of the Committee was as follows:—

"That the rents to be charged for dwellings erected by the Council shall not exceed those ruling in the neighbourhood; and shall be so fixed as to provide a net return of not less than 3 per cent. (after allowing for a sinking fund for rebuilding and all outgoings) upon the value of the land (subject to the obligation to erect dwellings upon it) plus the cost of building with ordinary foundations, and that all such dwellings shall be so designed that the cost of erection may not exceed a sum which will enable the Council to carry out the foregoing conditions."

On the motion to adopt the recommendation, Mr. Pickersgill, M.P., moved, and Mr. Branch seconded, the following amendment:—

"That, subject to compliance with the building regulations which may from time to time be approved by the Council as applicable to dwellings to be erected by the Council itself, the following principles shall (so far as practicable) be observed: The rents to be charged for such dwellings shall not exceed the fair local value, and shall be so fixed as to provide a net return of at least 3 per cent. (after allowing for a sinking fund for re-building and all outgoings) upon the total outlay of the Council on the erection of such dwellings, such outlay being estimated at the value of the land (subject to the obligation to erect dwellings upon it), plus the cost of building with ordinary foundations; and all such dwellings shall be so designed that the cost of erection may not exceed a sum which will enable the Council to carry out the foregoing conditions."

After some discussion this amendment was defeated.

Mr. Charles Harrison (the Vice-Chairman) moved, and Dr. Collins seconded, the following amendment:—

"That the recommendation be referred back, with an instruction to the Committee to report:—(a) The number and cost of the sites acquired under the Artisans' Dwellings Act of 1875, and other Acts, and now subject to the obligation that only working class dwellings shall be erected thereon. (b) Whether Parliamentary powers should be sought to get rid of this restrictive obligation upon any of such sites, having regard to the requirements of the surrounding districts, so that the Council may be free to sell or let the land for any purpose. (c) And generally, whether and to what extent and in what localities and under what conditions as to rent the Council should exercise the provisions of the Housing of the Working Classes Act, 1890, in reference to the erection or renting of separate houses and gardens outside the area of the County of London, and for what population and in what districts within the county the Council should erect dwellings for the working classes."

This amendment was also defeated, and the recommendation of the Committee was adopted and referred to the Finance Committee in order that they might bring up a report on the financial aspect of the question.

The Council Preparing to be its own Builder.

—The Report of the Works and Stores Committee contained the following paragraphs:—

"Appointment of Clerk in the Works Department.—In accordance with the resolution of the Council of 22nd November, 1892, an advertisement was issued inviting applications for the post of clerk in the Works Department at a commencing salary of £200 a year. We have received ninety-eight applications, and, having carefully considered the respective qualifications of the candidates, we are of opinion that Mr. William Franklin Dyson, who has been employed by Messrs. John Mowlem & Co., as chief prime cost clerk since October, 1891, is the best fitted for the post. We therefore recommend:—

"That Mr. William Franklin Dyson be, subject to a certificate of fitness by the Council's medical examiner, appointed clerk in the Works Department in the lower section of the first class at a commencing salary of £200 a year upon the following conditions:—That he do hold his office during the pleasure of the Council; that he be required to give his whole time to the duties of his office, and be not allowed to take any private business; and further, that on retirement he shall not be entitled and shall not make any claim to any retiring allowance under the Superannuations Act, 1856; and that he will submit to any general scheme which the Council may adopt with respect to insurance for pensions or superannuation."

"Central store yard.—In pursuance of the reference by the Council on November 22 last, we have had under consideration the question of the provision of a central store-yard and workshops necessary for carrying out the works referred to us by the Council. We have made full inquiry, and, after having viewed many premises, have been fortunate

to get the offer of a most convenient wharf at a reasonable price, and without paying any compensation for trade interest or disturbance. This property is known as Bartram's Wharf, Belvedere-road, Lambeth. The wharf contains an area of about 66,000 square feet, has a frontage to the River Thames of about 205 ft., a frontage to Belvedere-road of about 220 ft., and an average depth of 370 ft. There are already on the ground sawmills and buildings suitable for workshops, also stabling for 25 horses. The premises are the freehold of the Ecclesiastical Commissioners, who are prepared to accept a rent 1,500l. per annum for a lease of three years from March 25, 1893, and to give the Council the option of purchasing the wharf and buildings thereon for a sum not exceeding 39,000l. at any time during the tenancy. The Valuer reports that the terms offered are advantageous to the Council, and we are therefore of opinion that the Council should at once rent these premises with a view to the ultimate purchase of the freehold of the same. It is most important that a store-yard should be at once obtained, for the Council has recently entrusted its jobbing and hoarding and shoring works to us in addition to building works already in hand, and it is necessary to make provision for the storage of the plant and materials necessary for these operations. We recommend:—

(a) That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the Council do rent the premises known as Bartram's Wharf, Belvedere-road, from the Ecclesiastical Commissioners, for a period of three years from March 25, 1893, at a rent of 1,500l. per annum, and that the Solicitor be directed to prepare the agreement.

(b) That the Solicitor be directed to insert a clause in the agreement, giving the Council power at any time during the period of the lease to purchase the freehold of the premises for a sum not exceeding 39,000l.

Purchase of Plant.—In view of the proposed occupancy of Bartram's Wharf by the Council, we directed the Engineer to value the sawmill machinery and other plant on the premises, and we instructed the Valuer to enter into negotiation with the present occupiers, who have agreed to sell the machinery and plant to the Council as they stand for the sum of 1,100l. It is part of the arrangement that the vendors shall surrender to the Ecclesiastical Commissioners any interest which they may claim to have in the premises, in order that the Commissioners may give the Council vacant possession. The Council having given us authority on February 28 last to expend 1,000l. in the purchase of plant, we have now to ask for a further vote of 100l. to complete this purchase. We recommend:—

That, subject to a supplementary estimate being submitted to the Council by the Finance Committee as required by the statute, the Committee be authorised to incur a further expenditure of 100l. for the purchase of the plant and machinery now on the premises known as Bartram's Wharf.

These recommendations were all agreed to, and after transacting further business the Council adjourned at 7 o'clock.

Correspondence.

THE QUALIFICATIONS OF FELLOWS, R.I.B.A.

SIR,—The attention of members of the Institute is drawn to the important question to be decided at the special general meeting on the 27th inst., on the desirability of the examination of candidates for Fellowship. The following "Regulation," unanimously adopted by the Council, will be submitted to the meeting for their adoption:—

"On and after the 1st November, 1893, every person desiring to be admitted a Fellow shall in all cases submit for examination, by and to the satisfaction of the Council, evidence of his abilities as a practising architect, such evidence to comprise working drawings, and, if possible, photographs of his executed works—accompanied by a declaration signed by him that the buildings of which he has submitted drawings and photographs have been designed by himself; and such further evidence, if any, as the Council may, under the circumstances of the case, require."

In addition to this "Regulation" the General Meeting will be asked to decide whether the time has now arrived for the Institute to make the following "declaration":—

"Declaration of the Royal Institute under its Charter."

On and after the 1st January, 1896, subject to the power reserved to the Council in section 3 of the Charter, every person desiring to be admitted a Fellow shall be required to have passed such examination or examinations as may, from time to time, be directed by the Royal Institute."

We, the undersigned, are firmly persuaded that such a "Declaration" is undesirable in the interests of Architecture and of the Institute, and is wholly unnecessary. And, further, that the "Regulation" above quoted is amply suffi-

cient to fulfil all the provisions of Section 3 of the Charter, and we believe will tend to secure a high standard of proficiency in the class of Fellows. We hope that all members who agree with these views will make it convenient to be present at the Institute on the 27th inst.

(Signed)

JAMES CROOK.
HENRY CUREY.
CAMPBELL DOUGLAS.
JOHN L. PEARSON, R.A.
ARTHUR BLOMFIELD, A.R.A.
JOHN BELCHER.
E. INGRESS BELL.
JOHN M. BRYDON.
WILLIAM D. CAROE.
R. HERBERT CARPENTER.
THOMAS E. COLLCUTT.
HERBERT O. CRESSWELL.
HENRY L. FLORENCE.
ERNEST GEORGE.
J. ALFRED GOTCH.
ALEXANDER GRAHAM.
WILLIAM W. GWYTHYR.
B. INGELWOW.
ROBERT KERR.
EDWARD W. MOUNTFORD.
LEONARD A. STOKES.
ASTON WEBB.
WILLIAM YOUNG.

PROPOSAL FOR A MUSEUM OF CASTS.

SIR,—Why should not a Museum of Casts like that of the Trocadéro in Paris (only better, in that English architectural detail is superior to Continental), be erected as a basement to the proposed Tate Picture Gallery?

JOHN P. SEDDON.

THE INSTITUTE AND TERRA-COTTA.

SIR,—I note with pleasure the re-opening of the discussion begun at the Institute's evening devoted to terra-cotta. With the purely architectural question I am not concerned, but I take the opportunity to say a few words as to the criticism of terra-cotta on the score of its cost.

The instance quoted by Mr. Brydon (that of the Battersea Polytechnic) proves nothing. In that particular building the cost of terra-cotta was greater than that of Bath stone and less than Portland. No general deduction can be made from such a premise, as the question immediately arises, "Was terra-cotta used at its cheapest in the case of the Battersea Polytechnic?" As I had the pleasure of tendering for it, I can inform Mr. Brydon that the large amount of repetition which that admirable building undoubtedly presents was severely handicapped by some expensive non-repeated features. So that the relation of the cubic bulk of terra-cotta to the cost of the necessary moulds and moulds was not so favourable to a low price for the terra-cotta.

As a general principle it may be taken that the cost of terra-cotta will be little below that of stone where the features of a building are plain and of diverse character and the facings are in brick; but if the features are elaborate or much repeated, or there is a large area of Ashlar facing, the cost of terra-cotta will be much under that of stone, whilst if there is elaboration and ornament, coupled with repetition, the cost of terra-cotta will be far below that of the alternative material.

This has been proved over and over again, and I can assure Mr. Brydon and others interested that, although many of the architects who use terra-cotta would do so for its artistic merits alone, they are far too business-like to overlook the question of cost. It rarely happens that an estimate for terra-cotta work is accepted without its having to undergo the ordeal of a comparison of cost with stone.

In making the above generalisations and subscribing for once in a way to the false conditions of comparison of that kind, I have in mind for London work, Portland stone from beds of medium hardness, and for Midland Counties work, the better class sandstones, such as Darley Dale amongst Derbyshire stone, or Park Spring amongst those quarried in Yorkshire. I also purposely set aside for a moment the improved method of direct-work, which I have endeavoured to perfect in order to deal with the problem of non-repeated work, and am now arguing on the ordinary conditions of terra-cotta manufacture.

I do not propose to enter into the comparison with Bath stone, for I cannot think that Mr. Brydon, who deprecates the laboratory of the chemist as an aid to the production of one building material, will seriously champion the cause of another which needs to have sort out with it a chemical substance, "fluente, for hardening and preserving the stone" (vide advertisement). That would scarcely be consistent on his part.

S. H. LEECH.

Lambeth Pottery, March 21, 1893.

SIR,—Under the above heading you publish a letter from Mr. H. Huntley-Gordon, and in the second paragraph he says he makes "a broad

distinction between terra-cotta available to-day, and that made twenty years ago," but the distinction appears to me to be simply in the manner in which it is manufactured, and not yet in its durability; hence, is it not premature, seeing the distinction only now consists in its manufacture, as above mentioned, and we have as yet no guarantee that this distinctive terra-cotta will stand the atmosphere any better than terra-cotta of twenty years ago, to form any conclusion concerning it? Because, when we can feel fully assured that by using it we shall get a material which will stand the test of time, will be apparently necessary to wait, say, twenty years before we are able to prove whether there will then remain such a broad distinction between it and its kind manufactured twenty years previously.

INTERESTED.

SIR,—I have been much interested in the discussion on terra-cotta and its treatment, at the Institute of Architects, reported in your number of March 11. Mr. Stokes's paper is, I think, very absurd and exaggerated. After recommending its use for damp courses, then he says it "would not carry any heavy weight," when the whole weight rests on the damp course. If properly burnt in the waste heat from a Bristol kiln, white or buff terra-cotta is almost metallic in hardness and non-absorbent. In fixing it sometimes gets the ugly rap, the rain soaks in, then frost, then in time a piece is wrenched off. Only the other day a great piece of stone moulding or sill fell from one of the Government offices, nearly killing a passer-by. Now, if he had found fault at the finishing of it, he might, I think, with the same reason have complained at the face of terra-cotta blocks being finished with leather and sponge instead of fine-toothed drags and small tools.

I remember, as far back as 1853, working at Hill Hall in Essex. We had to repair the east front, the Portland stone vases, balusters, coping and plinths being much decayed and loose; we had to refix and make them good in Portland cement. On coming down the pilasters that ornament the east front, we found on cleaning off the vegetation that they were of terra-cotta, and made by Coade, of Lambeth, date 1790, or 1793, I forget exactly which. The arries and angles of the mouldings were as sharp as when they were made, and all finished off with fine-toothed tools, as if done yesterday, and that should be the method now.

With regard to vexatious delays, that is very often the architect's fault in not forwarding the drawings sooner. I understand the reasons why builders do not like it on plasterer's work, as it has to be gone over too many times; ordinary brickwork is more to their taste, as it is finished as soon as laid, and the joint struck and then strike the scaffold and erect the finishing. Terra-cotta, sir, is like steam, a few years ago in its infancy, and has a future before it if properly handled, and as for mortar or cement not sticking to it I would like Mr. Leonard Stokes to try and shift some of the blocks composing the screen to Brighton and Preston Cemetery, or the lodge and boundary railing piers, erected in 1886. Sir, I would be glad if you could find space in your journal for these few remarks in hope of seeing an alteration in the finishing of terra-cotta.

W. A. SYMMONDS.

Ditchling Potteries, Hassocks.

March 11, 1893.

NORMAN ORNAMENT.

SIR,—In your issue of February 25 Professor Aitchison makes an interesting reference to the decorated shafts of the Normans. Can any of your readers furnish a list of the churches in which these chevrons, spirals, and lozenges are to be found decorating the piers? I only know of the following:—Durham, Holy Island, Dunfermline, Orford, Waltham, Norwich, and I think Selby and the crypt of York. In Messrs. Perrot & Chipiez, "Art in Chaldaea and Assyria," vol. 1, p. 278, there is an illustration showing plan and elevation of a façade at Warka, in which the semi-circular pilasters appear decorated with the very same lozenges, spirals, and chevrons which are to be found at Durham. Perhaps this coincidence may be worth noting.

G. H. R.

BUILDERS AND "QUANTITIES."

SIR,—I should like to draw the attention of your readers to the present unsatisfactory, and I might say unfair, position in which members of the building trade are placed, by reason, firstly, of inaccurate quantities; secondly, by building owners not being liable for inaccuracies in the same; thirdly, by persons posing as quantity surveyors, and whose qualifications for acting as such are nil.

Perhaps some influential members of the trade or quantity surveyors might see their way clear to take some steps that would tend to place matters on a more satisfactory basis. I note an advertisement in your issue of 11th inst., in which the architect states that his clients will not be responsible for the accuracy of the quantities to be supplied. Ought we as quantity men in this case, as before tendering, the builder ought in justice to himself to check them, and might just as well take them off himself and save the commission? Ought not quantities (when furnished by or at the instigation



THE BUILDER. MARCH 25, 1893.





HOUSE AT ROYSTON, HERTS.—MR. JOHN PITCHER, F.R.I.B.A., ARCHITECT.

of the architect or his client), to form part of the contract?

I should be glad to hear the opinion of others on this matter.

FAIRPLAY.

*. We have always been of opinion that "quantities furnished" ought to be guaranteed, because ensuring their accuracy is only a matter of time and care. It is not a case of "professional advice" where a man advises to the best of his ability, but where he may be wrong in his judgment; the quantities are a matter of computation, not of judgment; and, as we have before said, if they are not correct they are not "the quantities," but something else.—ED.

The Student's Column.

CHEMISTRY.—XII.

Symbol P. Phosphorus. Atomic weight 31.

PHOSPHORUS does not occur naturally in the free state, but, in combination with metals and oxygen, occurs as phosphates. It is most abundantly found as apatite, a phosphate of calcium. Calcium phosphate forms a considerable proportion of bone, and is present in the yolk of eggs and in blood. Phosphates are always found in the most fertile soils.

Phosphorus is prepared from bone ash, which consists principally of calcium phosphate. The bone ash is first treated with sulphuric acid, which causes the formation of insoluble sulphate of lime, and a solution of phosphoric acid, containing a small quantity of calcium salt. This solution is drawn off, mixed with charcoal, and evaporated to dryness. The solid mass is then heated to bright redness in clay retorts, when phosphorus distils over and is condensed under water. This crude phosphorus is purified by redistillation, or by melting it under hot water and straining it through chamois leather or layers of charcoal.

At ordinary temperatures, phosphorus somewhat resembles wax in appearance. It is luminous in the dark, and, being very inflammable at a comparatively low temperature, is kept under water. It may easily be ignited by friction, and sometimes by the mere warmth of the hand. The ture of its flame, however, is so low that it is insufficient to ignite a splinter of wood unless tipped with sulphur.

The vapour of ordinary phosphorus when inhaled for any length of time gives rise to a distressing and disfiguring disease of the jaw.

An allotropic modification of phosphorus, termed red or amorphous phosphorus, can be obtained by heating the ordinary variety to about 240°C. in an atmosphere incapable of acting chemically upon it—such, for instance, as nitrogen.

This amorphous phosphorus is now almost universally used for tipping lucifer matches, because it is not poisonous. It is a brick-red powder, non-luminous in the dark, and is not inflammable until heated to 260°C. When heated to 260°C. it is reverted into the ordinary variety, and then burns in the usual way, with formation of phosphorus pentoxide (P_2O_5).

Phosphoric Acid. H_3PO_4 .

This acid may be obtained as a syrupy liquid or as a colourless solid; in the latter case it is termed glacial phosphoric acid. The acid is obtained by treating bone ash with sulphuric acid. It forms a most important series of salts, termed phosphates. The "soluble bone phosphate," or "superphosphate of lime, $H_2Ca(PO_4)_2$," which is so largely used as a manure, is one of the most important of these. It is obtained either from bone ash or from "coprolite," a native ore consisting chiefly of calcium phosphate. Phosphate of soda ($Na_2HPO_4 + 12H_2O$) is another salt of much commercial importance.

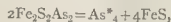
Phosphorus and Hydrogen.

Phosphuretted hydrogen, hydrogen phosphide, or phosphine $P.H_3$, is a colourless, poisonous gas which possesses an odour resembling that of putrefying fish. It is generally prepared by the action of caustic potash upon phosphorus. The gas is passed through a vessel containing water, and each bubble of gas as it rises to the surface and comes in contact with atmospheric oxygen, takes fire spontaneously. This inflammability is due to the presence of an impurity termed hydride of phosphorus (P_2H_4), which may be condensed by passing the gas through a tube immersed in a freezing mixture, when it will be found that the gas does not take fire spontaneously. It is this gas, given off with a trace of the hydride from putrefying animal matter, which is supposed

to produce the celebrated will-of-the-wisp or "ignis fatui" occasionally seen over marsh land and stagnant pools.

Symbol As. Arsenic. Atomic Weight 75.

This element closely resembles phosphorus in some of its properties, while in others it resembles the metal antimony. It may be considered as intermediate between the metals and non-metals. It is occasionally found in a free state, but usually combined with other elements, as arsenides. The commonest native arsenides are mispickel (FeS_2As_2), realgar (As_2S_3) and orpiment (As_2S_3). Arsenic is usually prepared either by distilling the native arsenical iron pyrites in earthenware retorts—



or by reducing arsenious acid by heating it with charcoal. The arsenic is evolved as a vapour, which, when condensed, forms a very brittle greyish-black mass, and possesses a metallic lustre. It volatilises at a dull red heat, producing a vapour which has an odour usually described as resembling that of garlic. When heated in the air, arsenic burns with a blue flame, and forms arsenic trioxide.

Arsenic Trioxide. As_2O_3 .

This is the common arsenic or white arsenic of commerce, and is often called arsenious acid. It is odourless, almost tasteless, and only slightly soluble in water. The solution is feebly acid, and contains arsenious acid, H_3AsO_3 . It is usually sold as a heavy white powder. It is soluble in hydrochloric acid, and is freely dissolved by caustic potash or soda solution. In the latter case it forms arsenites of potassium or sodium.

If sulphate of copper solution is added to one of these arsenites, a brilliant green precipitate, known as Scheele's green, is obtained, through the formation of a copper arsenite ($CuHAsO_4$).

Scheele's green is prepared by dissolving 1 part of powdered white arsenic and 2 parts of commercial caustic potash in 35 parts of boiling water. While still warm, the solution is filtered, and 2 parts of copper sulphate are added to the filtrate. The precipitate which separates out is washed with warm water, and dried. (Spon's Encyclopædia.)

Emerald green may be prepared by boiling 1 part of arsenious acid with 10 parts of water, and mixing it with 1 part of verdigris (copper acetate).

Vienna green is also prepared by mixing arsenious acid with verdigris, the proportions being different.

In each case an arsenite of copper is formed.

The arsenites of the alkalies are soluble in water, while those of the heavier metals, such as copper, and those of the alkaline earths are insoluble.

In addition to the trioxide another oxide, termed pentoxide of arsenic, or arsenic oxide (As_2O_5), is known, and forms, with water, arsenic acid. H_3AsO_4 .†

Sulphides of Arsenic.

There are three sulphides of arsenic,—viz., realgar (As_2S_3), orpiment (As_2S_3), and arsenic pentasulphide (As_2S_5).

Realgar is found native in orange-red crystals, while orpiment, which also occurs naturally, is found in yellow crystals. Orpiment is, however, prepared artificially as a bright yellow powder by passing sulphuretted hydrogen through a solution of arsenious acid, or by subliming a mixture of sulphur vapour and arsenious oxide. This trisulphide of arsenic is employed as a pigment, and is called king's yellow.

All compounds of arsenic are poisonous. The two most delicate tests for arsenic, Marsh's test and Reinsch's test, have been described in a previous paper.

The Metals.

Having examined the most important of the non-metals, we can now pass on to the consideration of the metals and their compounds. It has already been pointed out that there is no sharp line of demarcation between them, and that the distinction is made for the sake of convenience.

The metals are all solid at ordinary temperatures, except mercury, which is liquid. They all possess the power of reflecting light, and hence are said to possess a metallic lustre, and they are mostly good conductors of heat and light. Some metals, such as antimony and bismuth, are so brittle they cannot be hammered out or drawn into wire; while others, like gold and copper, are so ductile that they can readily be rolled into sheets or drawn into fine wire. Gold is capable

of being beaten into leaves so thin ($\frac{1}{100000}$ of an inch in thickness) that the metal becomes partially transparent.

Alloys were believed to be mere mixtures of two or more metals with one another. It has recently been shown, however, that some of these alloys are true compounds—e.g., aluminium bronze ($AlCu_5$).

Amalgams.—When a metal forms an alloy with mercury, the alloy is termed an amalgam.

Oxides.—All metals combine with oxygen to form oxides, and such combination is generally attended with the evolution of light and heat, but the conditions under which the oxidation may be effected vary greatly with different metals. The metals, with the exception of antimony, all refuse to combine with hydrogen alone.

Sulphides.—Sulphur unites with most of the metals to form a sulphide—e.g., lead sulphide, PbS .

Sulphates.—Metals combine with oxygen and sulphur to form sulphate—e.g., copper sulphate, $CuSO_4$.

Nitrates.—Metals in combination with nitrogen and oxygen (NO_3) form nitrates—e.g., mercuric nitrate $Hg(NO_3)_2$. They are all more or less soluble in water, and are all decomposed by heat with the evolution of oxygen.

Carbonates are mostly insoluble in water. They are compounds of a metal with carbon and oxygen (CO_3). Most of them are decomposed into the oxide of the metal and CO_2 by heat, thus $CaCO_3 = CaO + CO_2$.

Chlorides are compounds of a metal with chlorine. All the metals will combine readily with free chlorine—e.g., common salt, $NaCl$.

Alloys.

Alloys are formed by melting or fusing two metals together. They often exhibit very different properties to those possessed by either of the metals separately, and cannot, therefore, be regarded as mere mechanical mixtures. Thus—

1. An alloy of silver and lead will remain fluid at a considerably lower temperature than pure lead, although the melting-point of silver is three times as high as that of lead.

2. By adding tin to gun-metal, the hardness of the alloy is increased, although tin is softer than gun-metal.

3. The specific gravity of an alloy is seldom the same as the mean of the specific gravities (calculated to the correct proportions) of the metals in the mixture.

4. Two parts of copper with one of tin form a hard, brittle, white alloy, although copper and tin are both very malleable metals.

5. The tensile strength of an alloy is usually considerably greater than that of either of the metals composing it.

Brass is an alloy of copper and zinc, the proportions of which are varied according to the quality of alloy required.

The colour of the alloy depends upon the proportion of the copper to the zinc. Thus, ordinary yellow brass contains about 2 parts of copper to 1 of zinc, and if the proportion of copper is increased to 4 parts to 1 of zinc, the alloy assumes a reddish colour, while, if less than 2 to 1, it becomes lighter in colour than ordinary brass.

Ordinary brass is fairly tough and malleable, and can be drawn into wire or rolled into sheets. The presence of iron as an impurity renders it less malleable, and lessens its tensile strength. The presence of small quantities of antimony as an impurity in the copper employed will sometimes render the brass so brittle that it cannot be properly rolled. Brass is, moreover, rendered brittle by continued vibration.

Muntz's metal is an alloy of copper and zinc, with a small quantity of lead. It is cheaper than brass and more malleable. It is largely employed for sheathing ships, and occasionally for covering roofs.

Bronze is an alloy consisting principally of copper and tin. Thus gun-metal, ordinary bronze, bell-metal, "copper" coinage, and speculum metal may all be considered as bronzes, because they consist mainly of these two metals.

Solder is an alloy employed for making joints between pieces of metal, the solder forming a fresh alloy with the metal with which it is united. Every solder must, of course, be fusible at a lower temperature than the metal it is to unite.

The composition of solders varies according to the metal it is required to unite, for the more closely the solder agrees with the metal in malleability and hardness, the better will be the joint.

Hard solders are those which require a red heat to melt them, while **soft solders** fuse at a very low temperature.

* The molecule of arsenic is believed to consist of 4 atoms.

† See p. 72, ante.

The following table shows approximately the percentage composition by weight of the different alloys:—

	Copper.	Zinc.	Tin.	Lead.	Aluminium.	Gold.	Silver.	Antimony.	Bismuth.	Nickel.
Brass, ordinary	66	34	...	...	...	...	...	...	...	...
" for turning, fitting, engraving, &c.	75	25	...	...	...	...	...	...	...	...
Bronze	91	6	2	1	...	...	...	...	...	...
Bronze coinage	95	1	4	...	...	...	...	...	...	...
Gun metal, for ordnance	90.5	...	9.5	...	...	...	...	...	...	...
" of maximum hardness for turning	83	...	17	...	...	...	...	...	...	...
" soft	94	...	6	...	...	...	...	...	...	...
Bell-metal	80	...	20	...	...	...	...	...	...	...
Muntz metal	60	40	...	Very small quantity	...	...	...	...	...	...
" nails for	87	4	9	...	...	...	...	...	...	...
Britannia metal	1.8	...	89.4	...	...	...	...	...	...	...
Aluminium bronze	90	...	...	10	...	...	...	...	...	...
Fusible metal .....	...	...	10	31	...	...	...	...	50	...
German silver	51	30.6	...	...	...	...	...	...	18.4	...
Gold coinage	83	...	...	...	91.7	...	...	...	...	...
Pewter .....	...	...	80	20	...	...	...	...	...	...
Silver coinage .....	...	...	...	...	...	92.5	...	...	...	...
Speculum metal	7.5	...	33	...	...	...	...	...	...	...
Solder (fine)	67	...	...	33	...	...	...	...	...	...
Type metal .....	...	...	...	83	...	...	...	...	...	...
White brass	3	...	90	...	...	...	...	...	...	...
"	6	...	...	41	...	...	...	...	41	...

With the exception of the coinages, all these alloys vary more or less in composition according to the proportions preferred by different manufacturers. Muntz metal especially varies in the proportions of the two metals it contains.

Phosphor bronze is made of copper and tin together with a very small proportion of phosphorus. By altering the proportions of its constituents, it is manufactured with different qualities.

The following table shows the melting-points and specific gravities of the useful metals and some of their alloys:—

Metal.	Specific gravity.	Melting point.	Alloy.]	Specific gravity.	Melting point.
Potassium	0.865	Deg. Fahr.	Bell-metal.....	8.0	Deg. F.
Sodium	0.974	145	Brass ordinary.....	8.3	1,840
Aluminium	2.6	207	Gun-metal (6 copper to 1 tin)	8.4	1,960
Antimony	6.8	About 1,292	Steel, cast soft	7.8	3,300
Zinc	6.86 to 7.1	797	Muntz metal	8.2	...
Tin	7.29	442			
Iron	7.79	2,732 to 3,280			
Nickel	8.8	Somewhat lower temp. than iron			
Copper	8.96	1,990			
Bismuth	9.60	507			
Silver	10.5	1,873			
Lead	11.4	612			
Mercury	13.6	40			
Gold	19.5	2,015			
Platinum	21.5	3,280			

OBITUARY.

MR. E. S. HENSHAW.—We regret to have to record the sudden death of Mr. Edmund Simons Henshaw, in his seventy-first year, early on Sunday morning last. He was well known in the building trades by virtue of the official positions which he held in connexion with the organisations of the master builders, but he was never (as so many have supposed) a builder himself. He was the son of Mr. William Henshaw, a silk broker, and was born on January 12, 1823. He was educated at a school in Winchester, and afterwards at Calais. On leaving school he went into the firm of Grant & Hodgson, tobacco brokers, and afterwards was with his uncle, the late Mr. Richard Simons, a wine merchant of Mincing-lane. At the time of the "gold" fever he went to Australia, and on his return again joined his uncle. In 1868, his services were retained in New York by the United States Government in what was known as the "Sherry Wine Case" (which lasted over six months) on account of his knowledge of wines. About the time of the 1872 strike he became connected with the Central Association of Master Builders of London, and it was he who, with Mr. Stanley G. Bird, was mainly instrumental in the successful termination of the strike of masons at the Law Courts in 1877-8. On the introduction of the Employers' Liability Bill he was commissioned to draw up a scheme of insurance, and it was broadly upon that scheme that the Builders' Accident Insurance (Limited) was founded in 1881. Of that company he had always acted as Secretary. At the time of his death he had prepared

everything for a meeting of the Council of the Central Association of Master Builders, but when the members arrived it was resolved unanimously

black marble dolphins at intervals; the floor of the grill-room being of oak and American walnut parquetry. The first floor is reached by means of a broad staircase leading direct from the entrance lobby, as well as by a second staircase leading from the grill-room. On this floor is a large public dining-room 45 ft. by 24 ft., with panelled American walnut dado, doors, chimney-pieces, &c. A grill is provided on this floor. The second and third floors are repetitions of the first floor. Lavatories are provided on all floors, also service rooms with rapid electric lifts communicating with the kitchens. On the fourth floor are placed the kitchens, sculleries, and the usual offices, as well as staff bedrooms. The elevations are Early French Renaissance in character, the materials used being polished Labrador granite for plinth and circular columns, bronze caps and unpolished Kemnay granite up to the first-floor window-cills. The whole upper portion is of Monks' Park Bath stone, worked at the quarries of the Bath Stone Firms, Limited, and protected by their "Fluted" stone. The general contractor for the work is Mr. C. F. Kearley, of Kensington and Uxbridge. The following is the list of the sub-contractors:—Carver, Messrs. Daymond & Son; Bath stone, The Bath Stone Firms, Limited; granite, Messrs. Fenning & Co.; marble, Messrs. de Grelle, Houdret, & Co.; decorations, Adam furniture, Messrs. Marshall & Snelgrove; electric light, Messrs. Watson, Gusenheimer, & Co.; wrought-iron and bronze, Messrs. Starkie Gardner & Co.; fibrous plaster, Messrs. Geo. Jackson, & Sons. The building was designed by and has been carried out under the superintendence of the architects, Messrs. Treadwell & Martin, of Waterloo-place. Mr. K. J. Osborne was the clerk of works.

NEW PUBLIC RECORD OFFICE BUILDINGS, CHANCERY-LANE.—Messrs. Foster & Dicksee are getting the scaffolding into position for the purpose of building the superstructure of this building. The fireproof floors throughout are to be on the Fawcett system, the same as those now being put in the new Admiralty buildings.

LIBERAL CLUB, BACUP.—A new Liberal Club was opened at Bacup on the 18th inst. The buildings have been erected and furnished at a cost of 4,844l., and have been built from designs by Messrs. Mangnall & Littlewoods, architects, of Manchester.

NEW INDUSTRIAL DWELLINGS IN WALWORTH.—According to the *City Press*, the Fishmongers' Company are now continuing on their Walworth Estate the erection of model dwellings for the working classes—a work commenced some years since by the company in Paragon-row, Walworth. The Paragon-row block ever since the tenements were erected in 1876 has been always fully occupied. Some old leases of property in Brandon-street having fallen into the Company's hands, the Court some little time ago decided to pull down the houses and erect a block of dwellings. The new buildings, which are now roof high, have a frontage of 75 ft. to Brandon-street. They are being executed externally in bright stock brickwork with red brick strings and mouldings. Entering from Brandon-street by a central entrance into the corridor, suites of rooms lie right and left. The corridor is lit at each end, and also from the staircase in the middle. Each floor contains seven sets of rooms, some consisting of three rooms and some of two rooms. The buildings contain five stories, and give accommodation for thirty-five families, each house or suite of rooms having its own entrance door opening on to the corridors, and the convenience and privacy of individual families have been attained by providing in each suite of rooms complete water, sanitary, and other arrangements, so that in every house even the single room and scullery houses are provided with all the conveniences within their own front door. The buildings have been erected by Messrs. Brown, Son, and Blomfield, from designs prepared by the Company's architect, Mr. T. Chatfield Clarke, F.R.I.B.A.

NEW BUSINESS PREMISES, WORCESTER.—New premises have been erected upon The Cross, Worcester, for Mr. Arnold Lewis, tailor and outfitter. Mr. Ernest Day, F.R.I.B.A., is the architect of the new buildings, and Messrs. Bromage & Evans were the builders.

NEW SUNDAY SCHOOLS, JOHN-STREET, BEDFORD-ROW.—On the 18th inst., Mr. George Williams laid the foundation stone of these schools, which are being erected from the designs of Mr. F. T. W. Goldsmith, A.R.I.B.A.

FOREIGN AND COLONIAL.

FRANCE.—The State has voted 500,000 francs for the acquisition of certain objects of art from the Spitzer collection, which will be divided between the Cluny Museum and the Louvre.—The jury in the competition for the decoration of the Salle des Banquets at the Hôtel de Ville has selected three artists for the final competition: MM. Georges Bertrand, Prouvé, and François Lafon.—An exhibition of the works of the impressionist painter Camille Pissarro has been opened in the Durand Rue Gallery, to close on the 30th.—In the competition for a monument of the defence of St. Quentin, M. Theunissen has been selected as sculptor, and M. Heubes as architect.—The Municipal Council of Paris has voted a sum of 70,000,000 fr. for a certain

GENERAL BUILDING NEWS.

"SCOTT'S" RESTAURANT, COVENTRY-STREET.—On the 13th inst., the first portion of the new building of Scott's oyster and supper rooms was thrown open to the public. It will be remembered that the major portion of the premises was destroyed by a disastrous fire in the spring of last year. The portion of the building now opened has been erected on the site of that portion of the premises which was entirely destroyed, the corner block not having been at present rebuilt on account of the necessity of carrying on the business. This will now be proceeded with. The first portion now open consists of basement and five floors. The basement contains a large wine and coffee bar, "The Dive," 40 ft. by 30 ft., entered by a wide staircase descending direct from the main entrance. On this floor are the oyster and lobster stores, lobster boiling room, wine cellars, lavatories, &c. The ground floor is occupied by an oyster bar and grill room, divided from each other by a carved American walnut screen, filled in with etched and brilliant cut glass. The walls of the ground floor bars and grill room are treated in marbles of warm tone, the pilasters being of "red Languedoc," with black bases. The spaces between the pilasters are filled in with mirrors framed in "Jaune Lamartine," with flitting of "Favazza" around. The marble work is mounted on a base or dado of American walnut, and surmounted by a modelled frieze in fibrous plaster. The fittings are all in American walnut, this material being generally employed for the joinery throughout. The floor of the oyster bar is of white marble mosaic, with

number of street improvements, half the amount to be expended on the quarter on each bank of the river.—The Council has also resolved on the raising of a special loan for covering all the expense of the complete sanitary improvement of Paris, including purification of sewage, and the construction of an aqueduct to take the bulk of the sewage to the plain of Achères, according to the scheme long talked of.—The new reservoir at St. Cloud, to receive the water from the Avre, is to be opened on the 30th, and the water will, before long, be supplied for public consumption.—The project for making Paris practically a seaport is again being much discussed. Many members of the Chamber of Deputies wish to have the project realised for the exhibition of 1900.—The new bridge of Manoir, on the line between Paris and Rouen, has just been completed, about a mile and a-half from the bridge of l'Arche.—The statue of General Kellermann has now been definitely placed on the plateau of Valmy, under the direction of its author, M. Barrau. In view of the exhibition to be opened at Lyons on April 26, a metallic tower is being erected on the hill of Fourvières.—The municipality of Montreuil has instituted a competition for a new savings bank for that town.—The jury in the competition for two schools at Asnières has awarded the premium to M. Joannis Bernard, architect, of Asnières.—It is announced that a stone-built arena is being erected at Die (Lancette) under the auspices of bulls called in the district the "Courses Landaises."—The landscape painter, Louis Cabat, formerly director of the École Française, at Rome, has just died at Paris, at the age of eighty-one.—The sculptor Itasse has died at Hyères at the age of sixty-three. His daughter, Mlle. Jeanne Itasse, is herself a distinguished artist, and obtained last year a travelling scholarship from the Champs Élysées. M. Itasse was a sculptor of great merit.

BERLIN.—The great annual competition for the Schinkel Studentship has been decided. Herr Karl Moritz, of Messrs. Ende & Boeckmann, receives the first premium; Herr Bruno Werdelmann, of the Leipzig New Imperial Law Courts *attiler*, takes the second. There were five competitors. It has occasioned much remark that whenever a member of the Leipzig *attiler* competes he is sure to merit a premium. Herr Hoffmann, the architect-in-chief, and four of his assistants have gained the distinction in turn; a sixth member of this office would have received the distinction but for his untimely death.

A similar competition for civil engineers, also under the auspices of the *Architekten Verein*, has been won by Herr Max Foerster, of Charlottenburg. There were six competitors.—Besides the large number of churches which are being erected in Berlin for the benefit of the inhabitants, two new ones are to be built for the special use of the military garrison. The designs are by Herren

"Baupscapen" Rossietischer and Reg. Baumeister Menken respectively.—It has always been the rule to put any Government or Municipal building destined for demolition at the disposal of some authority who would find it suitable for scientific or other experiments. In the case of the old Cathedral, which is being pulled down, we hear the Royal Engineers will be allowed to make some blasting experiments on the foundations.—Of the many architectural models destined for the Chicago Exhibition, a very fine one of the new Memorial Church to the late Emperor William is now on view in the *Kunstgewerbe Museum*. It has been made of wood to a scale of 1:25. "Baurath" Schweiblen is the architect.—At the annual meeting of the manufacturers and traders in Portland cement much interesting information was given as to various technical points. The papers, &c., will be embodied in the form of a report.—It will be interesting to hear that the only difficulty of any account which may tend to delay the construction of the proposed Metropolitan Elevated Railroad is purely a sentimental one. The congregation of a certain church consider that the proposed railway will spoil the view on their place of worship as seen from certain points. They have protested against the route taken by the railway, which will now probably have to be changed.

MISCELLANEOUS.

HOUSE-ROOFING IN CHINA.—According to a recent communication made by Mr. Bellett to the Paris Geographical Society, a veritable revolution has been brought about in China in the construction of houses. The adoption of a new method of roofing. Hitherto Chinese houses have been covered with roofs of a very peculiar kind, which cost a great deal, and through their great weight press very heavily on the walls. In addition, the protection afforded against rain is very inefficient. The Chinese are now following the example set them by European residents, and understanding the advantages of galvanized sheeting, are substituting roofs of galvanized sheets for the old styles. The transformation only commenced a short time ago, and is very rapidly becoming general. In 1880 there were introduced through the port of Shanghai 391 tons 3 cwt. 3 qrs. 20 lbs. of galvanized sheets for roofing, representing a value of £155 12s. 6d. In the following year the quantity of the import rose to 768 tons 12 cwt. 2 qrs. 7 lbs.

EDINBURGH AND ELECTRIC LIGHT.—On the 17th inst., the Lord Provost's Committee of the Edinburgh Town Council had under discussion the report prepared by Professor Kennedy, of London, on the electric lighting of the city. No decision, however, was come to. Some members were desirous of obtaining more information from Professor Kennedy, and others wished to have a fuller report from Mr. David Cook, manager and engineer of the City of London Electric Lighting Company, who has already expressed concurrence with the opinion of the expert. The proposal that the Corporation should undertake the installation was favoured by some, while others were disposed to allow private enterprise to lead the way, and finally the meeting broke up without having come to any resolution.—*Scotman*.

ROYAL STATISTICAL SOCIETY.—At a meeting of the Royal Statistical Society, held on the 21st inst., at the Museum of Practical Geology, Jermyn-street, a paper was read by Mr. Stephen Bourne, on "Progress of the External Trade of the United Kingdom in Recent Years." The chief object of the paper was to bring down the figures produced by the same writer on previous occasions to the latest date. The external trade is that which originates or ends within the kingdom, and is carried on with places outside its borders. It consists of imports from abroad, and that portion of them which is again sent out of the country, together with the produce and manufacture here which is supplied to customers abroad. The total of these for a period of twenty years shows an average import of 392,000,000*l.*, reduced by the re-exports from that to the amount of 60,000,000*l.* a year, leaving 331,000,000*l.* as the value of those retained for home use. The exports of British goods is 227,000,000*l.*, leaving 104,000,000*l.* as the net annual excess of imports over exports. This excess, however, is reduced by certain deductions from the import side for freights, &c., and by additions to the export side for stores, coals, and other imports not included in the official returns as such. So that one-half of this balance is more apparent than real, and what there is of excess must be much more than met by earnings abroad, and the product of investments remitted home. The continued growth of our trade, and the cheapening of prices, was beneficial to the consumer, though perhaps not equally so to the home-growers. But the diminished value of the exports of British goods, the larger quantities and the falling prices of our products which was witnessed in the figures for the months of the present year, were by no means encouraging. It was not the business of statisticians to forecast the future, but if so inclined the indications afforded by this investigation did not promote its being done with a light heart.

REMOVAL.—Mr. George Wragge, metal case-maker and smith, announces the removal of his London show-room, from Surrey-street, Strand, to No. 9, Southampton-row, Holborn, and that he has also taken a show-room at 17, Lower Sackville-street, Dublin.

CAPITAL AND LABOUR.

THE FIBROUS PLASTERERS OF LONDON.—The Committee of the Fibrous Plasterers' Association have issued a manifesto to the fibrous plasterers of London, in which they say:—"The subject which we ask you to consider is of most vital importance to you all. In the first instance, we are all fibrous plasterers, who are not building plasterers, whether they think it is consistent to join a trade union run entirely in the interests of building plasterers, whose intentions are to oust all of them out of the trade as soon as the building plasterers learn how to produce fibrous plaster, and they can get on without fibrous plasterers? We challenge all fibrous plasterers who have joined the National Association of Operative Plasterers, to examine their Book of Rules and find one that is of any benefit to them, or in their interests. They will not: because they are all framed in the interests of building plasterers, who hold all offices, and, of course, have framed those rules to suit their trade. We address ourselves, particularly, to fibrous plasterers who have been in constant work for years. Have they reflected how the N.A.O.P. would serve them should they be discharged from their present situations? The N.A.O.P. would serve them, as they have served others, quickly fill their places with building plasterers, and keep the fibrous plasterers walking about, out of work, until tired out, and then be compelled to seek some other means of getting a livelihood. This is the experience of others to-day, it may be theirs to-morrow, and unless they try some means to prevent it, will be theirs very soon. The insulting and contemptuous manner in which the N.A.O.P. speak of and treat fibrous plasterers, should leave no doubt whatever of their intention towards them. Should any doubt exist, read what the Organising Secretary says. He said: 'The N.A.O.P. does not recognise any special men whatever; building plasterers only are acknowledged. I speak as a plasterer to plasterers, and in the interest of plasterers. Special men are to go to something else or they must take up the shovel.' Now this applies to fibrous plasterers who are special men; are they willing to come to this? If so, we advise

them to join the N.A.O.P.; they can then assist the Association to oust them out of their trade. If they are not, they can now defeat the N.A.O.P. scheme by joining a union representing themselves and their trade. They can then have a voice in making laws and framing rules in their own interests, and pay a small subscription which will be used for their protection and benefit, not against them, and to fight the battles of others, who, if successful, will take all benefits gained themselves." The Secretary of the Fibrous Plasterers' Association is Mr. E. Maskall, 9, Upton Grove, Southgate-road, N.

"SHOULD THE BRICKLAYER TILE?"—Such is the question which heads a letter in the *Star* of the 20th inst. The writer, who signs himself, "A Slater and Tiler," answers the question in the negative. He says: "Of late years, owing to the introduction of the Queen Anne style of house, tiling has largely taken the place of slating, but as slaters have been brought up to the trade of tiling, the change of fashion has not deprived them of work. Now, however, the Operative Bricklayers' Society are taking steps to compel builders to give the tiling to bricklayers only, despite the fact that bricklayers this last fourteen years have not been brought up to or learnt the trade of tiling, and a great many won't do it at all; driving nails is not their trade. Now, such a change would rob hundreds of slaters and tilers of their legitimate means of livelihood. We say it is a dog-in-the-manger policy. The bricklayers have a far greater share in a building as regards labour than we have, and surely can afford to be content with that fair share. Let bricklayers be what they are called, and stick to their trowels; and let those of us who this last fifteen years have brought up our apprentices and sons, and mastered the art of tiling, be, as we are called, slaters and tilers."

MEETINGS.

FRIDAY, MARCH 24.

Architectural Association.—Paper by Mr. J. A. Gutch entitled, "In Praise of a Country Practice." 7.30 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. F. C. Baily, B.A., on "The Regulation of Direct Current Motors." 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor A. Wynter Blyth on "Sanitary Law, English, Scotch and Irish; Public Health Act, 1875; Model By-Laws, &c." 8 p.m.

SATURDAY, MARCH 25.

Architectural Association.—Visit to the Battersea Polytechnic, Battersea Park-road, by permission of the architect, Mr. E. W. Mountford. 3 p.m.

Edinburgh Architectural Association.—Visit to (1) Glasgow Municipal Buildings; (2) Glasgow Cathedral.

MONDAY, MARCH 27.

Royal Institute of British Architects.—(Special General Meeting for Members only.) (1) Nomination of President for 1893-94. (2) To consider By-laws as to the nomination and election of candidates for membership. (3) To receive the Report of the Council as to the qualification of Fellows. 8 p.m.

TUESDAY, MARCH 28.

Institution of Civil Engineers.—Mr. G. E. W. Cruttwell on "The Pier Foundations of the Tower Bridge." 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor A. Wynter Blyth on "Sanitary Laws and Regulations Governing the Metropolis." 8 p.m.

Cardiff Architectural, Engineering, and Surveying Association.—Mr. C. Lonsdale on "Brick and Tile Making."

WEDNESDAY, MARCH 29.

Carpenters' Hall, London Wall.—Mr. J. Wolfe Barry on "The Tower Bridge." 8 p.m. (Admission free.)

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

3,081.—FIRE-PLACES: *R. J. Lee*.—This invention refers to what is claimed to be an improved blower and draught regulator for open fire-places. It is a combination of two parts, one to fit in front of the fire-place, closing to some extent the area above the bars, and acting as an ordinary blower. The second part acts more or less horizontally across the mouth of the chimney, and regulates the up-draught from the fire into the chimney. The parts are connected by hinges, or other means, to one another, and the second part can be raised or lowered by a rod bar or other method passing through the first part and workable from in front of it.

5,466.—SASH PULLEYS: *H. Holcroft and Another*.—This invention refers to sash pulleys and other appliances in which pulleys on wheels are mounted in a similar or analogous manner to turn within boxings or frames, and more especially to pulleys having balls or rollers interposed between their bearing surfaces. As applied in the case of a sash pulley having a grooved wheel formed in one piece with, or fixed to, the axle, the inventor forms a pair of circular caps having their edges turning inwards to act as bearings for the pulleys or rollers. These caps, together with the balls or rollers, are placed over the ends of the axle. The grooved wheel, together with its axle and with the caps and balls or rollers around the ends of the axle, is placed within a suitable mould, and the boxing or frame is cast around the grooved wheel and caps in such manner as to rigidly hold or form substantially one piece of metal with the caps.

5,468.—BRICKS: *S. Jefferies*.—This specification describes an improvement in the making of bricks and similar articles from plastic clay, and relates to that class of machinery in which bricks are made by severing them with wire from a stream of plastic clay issuing from a die. There is attached to the framing of the cutting table, or carriage, a frame composed of hinged parallel links, which, when operated upon by a hand lever or other

York. — By *Heison*, *Richards* & *Cs.*: 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677,

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APRIL 1, 1893.

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Cathedrals of England and Wales: XXIX., Manchester.—Drawn by Mr. F. D. Bedford, A.R.I.B.A.	Double-Page Photo-Litho.
Plan of Manchester Cathedral.—Measured and Drawn by Mr. F. P. Oakley	Double-Page Photo-Litho.
New Window, Manchester Cathedral, by Messrs. Perry Bacon & Bros.—Mr. J. Crowther, Architect	Double-Page Ink-Photo.
Inlay Decorations in Chapel, Palazzo Riccardi, Florence.—From a Drawing by Mr. H. W. Lonsdale	Single-Page Ink-Photo.
Tomb, San Lorenzo, Rome.—From a Drawing by Mr. H. W. Lonsdale	Single-Page Ink-Photo.

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Art and Handicraft.



THE collection of essays published under this title* forms probably the last that we shall have of the characteristic and piquant thoughts and expressions on art of the late J. D. Sedding. They consist of reprints of lectures or papers read on various occasions.

They have the usual excellences and defects of their lamented author's writing on art, to a typical extent. They are so full of enthusiasm, of felicities of literary expression, of piquant methods of putting old ideas with a new expression, that they cannot fail to be pleasant reading to all who are interested in art; on the other hand they are so rambling and discursive as to give the impression that the author just wrote on, saying the first thing that came into his mind, without regard to any central plan or argument. Writing like this has a charm of its own; but as to settling any disputed points about art, it is apt to seem rather inconclusive.

A certain general aim or tendency may however be recognised throughout the book. This consists in an endeavour to put aside and to depreciate formal teaching and classification and to recommend every student of art to look at the facts as they appear to his own perception, and take them for what they are and not according to scholastic arrangement and analysis. This is only the old familiar preaching of Ruskin, though it must be admitted that Sedding had his own way of putting it; and often a very effective way. This faculty is best illustrated in the first essay in the book, "On the Study of English Architecture," a paper read to the Sheffield Architectural Society. Here the obvious intention is to suggest a new point of view. The subject, as the author observes, is triteness itself; "it covers

ground that is beaten hard by the steady unceasing tramp of excursionists of all sorts and kinds during the past half century. My only chance of interesting you on the subject is therefore to find a fresh point of view, and a point of view that is not *special*. The subject has suffered grievously from having been invariably looked at from a particular or one-sided point of view."

This one-sided point of view which Sedding deprecated is that of the classifying archaeological student, whose great object is to discriminate styles and dates. Sedding's advice is, "study English architecture as it grew, where it grew, and as one thing from first to last," without caring to divide it into styles or epochs, or to regard one style as pure and another as "debased." There is a healthy element in this recoil from the arbitrary classifications of books, which tend to induce students to regard English architecture as sharply divided into so many epochs, as if they were as marked as the chapters in a book, instead of realising that in the actual development of the architecture there was no break, no conscious laying down one style and taking up another. This book views of English architecture of course deadens our feeling of its reality of interest, fixing the mind, as the old books of botany did, upon the arbitrary classification of forms rather than on their intrinsic interest and beauty.

But two or three points are forgotten, in the ardour of this incitement to direct, omnivorous, and unclassifying study. In the first place, though classification is not the end of architectural study, it is often a necessary beginning. When in the earlier part of this century it began to be perceived that "Gothic" architecture deserved a better title than that, and that the Mediaeval monuments were the remains of a great architectural epoch, the whole conception of the thing was in confusion; its analysis had to be worked out and the dates and historical relations of the variations of style fixed, in order to enable us rightly to understand its development; and Rickman did good work in this respect, which was useful and necessary at the time; so also did Sharpe in his painstaking classification and comparison of Gothic mouldings.

That some students have fancied they were studying architecture when they were only studying classifications may be very true, and Sedding's warning against that is useful and sensible; but the classification was wanted at the time; it has been of use in helping us to grasp the whole subject; and it is ungrateful, having got all the good we can from it, to turn round and deride it now. Then again, in his recommendation to study all English architecture on the spot and indiscriminately taking it for what it is, Sedding seems to leave out of sight the real and unmistakable break caused by the introduction of Renaissance forms imported from Italy. These received their own English treatment on our soil, no doubt, but their introduction forms a distinct break in the continuity of the subject. Sedding practically illustrated his theory of the unity of all English architecture a little too often in his own buildings, as in his curious freak of introducing in the practically Gothic church in Sloane-street an entirely classic-looking pulpit, which looks as if it had been an independent gift of some one which could not be refused and had to be accepted and made the best of; whereas in reality it was, we believe, deliberately designed for the situation.

Then, again, it is hardly safe teaching to exhort the student to "give no heed to old wives' fables about the 'pure' and the 'debased' styles." That is to say, that in our catholic and outdoor study of all English developments of architecture, we are to deliberately close our eyes to considerations of completeness and purity of style, and take architecture of all types and dates as of equal interest. So in a sense it is, but that does not preclude our recognising that there are better and worse styles of ancient work, just as of modern work. If a man cannot recognise that the wide shallow mouldings and stiff hard carved work of the late fifteenth century are essentially inferior to the mouldings and carvings of the thirteenth century, he has either lost or never developed his critical faculty in judging of architecture, which is a serious matter. So again with purity of style; there are pure styles and

* "Art and Handicraft." By J. D. Sedding. London: Kegan Paul, Trench, & Co. 1892.

corrupt styles, and the pure are the best. Purity of style means entire coherence in the character and treatment of the whole and the details. Elizabethan architecture is piquant and picturesque, with a notable charm of its own; but it is a corrupt style for all that, and for this reason it can never be named with Greek or Gothic, or even with the best Italian Renaissance, and it is a false and blind criticism to say the contrary. No doubt we want a piquant and picturesque style sometimes; it is an element of artistic enjoyment; but it is not as worthy of permanent admiration and serious study as a perfect and balanced style. Nor, again, is the minute proportioning of the Orders to be entirely scoffed at, as Sedding does in a passing footnote fling at Scamozzi; it affords a training in proportion, which is an element of architectural design often much neglected in these days.

Another favourite preachment of Sedding and some of his comrades and followers which is prominent in this volume of essays is that art in handicrafts is essentially the prerogative of popular workmanship, the art of the artisan. This string is harped on in a characteristic manner in the paper on "The Handicrafts in Old Days," read at the "Whitechapel Guild of Crafts"; a paper very well suited no doubt to the place and the audience. That there was a time when an ordinary workman tried to make an object beautiful as well as merely useful; that the cultivation of the sense of beauty and fitness in homely things is of the highest importance, and that it is a sense in which we are very deficient at present; all this is true, but it is only one side of the truth. We cannot make a nation or a generation artistic by the mere rite of glorifying the artisan. By all means let us cultivate in the artisan, as far as lies in our power, the perception that it is worth while for a man who respects himself to make a thing as well as possible, and if he tries to do that he will probably make it a work of art; but the whole subject is not to be settled off-hand in that fashion. Renaissance art, as typified in such an artist as Cellini, was something very different from homely artisans' work—art of the people. Cellini was as little of the unconscious humble artisan as could well be; he belonged to a totally different type; but he produced, in his violent, self-satisfied, and self-conscious way, the most splendid work. Renaissance art was not an art of the people; it was an art produced by skilled artists working for aristocratic patrons; the artisan theory will not fit it in the least. But on the other hand there is a great deal of truth in the author's remark as to the dullness of modern artisans' work:—

"Now do not think the badness of the new building is all the architect's, any more than you think all the goodness of the old building came from its architect. The design of the modern architect may be fussy and lack breadth, and his details be uninteresting—likely enough! But who reared the walls, and fashioned the wood and stone? What I wish to point out is that, apart from the question of the architect's design, there is a great gulf fixed between the old building and the new in matters that have come under the control of the builder and the hand of his men. In the ancient example there is characteristic material and intelligent handicraft, in the modern is utter dullness all over, and in order that you shall have the case put fairly, I will take you in a moment to one of the many modern houses and churches that I wot of, which is a direct—or a would-be direct—copy of an old structure. Here design is not in question, only *handiwork*. Yet anyone, who is competent to judge at all, knows that the new building is as remote from the spirit and character of the old, as the original and copy are remote in date of erection."

This is unquestionably only too true, but the causes for the difference are not all with the workman; this dullness is partly the result of the contract system, by which a building is to be got up as quickly and economically as possible, partly the increasing prevalence of machine-work, partly perhaps that the workman is allowed a less free hand and more tied down to details. But the cheapness and the machinery are the two principal influences in producing the

great distinction between old and new workmanship.

The paper on "Expression in Architecture," which was read at the Edinburgh Art Congress, mainly at the suggestion of the Editor of this journal, we are glad to find in this volume. It is a very clever and ingeniously worded plea for the inherent artistic character and power of architecture, independent of any assistance from painted or sculptured decorations. It was better to listen to than it is to read, owing to the discursiveness and want of fixed plan which is the defect of Sedding's writing; but it contains some very good points very well put, and is worth the attention of architects.

We can only just refer to another paper, "Art and Nature in Old Cornwall," which is perhaps the best in the book, as the subject, a disquisition on the characteristics of various old Cornish churches, is most happily suited to that rambling style of pleasant discursiveness in which Sedding delighted, and it is moreover full of picturesque touches in the descriptions of scenery. Indeed, the outdoor tone of Sedding's references to architecture is always noticeable, and nothing is more typical of his spirit than the sentence which concludes the paper on Art and Handicraft: "Believe me, that it is from the moss-stained stones of the tranquil sanctuary of art and religion . . . that we can best glean the intentions, best measure the skill, of the old craftsmen; it is in the writing of the old walls themselves that we can best read the legend of old humanity; it is in the echoes that linger there that we can best catch the pathetic under-song of human interest in Old English architecture that makes it worth studying at all."

RECENT DECISIONS ON INDENTURES OF APPRENTICESHIP.

IT has been more than once pointed out in these columns how changing circumstances of the times raise new questions on the construction of business documents. Indentures of apprenticeship are, as the saying is, as old as the hills; they were discussed by that legal sage Lord Coke in the sixteenth century, and yet they are discussed by our Judges at the end of the nineteenth century. It may be that since the Employers and Workmen Act, 1875, they have come more under the notice of lawyers, since, as by that Act a dispute between a master and a workman can be decided by a Court of Summary Jurisdiction, magistrates can now adjudicate on disputes arising out of indentures of apprenticeship. Of late some interesting and important decisions have been given on the subject, which appear to settle the law in regard to these engagements if they are affected by strikes.

The general principle by which the validity of indentures must be tested has been laid down in a modern case by Sir Edward Fry. The decision of this eminent Judge does not create new law, but it is desirable that this most recent exposition of the fundamental principle should be quoted. In 1890, Sir Edward, then Lord Justice, Fry decided the case of *De Francesco v. Barnum*. To the details of that case it is not necessary to refer, but this is the way in which the Lord Justice formulated the law:—"The question," he said, "is this: Is the contract for the benefit of the infant? Not, is any one particular stipulation for the benefit of the infant? Because it is obvious that the contract of apprenticeship must, like any other contract, contain some stipulations for the benefit of the one contracting party, and some for the benefit of the other. . . . The Court must look at the whole contract." In the case in question the conclusion of the Judge was that the contract contained "stipulations of an extraordinary and unusual character which throw an inordinate power into the hands of the master without any correlative obligation on his part." Therefore the Court could not uphold the contract. Bearing these prin-

ciples in mind, let us come to the particular questions which have lately arisen. In 1887 occurred the case of *Leslie v. Fitzpatrick*. Here the magistrates considered the indenture of apprenticeship to be void, but the Court of Queen's Bench reversed the decision. The important clause in the deed ran as follows:—"Should the employers 'cease to carry on their said business, or find it necessary to reduce the operations of their works, either temporarily or permanently, from their being unable to obtain materials, or in consequence of any accident, or in consequence of strikes or combination of workmen, or from any cause over which they shall not have any control," the employers might put an end to the agreement. In 1884 came *Meakin v. Morris*, in which there was an indenture by which the apprentice was bound not to be concerned in or to encourage any "turn-out," and by which the master was absolved from paying any wages to his apprentice so long as his business was interrupted or impeded by any "turn-out," and during any such "turn-out" the apprentice was authorised and allowed to employ himself in any manner he pleased or with any other person. It was considered by the Court that this clause invalidated the deed of apprenticeship, for it was so one-sided as to vitiate the whole deed. In 1893 came the latest case of all, *Corn v. Mathews*, in which the clause was practically the same as in *Meakin v. Morris*. This last case was heard by the Court of Appeal and was therefore practically also an appeal against the decision in *Meakin v. Morris*. The same conclusion was, however, arrived at, so that it is quite clear that such a clause is illegal, though it is not against the law to stipulate that a "turn-out" shall terminate the agreement. The distinction is somewhat subtle, but the reason appears to be that in the case of the illegal stipulation the master keeps his hold over the apprentice, but does not pay him; in the other, the agreement is ended, and the apprentice may go his own way. It does not, however, seem altogether clear whether the proviso would be illegal if the words "strike" were substituted for "turn-out" or "lock-out," since Lord Justice Lindley seemed to regard the basis of the decision as being the fact that the master may be the agent, so to speak, who produces the cessation of work. Here, again, the distinction, if it exists, is rather fine. It is obvious that in framing such a clause the desire of the master is to be rid of the burden of paying a number of apprentices if his works are at a standstill. The object is a reasonable one: on the other hand, the Court of Law regard indentures of apprenticeship as undertakings that the master will teach the apprentice, and take on himself the obligation of keeping him. They are something more than mere contracts of service. It is equally clear, however, that if an apprentice is to be thrown altogether on the world when a strike occurs, he is not practically in any better position than if the payment of his wages is only temporarily interrupted. Moreover, the practical result may be the same, for in one case, at the end of a strike, an employer may make fresh agreements with the discharged apprentices, and in the other he may begin to employ them again under the existing indenture. But after these decisions there can be no question that the only safe form of agreement for an employer is that which was upheld in *Leslie v. Fitzpatrick*. It is ridiculous to suppose that employers will not take care to guard against strikes affecting them injuriously in their arrangements with their apprentices, and, that being so, they must rely on the clause which totally ends indentures of apprenticeship in such cases.

GOLF CLUB-HOUSE, BRANCASTER, KING'S LYNN.

—We understand that the contract for the building of the Royal West Norfolk Golf Club-house, Brancaster, has been entrusted to Mr. William Curtis, builder, Litcham, Norfolk. Messrs. Milne & Hall, of Great Marlborough-street, London, are the architects, Mr. John Twaites being the foreman of the works.

NOTES.

ON Tuesday night the consideration of "Supply" in the House of Commons gave occasion for the periodical crossfire of comments on building work for which money might, could, or should be voted, with the usual display of curious crotchets and contradictory opinions. The question of the expenditure of 3,500*l.* on the sanitation of Buckingham Palace drew a protest from Mr. Hanbury as to the scandal of insanitary Government buildings, coupled with the curious statement that a fire had been for years kept up in the Victoria Tower to ventilate the drains of the building, and was afterwards found to have no connexion with the drains. Apparently the honourable member has got hold of some confused idea about the fire at the base of the clock tower for ventilating the House itself. The appeal elicited the interesting information from the Commissioner of Works that Buckingham Palace up to this moment is drained by old-fashioned brick drains, in which case it is certainly time that money was expended in bringing its drainage up to date. Then came various appeals for greater attention to the ancient Scotch palaces and castles; that an annual sum should be spent in keeping Holyrood in repair (in which we quite concur); and one member made the dangerous suggestion that attention should be given to Linlithgow, "with a view to its restoration," an idea which we are glad to notice does not seem to find favour in official quarters, though there is a disposition to spend some money, very rightly, in preventing it from going to further decay. The periodical grumbles about Rotten Row, the clock-tower light, and the House of Commons smoking-room, led up to the really important question of the enlargement of the House, and the fact that this was supported by members of such opposite factions and tendencies as Mr. John Burns and Mr. James Lowther indicates that there is a rather general feeling on the matter. One of the speakers, Mr. T. P. O'Connor, had however the practical sense to see that any considerable enlargement of the House must mean greatly-increased difficulty in speaking; but he added that there could be no difference in the opinion that there ought to be a seat for every member, and he will find it difficult to provide, that without "considerably enlarging" the House. The Commissioner of Works observed that the acoustic properties of the House were good, and members could make themselves heard in it without strain, but in a chamber double the size the strain would be great, and they would have to institute a tribute for speaking from, "which would involve a complete change in the practice of the House." The serious inconvenience to speakers which would result from any great enlargement of the House we have already pointed out, and we recommend those most concerned in the matter not to press the demand for a permanent seat for every member. Theoretically it seems the logical thing to do, no doubt; but practically it would cause greater and more permanent inconveniences than those now complained of. Some enlargement might well be made, and the accommodation increased to some extent; but the House of Commons is a very elastic assembly, in which anything like a full attendance is of very rare occurrence, and a little occasional overcrowding will be found a much more bearable inconvenience than a chamber so large that every speaker had to shout to make himself heard, and with a seating accommodation far in excess of what is generally called for.

IT is satisfactory to record that at the special general meeting of the Institute on Monday night the "Regulation" to the effect that candidates for the Fellowship should be required to give evidence of their abilities in the shape of working drawings and photo-

graphs of their works was carried, and that the ill-advised "Declaration" as to the admission of Fellows by examination was so manifestly opposed to the spirit of the meeting that it was withdrawn altogether. A large number of members had attended for the special purpose of voting against it if put to the meeting. The effect of adopting any such rule would probably be ruinous to the best interests of the Institute, and it is to be hoped that no more will be heard of it. The re-election of Mr. Macvicar Anderson as President ought to give general satisfaction; he has shown himself possessed in an unusual degree of that union of courtesy with firmness which is invaluable in a chairman; but it is understood that a special reason for departing from the usual precedent in regard to two years of office in his case is, that he had suggested a very important improvement in the method of reporting and issuing the proceedings of the Institute (already referred to in our columns), and that it was desired that he should continue in office to preside over and assist in the carrying out of his own suggestion.

THE Building Act Committee of the London County Council, acting in co-operation with the Post Office and some District authorities, are engaged upon framing a scheme for renaming several streets. The question is a large one, and evokes some considerations which, it is to be hoped, will not be quite overlooked. Outside the City boundary local and historical names are less frequent than those derived from builders and owners, though on the large estates, such as those of Portland, Bedford, Westminster, Cadogan, Portman, and so on, we find plenty of the two kinds, in which the family histories are illustrated and preserved. In one direction, however, we might take example from Continental nations. Compare some of our own not always significant street-names with those of Paris, for instance. There they have commemorated many of their famous countrymen, here the name of a great architect or sculptor, musician, poet, writer, &c., appears but rarely.† No doubt the Post Office would gladly see every repeated name swept away. King, Church, George, James, Charles, New, North, South, are very common. There are forty-one "High-streets" in the official "Guide," but many of them carry our minds back to a time when they were the main roads of villages which the ever-increasing town has taken into itself, and to wantonly change these would be to break the last remaining link between the old order and the new. During the latter part of their career the late Metropolitan Board of Works effected various alterations of this sort, not always very happy or sufficiently considered, besides incorporating some subsidiary "rows," "places," "terraces," and the like, with the thoroughfares they respectively faced. In the first chapter of a pleasing, and now rare, little book, T. Crofton Croker's "Walk from London to Fulham," illustrated by F. W. Fairholt (1860), is given an instructive account of how, within a period of fifty years, as many as six changes were made in the designation of the then Queen's buildings, Knightsbridge, showing, as Croker says, "the extreme difficulty which attends precise local identification in London." This difficulty is increased by the modern crotchet of renumbering house doors.

ON Wednesday evening the fifth of the Carpenters' Hall series of lectures on subjects connected with building was delivered by Professor T. Roger Smith, on

* Both the clauses here referred to were embodied in the letter signed by a number of Fellows of the Institute printed in our last issue (page 236).

† Milton (*parish* Grub) street was so-called after its builder; there was a Wren-road at Camberwell, and a Handel (ately Henrietta) street, by Brunswick-square. Johnson's-court was so named before Dr. Johnson lived in it.

"The Later Renaissance in England," with special reference to St. Paul's Cathedral, Greenwich Hospital, and Hampton Court. The chairman, Mr. Macvicar Anderson, in introducing the lecturer, paid a high tribute to the Carpenters' Company for its substantial assistance to the cause of technical education. The lecturer, in commencing the lecture, which proved to be a most interesting one, treated with an ease and grace of expression and illustration, which pleased a large audience, referred to the works of Inigo Jones, when he erected the Whitehall Banqueting House in 1621, St. Paul's Cathedral being then a Gothic structure much in need of repair. In 1633, repairs were commenced by Inigo Jones, and a classic portico at the west end was added. The Professor's description of St. Paul's in those days, and the base uses it was put to as an exchange, a lounge, and generally as a place of resort, was emphasised by one or two quotations from Shakespeare and other writers. The description of the great fire of London in 1666 led on to the introduction of Sir Christopher Wren, and then Dr. Wren and his works. Clifford's Inn buildings, Holborn, Crosby Hall, and Paul Pinder's house were each referred to as examples of the London buildings prior to the great conflagration. St. Paul's, owing to its position, was used as a vast store house, not only for furniture, but for libraries, and great was the consternation of the citizens when this stronghold was assailed by the flames. The preparation for the new building of St. Paul's by Dr. Wren, which took several years, and the condemnation of the first plans because they were "not sufficiently like the customary thing," led to the commencement of the building in 1673, and its completion in 1710, at a cost of about 124,000*l.*, more than half of which it was said was derived from the coal dues. The lecturer also described the use of the old foundation of close and hard pot earth, and referred to the singular absence of any material structural defect, in striking contrast to some other well-known Renaissance buildings. In making an interesting reference to the special features of St. Paul's, the Professor alluded to the grace of the exterior, which took the first place in Europe, to the wood-carving of Grinling Gibbons, and to the beaten ironwork of screens and gates to the choir. Reference was also made to the model of St. Paul's which exists, and to the unique collection of Wren's drawings at St. Paul's and at All Soul's College, Oxford. Passing allusion was made to Wren's City churches, and how he designed a former plan for the arrangement of London streets after the fire, and for the embanking of the Thames. The lecture was illustrated profusely by lantern, and the lecturer made a running commentary upon the buildings as they appeared on the screen. In this manner reference was made to St. Peter's at Rome, Sta. Maria della Salute at Venice, Pantheon at Rome, dome of the Pantheon at Paris, the Invalides at Paris, St. Paul's (London), Sir C. Wren's plan for laying out London, Old St. Paul's, the crypt of new St. Paul's, and Greenwich Hospital. Allusion was also made to Hampton Court Palace and Chelsea Hospital. A vote of thanks to the lecturer followed a thoroughly interesting lecture.

WE have received a copy of Dr. S. Monckton Copeman's report to the Local Government Board on the sanitary condition of Lakenheath, in the Mildenhall Rural District, with special reference to the recurrence there of diphtheria during a series of years. Lakenheath is a village in Suffolk, which contains about 1,850 inhabitants, many of whom are in very poor circumstances. At one of the higher points is the church, standing in an extensive graveyard, all interments in which are made in the upper and pervious stratum of the marl, from which the drinking water of Lakenheath is obtained by means of surface wells, which are, for the most part, on a considerably lower level than the churchyard :-

"The wells are nowhere more than 40 ft. deep, even in the highest parts of the village, and are frequently much more shallow. I found that their sides are built up for the most part of lumps of chalk, used after the manner of bricks, and set in mortar, though this is not invariably the case. Usually the water is obtained by means of a bucket lowered and raised by a windlass and rope or chain, the mouth of the well being usually uncovered, and sometimes quite unprotected against fouling by surface washings. Occasionally only did I find that a pump had been fitted over the well. Samples which were taken of the water from a number of these wells were mostly somewhat turbid, often having a peculiar milky appearance with sometimes a tinge of brown. In some of the samples numerous floating particles were visible.

The inhabitants complained to me bitterly of the bad taste and odour of the water obtained from the majority of the wells; indeed in several instances persons had of their own accord ceased using the water of their private wells for drinking or for cooking purposes. In some cases disuse of distasteful wells had not been possible owing to the difficulty of obtaining water from any other source; and one well the water of which had been actually condemned by an analyst, was, I found, still in use."

In reference to the subject of removal and disposal of refuse, Dr. Copeman reports—

"Water-closets are unknown in Lakenheath, all excrement, and the greater part of the household refuse, being disposed of by means of privy middens. The amount of privy accommodation is, in regard of some house property, decidedly insufficient, although a certain amount of improvement in this respect appears to have been recently effected through the action of the Sanitary Authority. The pits in connexion with these privies are, for the most part, of large dimensions, some of them being as much as 6 ft. or 7 ft. deep. Such portions as extend beyond the back of the closets is uncovered, and at the time of my visit the majority of the pits appeared to be full, or nearly so. I learnt that they are cleared out at uncertain periods by the cottagers themselves, who make use of the material on their gardens after it has stood there for some time fermenting. Occasionally neighbouring farmers remove it for use on their land, but the Sanitary Authority take no direct action in regard to the matter."

It may be added that up to the present time the Sanitary Authorities have taken no steps towards the provision of a sufficient and wholesome water-supply for Lakenheath. There is more in the report, but these details are sufficient to indicate why Lakenheath should be a favourable site for diphtheria.

ACCORDING to a recent report of the British Vice-Consul at Venice, the water supply of that city has been much improved. The former supply, consisting of water from the River Brenta, having been pronounced unfit for drinking purposes, through bringing down refuse matter and sewage, has been abandoned, and a new supply of great purity, cool in summer, and not requiring filtration, obtained from the springs of St. Ambrogio, near Treviso. Previous to 1884 Venice was supplied with water partly from the Brenta and partly by rain-water collected from the house roofs in the "pozzi," or Venetian wells.

FOR some time it has been customary for the administration of the Prussian National Gallery, soon after the death of an eminent artist, to collect and exhibit in their halls some good specimens of the deceased's work. Two such collections are now on view at Berlin; one of these consists of some excellent examples of the studies of the late Herr Paul Grab, who died last year in the prime of his life, and who had devoted himself especially to architectural subjects, as did his father before him. His drawings are noteworthy, especially for their combination of accuracy of delineation of detail with effective composition. His picture of Marienburg in East Prussia is one of his best works; and many interesting bits of old Berlin architecture figure among his studies. His realism in the treatment of masonry is remarkable.

TWO historical properties are in the market. The one, Coldham Hall, in Stanfield parish, near Bury St. Edmunds, was built in 1574 by Robert Rokewood, and

until recently has continued in that family. Here Edward Rokewood entertained Queen Elizabeth, who, on finding her host was a Papist, fined him in return. Ambrose Rokewood was executed for complicity in the Gunpowder Plot; his son Robert proved a staunch Royalist, and lost two sons in the Civil War. The house contains a secret chapel and three hiding places for priests. Elizabeth Simpson (Mrs. Inchbald) was daughter of a farmer in the parish, which she quitted for London in 1771, when seventeen years old. This estate has a park of 100 acres, and about 320 acres of arable and grass land. Gidea, or Geddy, Hall, on the outskirts of Romford, standing by the road to Brentwood, was erected by Sir John Eyles, Bart., circa 1720, on the site of the manor house, begun in 1467 by Sir Thomas Cooke on a license from the Crown to build a fortified residence, and finished by his grandson, the famous Sir Anthony Cooke, Edward VI.'s preceptor. Thomas, elected Lord Mayor in 1462, was created a Knight of the Bath at the coronation of Edward VI.'s consort. The daughters of Anthony were renowned for their learning. Dr. Walter Haddon, after visiting Gidea Hall, said in an address at Cambridge, "And what a house did I find there! yea, rather a small university. . . . I seemed to be living in a Tuscan villa." Of the daughters, who chose Greek, Latin, and Hebrew epigrams for inscription on the front of their home, Katherine married Sir Henry Killigrew; Anne—to whom Beza wrote a dedication—married at Blackfriars, Sir Nicholas Bacon, lord-keeper, and was mother of Francis, Lord Verulam; Mildred became second wife of William Cecil, Lord Burghley; and Elizabeth married John, Lord Russell, for whose monument in St. Edmund's Chapel, Westminster Abbey (restored in 1867 *ex curia* the Duke of Bedford), she composed an epitaph in Latin and Greek, as well as in English—a conceit which Addison, in the *Spectator*, reproves. Their daughter Elizabeth's monument, in the same chapel, bears an effigy seated in a chair (one of the earliest of its kind there) and is that which is vulgarly known as "the lady who died from pricking her finger." A view of the house was inserted in Le Serre's account of the progress from Harwich to London of Marie de Medici, who stayed there a day and night, having been met at Chelmsford by Charles I. The king slept at Havering-atte-bower, that being the last occasion, it is believed, on which the old palace, a jointure house for so many of our queens-dowager, was occupied by the sovereign. The bridge, of three elliptical arches, at Gidea Hall, has been attributed to James Wyatt.

ONE of the most notable houses in London—that is to say for its literary associations—is offered for sale. It is No. 22, at the end of St. James's-place, overlooking Queen's Walk and Green Park, and was the home of Samuel Rogers during the latter fifty years of his life. Born at the house on Stoke Newington Green which was pulled down about ten years ago, and wherein he wrote his "Pleasures of Memory," he lodged for awhile in the Temple, and then in Princes-street, Hanover-square. At St. James's-place Moore, it is said, first met Byron; the latter says in his diary (November 22, 1813):—

"If you enter his house, his drawing-room, his library, you of yourself say this is not the dwelling of a common mind. There is not a gem, a coin, a book thrown aside on the chimney-piece, his sofa, his table, that does not bespeak an almost fastidious elegance in the possessor."

Lord Macaulay and Washington Irving write in the same strain. The Crown lease of this house, which James Wyatt designed, is now to be sold. St. James's-place, originally built at the end of the seventeenth century, can boast of many famous inhabitants: including Addison, Wilkes, Parnell the poet, Molly Lepel after her marriage with Lord John Hervey—in a house built for her in 1747 by Flitcroft—Mrs. Robinson

("Perdita") at No. 13, and at No. 25 St. Francis Burdett for about twenty years until his death in 1844.

BY a strange coincidence, on the same day that we publish the view and plan of Manchester Cathedral we have to record the death of the Diocesan Architect, Mr. J. S. Crowther, from whose designs the recent additions to the Cathedral were made. Mr. Crowther, who was essentially what is called a "church architect," and one of the old Gothic revival school, had carried out a good many churches, and restored various ancient ones. To the profession at large he was, however, best known in connexion with the splendid illustrative work which he brought out many years ago in conjunction with Mr. Bowman, under the title "Churches of the Middle Ages"; a book which remains one of the finest examples of architectural illustration of English Medieval work which the enthusiasm of the Gothic revival called forth.

THE English portion of the "Women's Building" at the Chicago Exhibition will include among its interior decoration four large bas-relief panels by Miss E. M. Rope, whose works have been familiar to our readers in the Sculpture room of the Royal Academy, as well as in illustrations in our pages. The subjects are "Faith," "Hope," and "Charity," and "Heavenly Wisdom"; they are illustrated by allegorical figures treated in a broad style in low relief, and are to be executed in plaster with a slightly tinted ground. It is a satisfaction that English sculpture is to be represented in the women's building by so capable an artist as Miss Rope.

THE collection of pictures and water-colour drawings by Mr. Wetherbee illustrating "English Pastoral Life," now on view at the Fine Art Society's galleries, is well worth a visit. Without going in the least away from simple nature, the artist has fully realised and understood the poetic elements of country life, in this series of landscapes with figures. In the treatment of the landscape there is a great deal that is very fine and very true, and a great deal of variety of effect. One of the larger works, "The Dawn of the Year," there is something like an imitation of Mason, but in the majority of the paintings, and drawings Mr. Wetherbee has his own story to tell in his own way.

THE Souvenir book of "Becket," presented at the Lyceum Theatre, which a copy has been sent to us, forms a record of a play in the mounting of which the architectural accessories, though not altogether satisfactory, have received more attention than is generally the case. In the Castle in Normandy, which forms the background to the Prologue, Mr. Teibin has given the character of the Norman château with its circular turrets with machicolated cornice and timber gallery and conical roof. Becket's house (interior) the architectural detail, what there is of it, is rather early for the period, though of course the house need not be supposed to be a new one. In the street scene in Northampton, on the other hand, the half-timbered houses have rather the look of the thirteenth than the twelfth century. In treating the scene of the death of Becket, Mr. Teibin reverts unfortunately to the typical scene-painter's indifference to architectural fact. The scene is laid in the "north transept of Canterbury Cathedral," for which the artist might have got a direct model in the north-east transept, which was of the same date as the north transept and still exists practically unaltered. This transept is without aisles and with the usual eastern apsidal chapels, and as the main north transept was the same width and projection as the north-east one the arrangement was doubtless much the same.

But Mr. Telbin, for the sake of stage effect, invents a nondescript and impossible Norman transept, with an aisle with a flat timber roof (just the place where there would not be one), through the arcade of which we apparently look into the main transept, with stairs descending which must come from the dormitory on the north side, if from anywhere; but in that case we must be looking east, and the apsidal chapel partly shown on the left must be facing north, where a transept chapel never would face. The aforesaid stairs, by the way, are decorated with a nineteenth century arca railing. But the whole thing is an architectural jumble.

COMPETITION FOR NEW BATHS AND WASH-HOUSES AT KENSAL TOWN.

THE Commissioners for Public Baths and Wash-houses of the parish of Chelsea have met with a very good response, twenty sets of drawings having been submitted. The authors of all the designs have experienced great difficulty in dealing with the confined nature of the site, which practically rendered it impossible to provide all the accommodation asked for on the ground-floor only. The Commissioners' instructions did not stipulate the sizes of the swimming-baths, but required the provision of one large and two smaller swimming-baths for men, boys, and ladies. Sixty private baths were also specified, forty for men, twenty for women. The wash-house department was to include accommodation and fittings for twenty washers, with space for ten more hereafter. The remaining requirements were engine-room and workshop, offices, and rooms for caretaker.

Details of the fittings used at the Chelsea Baths, and meeting with the Commissioners' approval, were supplied, and the source of steam supply was also to be considered as provided, so that the work of the competitors was very much simplified and the problem reduced. No limit of cost was laid down. The designs were sent in under motto, but the mottoes were covered with numbers, and the Commissioners have decided (without the assistance of a professional assessor) to award the first premium of £75 to the authors of design No. 10, the second premium of £50 to the author of design No. 9, and the third premium of £25 to the authors of design No. 15. The site is of an irregular L shape, fronting to Kensal-road at one end and Wedlake-street at the other, and flanked on one side by the Grand Junction Canal.

The designs sent in may be classified into four groups, according as the authors have endeavoured to solve the problem (1) by placing all the baths (swimming and private) on the ground floor; (2), by placing part of the private baths on the first floor; (3), by placing all the private baths on the first floor; (4), by placing some of the swimming-baths on the first floor. Each of these solutions has its advantages and its disadvantages. The first solution is preferable for convenience, but from the limited area of the site reduces the swimming-baths to very small dimensions; the third arrangement has the great advantage of providing the largest possible area for the swimming-baths; while the second, being a compromise between the first and third, is like most compromises, deficient in the advantages of either extreme, and lacks the convenience of the one without obtaining the space of the other. The fourth solution is no more than a frantic struggle to escape the pitfall which has engulfed many competitors who have completely lost the top-light to their swimming-baths.

The first premiated design, No. 10, scheme A, shows the whole of the private baths on the first floor, and thus obtains on the ground floor a men's swimming-bath with water area 82 ft. by 25 ft., boys' swimming-bath, 48 ft. by 22 ft., and women's swimming-bath, 51 ft. 6 in. by 21 ft. The men's bath has 47 dressing-boxes and a shower-bath, besides the W.C.'s, attendant's store, &c. The boys' bath has a foot-bath, which in this locality it would, we imagine, be necessary to use as a soap-bath; to this bath there are 25 dressing-boxes, while the women's bath has 37. In the arrangement of their plan the authors have placed the entrance to the baths in Wedlake-street, with the men's swimming-baths next to the canal frontage and the boy's swimming-bath parallel, that for the women being at right-angles and beyond the other two.

The private baths are placed partly over the swimming-baths, but not wholly or even unduly covering them, so that ample light is obtained. The working out of the plan, with its entrances and approaches, is one of the best in the competi-

tion, and in many points of detail is superior to most of the other designs submitted. The wash-house department is entered from Kensal-road, and occupies the shorter arm of the L-shape site. The establishment laundry is placed on the ground floor, and the public wash-house on the first floor, where additional area is obtained over the entrance to the Destructor-yard of the parish. The elevations are designed in a simple and suitable fashion on the lines of English eighteenth-century work, and the Commissioners may be congratulated on having chosen the design which is best both in plan and elevation. The design B, by the same authors, places the women's private baths on the ground floor and reduces, therefore, the size of the swimming-baths. This plan is otherwise very similar to that selected, which has, in our opinion, been wisely preferred, although its cost, as estimated by the authors at 15,400*l.*, is 500*l.* more than that of B.

The second premiated design, No. 9, also has the whole of the private baths on the first floor, but those for men being placed over the boys' swimming-bath; this has no top light and is but 14 ft. high, though it is better than those in some other plans in having good light on two sides. The sizes of the swimming-baths in this design are: men's, 90 ft. by 30 ft.; women's, 51 ft. by 20 ft.; and boys', 54 ft. by 24 ft. The entrances for men and women are separated, the former being in Wedlake-street, and the latter, with the entrance to wash-house, in Kensal-road. The elevations are poor and tame, and though the design as a whole is certainly better than the third, we think that there are other designs amongst those not premiated which come nearer to the standard of the design placed first. The estimated cost is, however, low, 11,950*l.*, and its economy has, perchance, weighed with the Commissioners.

The third premiated design, No. 15, has the women's private baths on the ground floor, thus limiting the size of the swimming-baths to—men's, 60 ft. by 25 ft.; women's, 48 ft. by 20 ft.; and boys', 45 ft. by 20 ft. It is difficult to see why this design has been premiated, as the planning is by no means skilful, while the elevations lack proportion both in their masses and in their parts. The cost, too, is estimated at 15,800*l.*

Design No. 1 has the private baths both for men and women entered from the gallery of their respective swimming-baths, thus preserving the top light of these baths, which the author in his report calls "that most essential feature," but nevertheless puts his wash-house over the boys' swimming-bath, which is lighted from one side only!

Design No. 2 has a plan very similar to the first premiated, though not so good in detail, and inferior in elevation, which is plain and uninteresting. If the Commissioners feel that the solution in the selected design is what they want, this design seems to have a claim to recognition as a close approximation thereto.

The author of the designs numbered 4 has made a bold bid for victory by submitting three alternative designs A, B, and C, adopting the first three of the possible solutions of which we have spoken. In each case the planning is good and skilful, and shows adequate knowledge, but we think that the author has been fairly beaten on his merits for the first place at least.

Design No. 6 has a good plan, but gives a small amount of accommodation, and has, indeed, limited himself to only part of the available site. As his estimate of cost is only 6,250*l.*, it is clear that the author has been too economical.

Design No. 13 also has a fairly good plan, but the swimming-baths are small, and the placing of baths on second as well as first floor is a detrimental feature which other competitors have not found necessary. The elevation is quiet and sober, but somewhat lacking in interest.

The author of design No. 14 has submitted an alternative, which, in our opinion, is better than his original designs. Both have many good points, and give ample accommodation in the swimming-baths, but in one case the women's bath, and in the other the boys' bath, has no top light.

It is clear that the provision of large swimming-baths with top light to each is the cause of success in the well-arranged and well-thought-out plan of the successful competitor.

EALING.—The waste heat from the destructor here is to be utilised to supply power for generating electric light. The destructor is to be added to, and will be then an 8-cell destructor, of which each cell will supply from five to ten horse-power by what would otherwise be waste heat.

IN PRAISE OF A COUNTRY PRACTICE.*

If you will tear yourselves away from the delights of London, shrouded as they often are in smoke and fog, I should like to place you in the windows through which I look every day of my life, and show you a glimpse of some characteristic Midland scenery. Large undulations terminate the view on every side. In one direction the sombre tints of the earth are divided from the pale sky by the deeper hue of a distant wood. In another, a white road winds out of sight over the shoulder of a gentle declivity which permits a glance at the dim blue distance of the next county. On a third side, one or two slender spires overtop the hills as they shoot up out of their masses of foliage; while straight in front of us, just across the valley which parts us from the town, rises the grey mass of the tower and spire of the parish church, with its battlements and turrets and crockets sharply defined against the sky. It is not merely in its beautifully-tapered outline—unsurpassed by any spire in the land—in its crisp and vigorous delicacy, or in its curious angle-turrets, that seem to be an echo of the defensive features of a castle—it is not only in these that its charm lies; but also in its ever-changing aspect, responsive to the changes in the atmosphere. Sometimes it thrusts its summit, dark and delicate, above the morning mist which hides all the lower part, together with the earth that supports it. Sometimes the hot summer sun picks it out with sharp shadows in front of the blue sky, leaving it still, sunlit though it is, darker than its peaceful background. And then, again, sometimes—not often—the evening sun will paint it white against black, storm-laden clouds, lending it an almost terrible aspect, like the white lips of an angry face.

At its base, stretching away on either side, lies the town, red with red bricks and blue with blue slates; here and there in the older parts somewhat mixed with grey stone, and largely mollified with trees. But as it recedes from the church, the town grows redder and redder, till at one end it stops with a mass of white-brick cottages that mark a newly-developed building estate: while at the other it breaks up into detached houses that show how the moneyed men are gradually building their way into the country. The town is no less interesting to us than the church, though in a different way, for there lies our work and their live our clients.

You who live and work in this great wilderness of London have but a faint idea of what it is to live among your work and among your clients. The vast journeys that separate you from the former half remove it from the realms of tangible reality. To you it is less a living fact than a kind of *simulacrum* on paper. Your decisions on unexpected matters of construction are often more or less theoretical, not dictated by the lively knowledge which an inspection on the spot imparts. You cannot watch its constant growth, brick by brick and stone by stone, and see your design slowly evolve itself, till the amorphous mass of the ground floor develops into articulate shape with the roofs. To you the building grows by leaps and bounds, and to some of you, perhaps, it never grows at all, except as an abstract thing in mechanical drawings.

How much more difficult it is for those who pay only a flying visit now and again to their work to introduce those little touches which spring from, and harmonise with, local circumstances not observable till the building is partly built! How much easier is it for those who can watch the effect of their mouldings from day to day to improve upon them as occasion arises, and to modify them to meet slightly-altered conditions. For instance, if a string-course is hardly as effective as it should be, three steps will inform you how much the mason has worked—and he cannot have worked much since you saw him last—and a very little adjustment will probably enable you to use the disappointing member elsewhere, while a slight recasting of the detail will give all you desire. Or if a chimney-cap has not the delicacy of profile that you expected, before another one is worked you can remedy the defect; and all without waste of stone or hindrance to the work. Then, again, how valuable it is to spend ten minutes now and then in quiet contemplation, free from the importunities of foreman or clerk of the works. What object-lessons one obtains as one watches how the necessities of the plan control the masses which compose the picture for the eye; how this chimney seems a false note, or that window ruins the

* A Paper by Mr. J. Alfred Gotch, J.P., F.R.I.B.A. Read before the Architectural Association on Friday, March 24, as elsewhere mentioned.

privacy of some garden-nook; or how yonder little bay, which is a delightful feature inside, seems but a sad excrescence on the outside, and moreover, brings into view things better left unseen. It is from melancholy observations like these that one departs a sadder and a wiser man, with a resolve to do better next time; and gradually one is able to store up a mass of experience and observation which instinctively guide the pencil in the future. No doubt you who live in London indulge yourselves in these object lessons; but we who live in the country can do it so much oftener; and while you are stifling in the Underground Railway, or swaying in the open air on the top of an omnibus furnished with what are called by way of mockery "garden seats," we can call in *en route* for the office, and take a quiet look round at the work.

It is true that we suffer some disadvantages. We cannot repeat ourselves too often; we have to be careful in what houses we use our last and grandest design for a chimney-piece: but then we generally know what people call upon other people, and whether they are likely to see the interior of each other's houses. We have to be careful, too, how we make mistakes. You happy persons who conduct vast practices from London in remote corners of the land can afford to make mistakes in some of the remotest corners. First of all, are you not "London architects"? and does not that term endow you with a skill and knowledge impressive to all but the immediate sufferers and their intimate friends? And, granted that the mistake is so egregious as to convince even the indifferent, and to close your prospects of further work in that particular corner, why, the place is very remote, and many a day will elapse before the news spreads to any of your other centres of activity, so long as you keep out of the law-courts. Not so with us in the country. Most of our eggs are in one basket, and to drop that means losing our market altogether.

Yet another difference—in the main wholesome to us "rustics," as we have been termed by you Londoners. Not only are we in touch with our work while it is in progress, but we have to live with it for ever afterwards. You Londoners may go down into the country and deliver yourselves of an abortion, and forget all about it, for us — Day after day we see our work; and day after day, as we turn the corner, we writhe afresh at our failures, or buoy ourselves up with the hope that the world will endorse our own secret opinion about our successes. It is no good; we cannot get away from our work; no ingenuity in the choice of routes is of any avail; there the buildings are, and to get from one place to another they have to be passed. But if rightly regarded, this is a wholesome discipline; and the casual remarks of a stranger, or the criticisms of a reliable architectural friend, may be profitably stored up, like the sunshine and the rain which go to make the fruit in due season.

Living with one's work is indeed a wholesome discipline, and one is often tempted to wish in the interests of Art (though not perhaps of the artificers) that some of our painters and sculptors had to live with the works which they send to the Academy. If this be the case with regard to our brother artists, whose productions can, as a last resource, be removed from sight, how much more so it is with us architects, whose designs are part of the structure itself?

If we architects were more accustomed to live with our own conceptions, I imagine there would be fewer of those picturesque features which we are so ready to bestow upon our clients. There is no better corrective of the wayward fancy than to live in a house of one's own design, and to bring to the sharp practical test of daily use all one's little fads of plan and decoration—the inglenooks and serving-hatches, and pretty grates and lead-light windows and stone mullions, and panelled walls, and the hundred-and-one things that involve responsibility. I would not be thought to condemn the matters mentioned by any means, but I say that to live with the creations of our own fancy sobers the judgment and steadies the hand. And, therefore, we dwellers in the country find ourselves subjected to a wholesome discipline in living amid our work.

But have you any idea of what it is to live amid your clients? To meet them on the tennis ground and the golf-links; to see them in the club, and hear them speak at public meetings; to work with them or against them in the innumerable schemes that fill the leisure of dwellers in country towns? Do you know what it is to oppose one at a local election, to buy your hat of another, and to send back to a third the joint of meat that he has not cut to your liking? To us our clients

are ordinary human beings, with a hundred objects in life, not gifts of Providence endowed with the sole desire of having a house built. We generally know something of their character in relation to other matters than building, and are able from the outset to form an opinion as to their likes and dislikes.

Another peculiarity of a country practice, which has its whimsical aspect, is the chameleon-like character of the people one has to deal with. A builder to whom you issue instructions from day to day, which he disputes at his peril, will once a fortnight sit in judgment on your plans at the Local Board: a foreman bricklayer at one job will be on the building committee of another; the carpenter who makes the round of the building with you in the morning will sit at your side in the evening as your colleague in a debating society. And these contrasts of relationship are not isolated incidents, but are of constant occurrence. And far from being strange or embarrassing, they engender a mutual knowledge and respect which are of very great assistance in getting work well done.

But it is not only to the town itself that our attention has to be confined. Many a journey has to be taken into the country. Not a scramble for an express train, a tedious journey, and then a drive through country of which we know nothing, not even the points of the compass, or what places lie on our left or our right. No, but leisurely drives through country which we get to know better month by month, and with the chance of choosing a suitable day for the work. We see the same scenes under every condition, with the early or the late sun, or under the steady blaze of mid-day. Sometimes we see them in a clear and brilliant atmosphere, like that of Logic and Science, when the distant and the near seem equally easy of access. And then, again, we see them veiled in a delicate mist which, like Poetry, lends distance and proportion. The valley that at one visit ripples as the breeze touches the silvery hay, at others will ripple, perhaps, with the broad waters of a flood, or lie shrouded in the monotonous mantle of the snow. At one time the way will be cheered by the bending bunches of the lilac; at another the road will take you near the delicate and delicious odours of a field of beans. Still later in the year the bright red admiral will flutter past and sun himself on the stones, while in the winter the attention is concentrated upon the course of action to be pursued if the horse should actually fulfil his frequent threats of slipping down. And so in our constant drives we get to know the landscape in all its moods, and every view becomes more valuable as our experience of its varying aspects increases.

I am induced to dwell thus on matters which are not actually architecture, for two reasons: partly because I am anxious to convey to you some idea, if only a faint one, of the pleasures that attend a country practice; and partly because a constant observation of natural scenery has a very considerable effect on the temperament, and tends to develop that habit of thought which helps us not only to satisfy the necessities of those for whom we design, but also to marshal the arrangements with which we endeavour to satisfy those necessities in such a manner as to express certain ideas—such as stateliness for the rich and great, unpretentious comfort for the well-to-do and homely; repose for quiet surroundings; or aspiring vigour for hilly regions.

There is a very great deal to be said for giving a man a house suitable to his character: for adapting the design to his habits of life, rather than inviting him to change his habits to suit your design. You may give him high-art fittings, and papers, and hall-floors, and all such accessories; but there comes a time when your help is no longer required—when, in the natural course of things, you relinquish control over the building; and then, left to himself, he will be sure to sin grossly in respect of carpets, and furniture, and pictures, and knick-knacks, and all the trumpery ornaments which the "Stores" supply. And all this flood of barbaric splendour will submerge the features which sealed the triumph of your patience and rhetoric and sarcasm.

And there is a very great deal to be said for making buildings suitable to their locality. Tile-hung walls in London are as incongruous as a prim suburban villa in the open country. A villa in the country may be required of the same capacity and at the same cost as one near a large town, but assuredly it ought not to be of the same appearance. Half the charm of the best work arises from its spontaneity, and from the entire absence of any apparent effort. As you look at it you do not admire this or that feature as a *tour de*

force, but rather regard it as inevitable under the circumstances.

But it is not only from nature that we can obtain delight as we drive in pursuit of a country practice. Very few are the villages that have not some relic of ancient days, upon which we can gaze with renewed pleasure at every visit; and not only with renewed pleasure but with increasing knowledge. There is no building that I ever knew, no matter how intimately from which it has not been possible to gather something fresh with every visit, particularly if accompanied by a friend of congenial pursuits. Discreet eyes look upon such different ways that, even if no new feature is discovered, there is sure to be some new aspect to reckon with. And so these old friends have an ever-abiding interest. Like Cleopatra,

Age cannot wither them, nor custom stale
Their infinite variety.

And the advantage of a country practice is that these things come in our way in the pursuit of our ordinary vocation, without any special effort, and we get to know them as incidental to the general arrangement of things, and not as sacred objects of special pilgrimages.

But while some of the pleasure of a country practice proceeds from the scenes in which it is pursued, not a little of it arises from the variety of work which it entails. The interest never flags. Now it is a church, next week a school, perhaps in the town or perhaps in a village. Before these are digested comes an infectious hospital or an infirmary. The scene may then change to a factory or a public-hall, which in its turn may be followed by a suite of offices, a shop-front, or some swimming-baths. A club, a hotel, and a chapel, extend the list, which is interspersed here and there with houses large and small. Not the least pleasant task is to deal with farm-buildings, where sights, and sounds, and smells are all eloquent of country life. The mind is therefore always occupied with endeavouring to become acquainted with fresh requirements. From the courtly parson to the blundering publican, or from the far-sighted manufacturer, careful of every penny, to the well-bred Master of the Hounds, whose chief desire is to have his house enlarged in strict harmony with the ancient portions—these are changes which any week—almost any day—may see. No doubt in London and other large towns you get some variety, but cannot think that you, who are more or less specialists, can have such a wide and ever-shifting range as we who live in the country, and are compelled in the nature of things to take the work that falls in our way.

That is one of the governing factors of our life—that we must take what falls in our way—and so it comes that we "rustics" look on with some amusement at the controversies which shake you Londoners to the centre. "Architecture: Profession or an Art!" What in the world does that matter which view people take? Let us do the work that comes to our hand with all our might; not waste our time on disputes of nomenclature. Do you suppose we who live in the country are going to set up some fanciful standard of kind—none of excellence, mind you—and tell our clients: "This is a factory, and therefore not architecture," or "That is a shop-front, that presents no scope for art, and therefore we are much obliged, but will you kindly go elsewhere?" Do you think we can afford to earn a reputation for eccentricity like that? Or do you suppose that it is any more possible for us to decline to survey some land, or give an opinion on the price of building sites, or lay out a building-estate when called upon to do so? Who is to do it if we do not? Architects who earn their living earn it through their clients, obviously; and if they gain a reputation for wanting to make puzzling selections from the work that comes in their way, they may say good-bye to clients of all kinds, and where then will be the architecture pure and simple upon which they are to concentrate their cultivated intelligence?

A rich man might possibly afford to be eccentric; but under the conditions which govern country life I doubt whether even he would be anything but a negligible quantity. But the man who lives by his calling must, in the very nature of the case, satisfy the conditions which govern his calling in the place where he is pursued.

We may be told, as in fact we have been told, that this is all quite right, but it is incompatible with good architecture. "The proof of the pudding is in the eating;" I do not believe it is incompatible where there is previous good training and enthusiasm for the work. That it is what is wanted, enthusiasm, and a fixed determination to do the best possible; to face difficulties, to master the essential conditions, to

acknowledge shortcomings frankly (at any rate to yourselves), and to resolve not to commit them in future. To spare no pains, either on the drawings or on the building, but to go at it again and again till you get the thing right.

It is here in this Association that I see "the Hope of English Architecture." Far from saying to you "Refuse surveying!" "Refuse to take out quantities or lay out estates!" I say "Render yourselves competent to do these things. Do not imitate the idea that from London only is good architecture to be bestowed upon England, but go out if you can into the fine free life of the country; carry into innumerable centres of activity the enthusiasm which you gain here by contact with other young and eager minds, so that the whole country may be leavened with the nobler aims, the greater culture, the more refined taste which you acquire here." To do this effectually you must be ready to be a surveyor as well as an architect; but you have great names in the past to keep you company—John Thorpe and Inigo Jones and Christopher Wren. But if your names, like theirs, are to live—remember this, that though surveying is an essential part of your life-duties, it is, after all, in your architecture alone that you can achieve immortality. Yet it is not given to all to live for ever on the tongues of men. How small is the number of ancient buildings that we can trace to their actual designers. And, after all, how small is the importance of a man's name in comparison with the quality of his work! And, therefore, if we dare not aspire to immortality, let us take comfort from this—that though our brows may never bear the fading laurel, nor Time inscribe us on the everlasting roll of Fame, no one can deprive us against our will of the consciousness of having done our work to the very best of our ability.

[Some notes of the discussion which followed the reading of this paper will be found on another page.]

LIABILITY FOR DRAINAGE REPAIRS.

MR. P. E. PILDITCH, in his paper read at the Surveyors' Institution on March 6 on "Dilapidation Practice, particularly as affected by some Recent Decisions," made the following remarks as to liability for drainage repairs, &c. :—

"Four cases have recently been decided upon the question as to whether the landlord or the tenant is liable for the cost of repairs required to drains and sanitary arrangements during the existence of a tenancy. In each of these cases the terms of letting and the repairing and other covenants have varied, so that the matter needs some examination in detail, though not, you will be pleased to hear, at any great length."

Under the Public Health Act, 1875, the Metropolitan Management Acts, 1855 and 1862, and the Public Health (London) Act, 1891, the liability to make good structural defects to drainage is cast upon the lessor, apart from contract upon the subject.

In *The Home and Colonial Stores v. Todd** (1891), the tenancy of a London house was one for 12 years at a rent of £40 per annum, 'payable free and clear from all deductions for main drains and sewer rates, improvement rates, taxes, &c.' The Local Authority themselves reconstructed the drains of the house which were defective, and recovered the cost from the tenant. The Court held that, the premises being let at a rack-rent, and the work done being for the permanent improvement of the property, the landlord was liable to pay the cost, under Section 73 of the Metropolitan Management Act, 1855, and Section 6 of the Amending Act of 1862, and that there was nothing in the covenant to make the tenant liable to do so.

The next case is *Lyon v. Greenhow*† (1892). The property, which was situated outside the Metropolitan area, was let on lease for nine years. About eighteen months before the expiration of the lease, the Local Authority executed the rearrangement of the drainage system into the sewer, the property having been previously drained into a cesspool, and the landlord paid the cost of the same under threat of legal proceedings. The covenant ran as follows:—"The tenant will pay all rates, taxes, and assessments . . . which . . . shall be imposed upon the said premises, . . . and will make, uphold, support, cleanse, repair, and keep in repair all . . . sewers, drains, cesspools, necessities, privies, aunts, . . . belonging to the said premises." The landlord brought an action to recover the cost, 68*s.*, from the tenant, but the Court held that under Sections 22 or 94 of the Public Health Act, 1875, the landlord was liable for the same

as being in receipt of the rack-rent, and that the covenant I have quoted did not make the tenant liable for structural alterations to the drains. In this case an attempt was made to read Sec. 4 (the definition Clause) of the Public Health Act as excluding an owner who employed an agent to collect his rent from the meaning of the term 'owner' as being 'the person . . . receiving the rack-rent of the premises, whether on his own account or as agent,' which was, of course, overruled.

The third case is that of *Gembhardt v. Saunders**, one of the first cases under the new Public Health (London) Act, 1891. The premises were let from year to year; the drains became stopped, and the Local Authority served a notice upon the tenant to abate the nuisance, which he did, when it was found that it was caused by a structural defect. The Judge of the City of London Court held that the tenant could not recover the cost he had been put to from the landlord, because the Local Authority had not served a notice upon the owner under section 4, sub-section 3, which provides for the service of a notice to abate a nuisance arising from a structural defect upon the owner; but the Divisional Court overruled this decision, and held that the landlord was liable under section 11, sub-section 1, of the Act.

The fourth case is that of *in re Bettingham-Melhado v. Woodcock* (1892), in which certain structural alterations had to be made to the sanitary arrangements of premises in Westminster, held by a solicitor upon lease which contained a covenant by the tenant 'to pay all rates, taxes, assessments, and outgoings whatsoever,' and to 'keep the said premises in a tenable state of repair, . . . ordinary wear and tear alone excepted.' The Judge held that the tenant, being liable for all 'outgoings' was clearly liable to undertake the repairs and alterations in question, and that his liability might, in consequence of the existence of that word in the covenant, seriously increase his general liability for repairs, so as even to cover repairs necessitated by ordinary wear and tear which would not be covered by the repairing covenant.

This is a most serious point for lessees and surveyors advising as to the practical bearing of the repairing covenants in an agreement.

I have been obliged, owing to considerations of space and time, to make my reference to these cases much briefer than their importance would warrant, but I may say that there are a great many important points as to the relative liabilities of landlords and tenants, and as to the construction of the Metropolitan Management Acts, and the Public Health Acts 1875 and 1891, which render a careful perusal of them well worth the time so expended."

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

THE BATTERSEA POLYTECHNIC.

The fourth of the Architectural Association Spring Visits took place on the afternoon of Saturday, March 25, under the guidance of the Junior Honorary Secretary, Mr. F. T. W. Goldsmith, when the Battersea Polytechnic was inspected. The architect, Mr. E. W. Mountford, met the large party of members who assembled, and conducted them over the building. The condition of the building at the present precludes detailed reference, as the interior fittings are almost entirely absent, and some nine months will elapse before the buildings will be complete. Accounts of this building appear in our issues of March 28 and April 18, 1891. In planning the building the architect had to arrange for the accommodation of the administrative department, technical education department, including art rooms, and departments for physical and social recreation. The necessary concentration of each department has been successfully carried out, and though each is kept perfectly distinct and separate, they can be easily brought into communication with each other and the main entrance, which is in the centre of the main front façade. A point has been made in the perfect straightness and simplicity of the corridors. The great hall, destined to provide accommodation for 1,200 persons, has not yet been begun: it will be constructed so that when required it can be let for purposes entirely apart from the Institution. In the elevations red bricks of a good colour have been used, and these are relieved by the use of Monks Park stone dressings; brown tiles have been used on the roofs. We hope to again refer to this building at a later stage of its progress. The contract is being carried out by Messrs. Holloway Brothers, of Victoria Works, Lavender Hill.

* L.R. [1892] = Q.B.D., 452.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon last at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

The London Improvements' Bill.—The Parliamentary Committee brought up the following report and recommendation:—

"This Bill was reported by the Examiner as not complying with the Standing Orders. The subject of the report of the Examiner was a single clause in the Bill (45, the clause relating to the improvement charge), the Standing Orders having been in every other respect fully complied with. The whole discussion before the Examiner turned on the legal effect of clause 45, taken in connexion with existing Acts of Parliament, and whether the paragraphs in the notices for the Bill, which are referred to in his report, describe this effect sufficiently clearly to warn persons interested of the 'objects' of the Bill. The Bill has since been before the Standing Orders Committee and has been allowed to proceed, subject to the issue of fresh notices.

The more important improvements included in the Bill were resolved on by the Council on the understanding that satisfactory provisions were made as to payment for them, and the Bill contains 'betterment' clauses, under which it is proposed to charge a portion of the cost of the improvements on the owners of property benefited. The Bill, as the Council will remember, includes the following improvements—

- (1.) New central street, from Holborn to the Strand and subsidiary streets.
- (2.) Approach to Tower-bridge.
- (3.) Widening of Wood-lane, Hammersmith.
- (4.) Vauxhall-bridge.
- (5.) Rotherhithe and Ratcliff-ferry.
- (6.) Widening of southern approach to Woolwich Ferry.

The Bill was formally read a first time on the 2nd instant, and looking to the terms of the resolutions of the Council, we have given lengthened consideration to the question of the course to be pursued with regard to its further progress, and having regard to all the circumstances of the case, we recommend—

"That the Council do sanction notice being given for the second reading, upon the understanding that further progress with the Bill in its entirety will be dependent on arrangements being made by Parliament during this session for some financial relief to the occupiers of London."

Amongst other amendments which were rejected was the following, moved by Mr. H. P. Harris:—

"That having regard to the very urgent nature of some of the improvements comprised in the London Improvements Bill, the Council do proceed with the Bill."

This was rejected, on a division, by 71 votes to 26, and the recommendation was agreed to.

Resignation of an Assistant-Engineer.—The report of the Establishment Committee contained the following paragraph:—

"The Deputy-Chairman has reported to us that he has received, through the Chief Engineer, the resignation of Mr. W. S. Crimp, one of the District Engineers of the Council. Mr. Crimp was appointed, after advertisement, in February, 1890, at a salary of 600*s.* a year, and in February, 1892, the Council raised his salary to 650*s.* by two annual increments of 25*s.* each. In resigning, Mr. Crimp states that he leaves his present work with regret, and that his only reason for doing so is that he considers the salary now paid to him by the Council to be inadequate, and that he has therefore accepted a partnership with a firm of civil engineers at Westminster."

Mr. Crimp has had the care of the most important district of London, and is one of the ablest officers of the Council, and we report his resignation with much regret. The Engineer states that Mr. Crimp's departure must cause considerable derangement of the work of his department, and makes certain suggestions as to filling the vacancy. We think that these suggestions should be considered by the committees chiefly interested in the work formerly carried on by Mr. Crimp, and as by the order of the Council the question of the appointment of a successor must be referred to these committees jointly, we recommend—

"That the resignation of Mr. W. S. Crimp, the letter of the Chief Engineer, and the question of the appointment of a successor to Mr. Crimp, be referred to the Main Drainage Committee, the Highways Committee, and the Improvements Committee to report jointly to the Council."

We may add that Mr. Crimp's engagement will terminate on June 30, but that he kindly states that if this will cause inconvenience to the Council he will do all he can to meet the Council's wishes."

After transacting other business, the Council adjourned until Tuesday, April 11.

SANITARY INSTITUTE.—We have received the annual report of the Sanitary Institute. In the epitome of work done during the year we find included thirty-four London lectures to sanitary officers, attended by 3,253 persons, and eighty-seven similar lectures in the provinces, attended by 7,265 persons. The Institute has received an important contribution to its funds in the shape of a legacy of 9,248*s.* from the Berridge Estate.

* L.T., C.L.D., vol. 63, N.S., p. 829.

† T.L.R., Q.B.D., vol. 8, p. 457.

THE ARCHITECTURAL ASSOCIATION.

The eleventh ordinary meeting of this Association for the present session was held on Friday, March 24, in the meeting-room of the Royal Institute of British Architects, 9, Conduit-street, Mr. Paul Waterhouse, M.A., Vice-President, in the chair.

On the motion of Mr. F. T. W. Goldsmith, one of the honorary secretaries, a vote of thanks was accorded to Mr. Delissa Joseph, the architect of the new Synagogue at Hampstead, for permitting the members to visit that building on March 11.

The chairman announced that the Lectures on Professional Practice would begin on April 18, and that the Class for Modelling would commence on April 20.

Mr. J. A. Gotch, J.P., F.R.I.B.A., past President of the Association, then read a paper "In Praise of a Country Practice." We print this paper *in extenso* in this number of the *Builder*.

In the discussion which followed, Mr. Hampden W. Pratt said he had very great pleasure in moving a hearty vote of thanks to their esteemed past President for the very pleasant paper which he had given them. Mr. Gotch had placed before them a glowing picture of the opportunities which country practice afforded. No doubt when they (the town members) paid their next visit to the country they would find very little to criticise; indeed, if every architect faithfully carried out the ideas which Mr. Gotch had expressed they would attain to something approaching perfection. Mr. Gotch had spoken of the advantages of practising near one's work; but it must not be altogether forgotten that many architects practising in London had their work as close to them, or nearly so, as Mr. Gotch could desire. He wished to cordially endorse and emphasise the one important lesson that ran through the whole of Mr. Gotch's paper, and that was that the young architect must do his work thoroughly. One advantage of practising in the country near one's work was that, except on very large buildings, it would be found possible to do without a clerk of works. It was his opinion that where a clerk of works was employed on a job the architect did not always give that personal supervision to the building which it ought to have.

Mr. F. W. Marks, in seconding the vote of thanks, expressed his regret that the attendance of members was not so great as could be desired. Mr. Gotch in his paper had called attention to the fact that in a country practice the architect came closer in contact with the workmen, and they thus became more in touch with one another. He thought that if more architects could rush away from the turmoil of this great city there would be more good architecture than we saw in the present day. The great evil in architecture in the present day was, he thought, the tendency to centralisation. Every man who made a mark in the provinces as an architect seemed to think that he must necessarily come up to London. From what he (the speaker) had seen of country practice he liked it very much, and probably, like many of them, he might some day try to set up a country practice if he found, when the time came, that he was prepared to undergo the long period of waiting which, he was afraid, would attend the lot of any young man who went from London to set up a practice in the country.

Mr. Sydney Vacher said he should like to add his thanks to Mr. Gotch for having given them so exceedingly attractive a picture of country practice. He was very much impressed with what Mr. Gotch had said as to the way in which people could be kept in touch with work in the country; but he was rather disappointed in one thing. Mr. Gotch had told them a great deal about the art aspect of architecture in the country, but he should have liked to have heard something more about it from the business point of view. Mr. Gotch had said that the country practitioner had to take most things that came to his hands; that was also largely true of the London practitioner, although some few became specialists. But he thought that there could be no doubt that in a country practice the purely business part of the work became very small—and the purely architectural part very small—so small, in fact, that it must be very difficult sometimes for the practitioner to keep up his enthusiasm for architecture. He thought it was the practice for architects in the country to take out their own quantities; but he should like to know whether it was a fact that in the country the architect charged a fee of 2½ per cent. for his quantities, although in

London the charge was only from 1½ to 2 per cent? For his own part he was of opinion that if a man could get enough architecture to do he had no time to take out quantities. One of the necessary qualifications of an architect was the power to do good work at a moderate cost, and therefore he did not think it was advisable to make a practice of altering the details of a building while the work was in progress.

Mr. C. H. Brodie said he had great pleasure in supporting the vote of thanks to Mr. Gotch. As one who had served his articles in the country (in Devonshire), he could speak with some knowledge of the subject when he said that Mr. Gotch's points as to the delights of a country practice were not at all strained. The delights of a country practice were far beyond what we could hope for in London. He thought that Mr. Gotch had done very well to insist upon the good that resulted to the work from closer contact between workmen and architect.

Mr. Greenop, in supporting the motion, said he cordially endorsed Mr. Gotch's very sensible remarks about the architect-surveyor. One heard a great deal of what he might call cant on that question. He had heard men get up and talk very highly about architecture being an art, and not a profession, but he knew for a fact that some who talked like that were very pleased to get a fee for introducing a mortgage. He thought that the country architect had this advantage over his London brother—that in the country the architect had generally to deal with the whole four sides of his building, whereas the London architect had only one narrow frontage, as a rule.

Mr. Stockdale having said a few words, Mr. Max Clarke, referring to the quantities question, said that architects in London who took out their own quantities charged 2½ per cent. for them. If country architects charged a little less for them, it was perhaps due partly to the fact that in the country there was more competition, and partly to the fact that in the country the system of taking off the quantities was not so elaborate as that adopted in London.

Mr. Blackwell put in a word for the advantages of country practice from an assistant's point of view.

Mr. T. C. Yates said that there were some aspects of country practice which Mr. Gotch had not touched upon. Sometimes an assistant would set up in the town in opposition to his master, notwithstanding he had entered into an agreement not to practice (say) within forty miles of the town.

Mr. A. T. Bolton having said a few words, The Chairman said he should like to join most heartily in thanking Mr. Gotch for his suggestive paper, which was presented to them, like all Mr. Gotch's papers, with the added charm of literary grace. He was only afraid that one effect of the paper would be to cause Mr. Gotch's own domain to be invaded by London architects.

The vote of thanks having been passed by acclamation,

Mr. Gotch briefly replied, saying that they in the country would always be pleased to see their London friends—as visitors. As to "quantities," as far as his experience went it was a great advantage to have the quantities taken off in the office where the drawings were prepared. The country system of quantities was, he thought, to be preferred to the London method. It was not so elaborate, but the very elaboration and minuteness of a London bill of quantities was somewhat of a difficulty to the country builder.

BUSINESS CHANGE.—We understand that the business which has for many years past been carried on by Messrs. Robert Steele & Co., iron and brass founders, Sleaford-street, Nine Elms, has been purchased by Mr. J. Stone, engineer, smith, &c., of St. George's-road, Southwark. For the purposes of the new business, Mr. Joseph Stone has taken into partnership his nephew, Mr. Charles Grace. The style of the firm will be "J. Stone & Nephew."

BRICKS FOR CHIMNEYS.—With reference to the recent fall of the manufactory chimneys in which the bricks were reported to have been damaged by chemical acid, the Brockley Brick and Tile Company send us a circular in regard to their acid-resisting "metalline" bricks, which are claimed to be impervious to the action of the acids, as they must indeed be, if it is true, as stated in the circular, that one of them was "continuously boiled in sulphuric acid for two months" without any perceptible action having taken place. The use of bricks that will resist acids is a very important consideration in building chimneys which will be exposed to chemical fumes, and the metalline bricks may be worth attention in this respect. They are made of specially prepared clays, burnt extremely hard.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—About fifty members of the Edinburgh Architectural Association journeyed to Glasgow on the 25 ult., and were shown over the Municipal Buildings and the cathedral. On the arrival of the members at Glasgow, they were met by Mr. John Honeyman, and at once proceeded to the new Municipal Chambers, being shown over the building by the custodian, Mr. M'Leod. Before leaving, on the motion of the President Mr. W. W. Robertson, a vote of thanks was awarded the Lord Provost and Magistrates for their courtesy. The Cathedral was next viewed, and Mr. Honeyman pointed out its different styles of architecture. Subsequently some of the members of the party visited the new Barony Church, designed by Messrs. Burnet, Son & Campbell.

GLASGOW ARCHITECTURAL ASSOCIATION.—On the 21st ult., a lecture was delivered before the Glasgow Architectural Association by Mr. Campbell Douglas, F.R.I.B.A., entitled "Notes of a Visit to Spain and Portugal." By means of a large number of lantern slides various buildings of interest were illustrated in Lisbon, Toledo, Madrid, and elsewhere, and reference made to peculiarities in design, materials, &c., of the native architecture. A number of pictures by celebrated Spanish artists from the gallery at Madrid were also shown by slide, and at the close a vote of thanks was awarded the lecturer.

COMPETITIONS.

DECORATION OF HUDDERSFIELD TOWN-HALL.—We are informed that the designs for the decoration of Huddersfield Town-hall, which have been under consideration for some time past, have resulted in those of Mr. Reuben Bennett, of Manchester, being accepted. There were twenty competitors, and each sent in under a *nom de plume*.

SCHOOLS, CLACTON.—We understand that in the Board School Competition for Clacton-on-Sea the first premium has been awarded to the design sent in by Mr. T. H. Baker, a local architect.

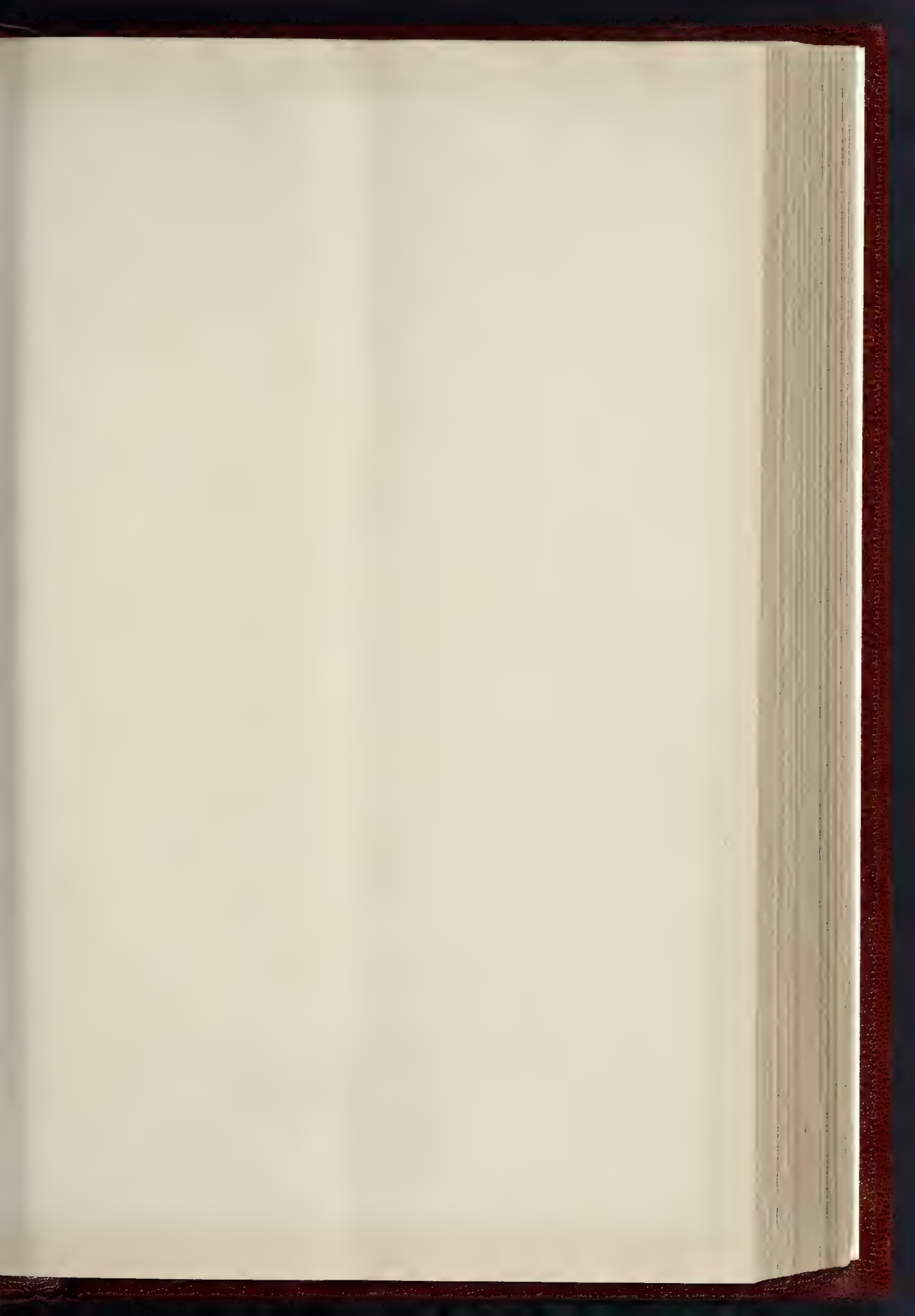
Illustrations.

MANCHESTER CATHEDRAL.*

THE present diocese of Manchester is of modern creation, but the Cathedral church itself, or as it is still called in the local vernacular "th'owd Church," is of ancient foundation, having been originally Parish Church, then Collegiate and Parish Church, and now finally Cathedral of the diocese and Parish Church of Manchester, the Cathedral proper consisting of the choir and its aisles only, while the nave and its aisles are still the Parish Church. The Dean has moreover, according to Act of Parliament (13 & 14 Vict., c. 41, sec. 4), " . . . cure of souls in the Residuary Parish," in which he is assisted by the Minor Canons, who . . . shall be subject to and act under his directions; and the said Dean shall have all rights and powers in reference to the performance of the services of the said Parish Church as fully and effectually as if he were Rector of the same." Manchester, together with the rest of Lancashire, originally formed part of the large Diocese of Lichfield and Coventry, but on the formation of the See of Chester by Henry VIII. in 1541, Lancashire was transferred to the jurisdiction of the Bishop of Chester, and remained so until 1848, when the present Diocese of Manchester was created.

There is a general, though totally erroneous impression, that Manchester, and all pertaining to it, is of quite recent, if not of purely mushroom growth. As a matter of fact, it has been a place of some importance ever since the Romans established a camp on the banks of the River Irwell, part of the walls of which still remain, by a curious change of circumstances, in the basement of a modern warehouse. This Roman station was about a mile south of the site of the present church, and after the departure of the Romans from Britain, the site of the town was removed north to a point at the junction of the Rivers Irk and Irwell, the position now occupied by the Cathedral and Chetham's Hospital, this latter at one time the

* This series of illustrations of the Cathedrals of England and Wales was begun in our issue of January 3, 1891. A list of those already illustrated, with particulars of future arrangements, will be found on page 260.





Cathedrals of.

No 29 MANCHESTER FROM THE S



PHOTO LITHO. ORRIDGE & CO. 48, 49, EAST NAKED ST. STREET, LONDON. ANS. 1. C.

and Wales.
DRAWN BY MR. H. D. BEDFORD, A.R.B.A.

domestic buildings of the college. This migration was probably brought about by the plundering of the old town by the Danes. At this new site a manor house was built, and in all probability a church erected near the site of the present one. This settlement, with the exception of the church, was formed into an island by the formation of a broad and deep moat, joining the two rivers. Traces of this moat still exist in the deep cellars of the modern buildings which cover it, and the passage known as "Hanging Bridge" is in reality the Medieval bridge crossing the moat, and leading straight to the south door of the Cathedral. The arches of this bridge are still *in situ*, though hidden between the cellars of the houses on either side, and still carry the footway which forms the chief means of approach to the Cathedral from the town. The old Church of St. Mary, mentioned in Domesday Book, stood about 200 yards south of the Cathedral, and outside the moat, and not on the site of the present edifice, and there is no evidence to show when the present site was first built on. The view generally taken is that the present site was not built on till 1421, the date of the foundation of the college, but, as will be hereafter mentioned, the Cathedral contains evidences of a date considerably anterior to this.

The Cathedral occupies a commanding position on a high ground, and is not seriously hemmed in by surrounding buildings except at the east end, and stands in its own disused churchyard; but it suffers much from the general character of its surroundings, and from the smoke-laden atmosphere which is unfortunately such a marked characteristic of Manchester. It is now difficult to realise what the natural beauty of the site must have been, when smoke as we now know it was not, and the Irwell—not to mention its disgraceful tributary, the Irk—was still clean, and when the oak used in the building was still in the form of living trees growing in the immediate neighbourhood. Now, the outside is entirely naked, save for patches of new stonework here and there, and this in spite of the fact that the whole church has been recased externally within about the last thirty years. To the ordinary observer, the first impression of the church is one of disappointment. It possesses few or none of the attributes one is accustomed to associate with a cathedral, especially with the cathedral of an important city like Manchester, though it cannot be denied by even the most disappointed that it possesses a great beauty and dignity of its own. A never was built for a cathedral; and, considered as such, it must be admitted that it is disappointing, though it really is a very fine and complete specimen of a late Collegiate church.

The Cathedral consists of a nave and choir, with north and south aisles, a lofty western tower, a Lady Chapel at the east end, and a small octagonal Chapter House opening out of the south aisle of the choir. Again, beyond the aisles proper extend outer aisles on both sides. These outer aisles were originally private chantries or chapels, and were divided from the aisles by wooden screens, which in the choir still remain; but in the nave the chapels have been gradually incorporated into the body of the church, with the result that we have a very unusual plan for an English church, though more common abroad, of a central nave with inner and outer aisles on both north and south sides. The effect of this multiplicity of aisles and apparent maze of columns is very striking on first entering the church, and more over the effects of colour and "atmosphere" produced are very fine, the interior being built of sandstone, and nearly all the windows being now filled in with stained-glass.

The Cathedral has suffered fearfully by so-called restorations and beautifications, chiefly at about the beginning of the present century, when many of the chapel screens were removed, enormous galleries were erected, and the old work was hacked away and covered with Roman cement, and worse still, was in places refaced and "improved." During the last ten years, however, all this has been altered, and the restorations effected since then have improved the building in many respects, and the extensions rendered necessary to accommodate the congregation, and to take the place of the removed galleries, have been carried out entirely in keeping with the ancient structure.

Almost nothing is known of the early history of the church, prior to the date of its collegiate foundation. Domesday Book records that there were two churches in Manchester, St. Mary's and St. Michael's, which were possessed of one carucate of land, free from all taxes, save danelgitt. No mention is definitely made of any church in Manchester between the date of Domesday Book and the date of the foundation of the College,

and even the approximate date when a building was first erected on the present site is at present a matter of conjecture. The names of many of the early rectors are, however, known, and among them are several who were advanced to the very highest positions. Chief among them, perhaps, was Walter de Langton, who in 1292 was appointed Rector of Manchester, and in the same year Keeper of the Great Seal by Edward I. Four years later he became Bishop of Lichfield, where he built the Lady Chapel, and left funds for its completion. He retained the rectory of Manchester for three years after his appointment as Bishop, and, quite possibly, being a great builder, he may have indulged his tastes at Manchester. William de Marcia was another celebrated Rector of Manchester. He was Treasurer of England, also in the reign of Edward I., and was subsequently Bishop of Bath and Wells. We also learn that in 1342 there were four chaplains in Manchester. Also at about this time several valuations of the Rectory were made, which average at about 200 marks per annum. It is quite reasonable to argue from these facts that an important church must have existed in Manchester prior to 1421, the date of its collegiate, and, as far as it is possible to read it, some parts of the architecture of the church seem to favour this view, and to show in advance, the arch and its responds opening into the Lady Chapel are almost certainly of Decorated date; while the Lady Chapel itself, said to have been founded (rebuilt?) by Warden West in 1518, contains windows which, though the work of the eighteenth century, seem rather to have been copied from Decorated than from Perpendicular work, as they contain circles in the tracery, and a bastard imitation of the ball flower in the mouldings. Also, when the old tower was pulled down in 1864, it is recorded that the lower portion was undoubtedly of Decorated character, and during the various restorations of this century, many fragments of Decorated, and even earlier stonework have been discovered. The existence of Decorated work at each extreme end of the building is strong presumptive evidence that a church of equal dimensions existed before the present one was built. The popular tradition is that the original church was of wood, like several still remaining in the district, and very likely parts of it were so constructed; but having regard to the fact that Manchester was then a place of considerable importance—one of the few in Lancashire indeed in those days—it seems reasonable to suppose that there was a large Decorated church on the same site before the present one was built, and that some traces of it still exist. As, however, these traces are but problematical, it has been thought best to shade the plan in two ways only, for Perpendicular, including restorations, and modern additions.

Mr. Crowther, the Architect to the Dean and Chapter, who has carried out all the recent restorations, had been for some time engaged upon an exhaustive monograph of the Cathedral, which will be of exceptional interest, and will probably settle most, if not all, of the many vexed questions as to dates, as of course during the carrying out of the work he had exceptional opportunities of arriving at the true facts of the case, and many important discoveries are understood to have been made.

In the year 1421 licence was granted by Henry V. to Thos. Lord de la Warre, Rector and lord of the manor of Manchester, to collegiate the parish church. The words of the charter are "Ecclesiam de Mancestre in ecclesiam Collegiatam erigere"—which seem to point rather to the fact of the existence of an earlier church of sufficient size and importance to be made into a Collegiate Church, than to any expressed intention of building a new one. "Erigere" is seldom used as meaning to build. As a matter of fact the Church was, with the exception of the minor fragments above mentioned, entirely rebuilt within the first hundred years following its collegiate, and it is only from this date, 1421, that anything really certain has been recorded about the fabric—and even now many contradictions and irreconcilable statements exist. On the formation of the College the Church was dedicated to St. Mary, St. George, and St. Denys, and the collegiate body originally consisted of a warden, eight fellows, four clerks, and six choristers. The College was dissolved by Edward VI., and its land passed into the possession of the Stanleys, but was re-established by Mary, and its lands—with the exception of the domestic buildings—were restored to the College. The buildings remained in the possession of the Earls of Derby

until after the Restoration, when they were conveyed to the feoffees of the Chetham Hospital, and have ever since been used as a school and library. They remain in much their original condition, and are one of the most interesting "sights" of Manchester. The re-establishment of the College was confirmed by Elizabeth, who altered the foundation to a warden and four fellows, again by Charles I., and again at the Restoration by Charles II.

The first warden, Sir John Huntington (1422-1458) began the work of rebuilding on his appointment, which was sedulously continued by his successors for something like 200 years. Huntington is generally credited with having first built the choir and its aisles and Chapter House. Langley is supposed to have built the nave, and Stanley is said to have rebuilt Huntington's choir, to have built the double entrance to the Chapter House, a sketch of which is given, and in conjunction with Richard Beck, a Manchester merchant, and a member of the London Grocers' and Mercers' companies, to have erected the splendid stall work of the choir. Moreover, Stanley at his death, when Bishop of Ely, left permission for the erection of the Derby and Ely chapels, marked on the plan as St. John the Baptist's chapel. To follow out carefully all the traditions as to which warden built what would be far beyond the scope of the present paper; it must suffice to have mentioned them, and to refer to some of the features of the building.

The nave and choir are of six bays each, very similarly treated as to detail, and divided by a lofty chancel arch—rising nearly to the roof and springing from responds coupled to octagonal turrets containing the stairs leading to the roof-loft and roof. The stonework of the choir is original, having been skimmed only with cement—now removed—and so fortunately preserved. The nave has been entirely rebuilt, but has been exactly and carefully done, and is a faithful reproduction of the original work. The roofs of both the nave and choir are original; that of the nave was repaired when the stonework was rebuilt, but with the exception of a few new timbers is practically the old roof. The intersections of the timbers are covered by a series of most beautiful bosses, carved out of the solid, and at the feet of the springers of the principals are a 'singularly perfect series of angel-figures playing on musical instruments, stringed instruments on one side and wind on the other. These figures are carved with great power and spirit, and are in good condition, in spite of the fact that several of them contain bullets fired into them, presumably by the Commonwealth soldiery. The choir roof is more elaborate, the panels between the timbers being filled with delicate tracery. The bosses of this roof are built up, not carved out of the solid. Each leaf is carved separately, and nailed in its position. The effect is very good. This roof was repaired recently by placing strong new principals over the old, and bolting the two together, and by removing the various coats of paint with which it was covered. None of the other roofs are ancient, though in places the old timbers remain covered by deal casings.

The arcade dividing the inner and outer aisles on the north side of the nave dates from about 1500, the Holy Trinity Chapel having been founded in 1498, and St. James' Chapel in 1507. The arcade corresponding to this on the south side is entirely modern, the chapels on this side having been originally divided from each other by walls, and from the south aisle by arches not in the form of an arcade. These were removed, together with the oak-screens, in 1815, and an arcade was then built, which has been replaced by the present one. Both porches are modern, but a small ancient one once existed on the south side, as shown on the plan.

On entering the choir, the first thing that meets the eye is the magnificent tabernacle work of the stalls. These were erected about 1505 to 1510, and will compare favourably with any work of the same sort in England. A curious point in connexion with these stalls is that they were, without doubt, designed and executed by the same hand that produced those in Beverley Minster, and very probably those at Ripon, while a strong family likeness, so to speak, can be traced to other similar work in the North of England. At Beverley the resemblance is singularly striking, the whole design being nearly identical, with the exception that the very unusual feature of the level cornice above the canopies is omitted at Beverley, and the canopies finish in spirelets in the more customary manner. The misereres at Manchester are very fine, and the stalls-elbows, bench-ends, and finials, and, indeed, all the details are well worthy



illustrated by the martyrdom of St. Stephen, the baptism of Christ, and the descent of the Holy Spirit. Two lights are devoted to each of these subjects, the larger mullions separating the subjects, the smaller crossing the picture.

DADO IN MEDICI CHAPEL, RICCARDI PALACE, FLORENCE.

The building, now called the Riccardi Palace, at Florence, was originally the seat of the Medici family. It was built in 1430 by Michelozzo for Cosimo de' Medici, and the Chapel, so well known from the masterpiece of Benozzo Gozzoli that decorates its walls (the Procession of the Three Kings to Bethlehem), is a very complete example of early Renaissance art; the beautiful carved stalls, the marble pavement, the decorated ceiling, and, presumably, the dado, now illustrated, being from the design of Michelozzo. This latter is painted in black and white only, with the exception of the large discs, which simulate precious marbles of various colours, and the roundels both large and small, which bear the red "Palle" of the Medici on a yellow ground. The design is interesting as embodying a device of the family, the ring with motto, "Semper," which, with the arms above mentioned, have a great share in the composition of the ornament.

The dado is 4 ft. 2 in. from the ground to the lower border of the grisaille framing to Gozzoli's painting.
H. W. L.

TOMB AT SAN LORENZO, FUORI MURA, ROME.

The Roman sarcophagus which was utilised as a tomb for the Cardinal Guglielmo Fieschi, when he died in 1276, is of the third century, and is remarkable for its size and completeness. The main subject is a marriage, with Juno, Hymen, Venus, the victim for the nuptial sacrifice, &c.; on the lid, Pluto and Proserpine, the Dioscuri, Phoebus, and Nox. Two columns, probably also antique, carry a wooden Medieval baldachin. In the fresco on the wall we see the Cardinal and his uncle, the Pope Innocent IV., supported by St. Lawrence and St. Stephen, kneeling at the feet of Christ. Over the end of the tomb is the Madonna and Child. The paintings are of no great intrinsic merit, but their colour combines well with the mellow tones of the old marble, and the whole forms a singularly attractive and suggestive group.
H. W. L.

OBITUARY.

MR. J. S. CROWTHER, F.R.I.B.A.—The *Manchester Guardian* of March 28 announces the death of Mr. Joseph Stretch Crowther, architect, Manchester. He was best known as an ecclesiastical architect. His first work of any importance in this department was St. Mary's Church, Moss-lane, Hulme, built by Mr. Wilbraham Egerton, of Tatton, and consecrated by Bishop Prince Lee in November, 1858. This church is still regarded as one of the best specimens of Gothic architecture on the south side of Manchester. In 1874 he was commissioned to design the well-known Church of St. Alban, Waterloo-road, Cheetham, and at a subsequent period, during the rectorate of Canon Knox Little, the schools of the same church. In 1875 he designed the important new church of St. Mary's, Crumpsall, the original structure of which had been struck by lightning and burnt down. His next work of moment, and that which in point of importance ranks next to the restoration of Manchester Cathedral, was the Bury Parish Church, which was rebuilt from his designs in 1876. This edifice was always regarded by Bishop Fraser as "the gem of the diocese." Another work of considerable importance was St. Benedict's, Ardwick, erected by the late Alderman J. Marsland Bennett, and consecrated by Bishop Fraser in March, 1880. In 1885 he restored the chancel and other parts of the Parish Church of Rochdale, and in 1890 he designed the chancel for Littleborough Parish Church, at a cost of 7,000*l*. As is well known, Mr. Crowther's principal work has been in connection with the Manchester Cathedral, the restoration of which he had fortunately completed just on the eve of his death. This restoration was commenced some ten years ago, and it may be said to be the crowning act of Mr. Crowther's busy and active life, not merely because it was his last, but because it was by far the most important undertaking on which he has been occupied. We may add that Mr. Crowther was joint author, with Mr. H. Bowman, of "Churches of the Middle Ages," published in 1845.

MR. WILLIAM BALFOUR.—The death took place, on March 21, of Mr. William Balfour, Montrose, retired builder. He was eighty-seven years of age, and was a son of the late Mr. John Balfour, who was also a builder of many years standing in Montrose.

of the minutest study. The rood-loft is situated above the return stalls and the rood-screen, and carries part of the huge modern organ (the remainder being stowed behind the stalls in the north and south aisles). The organ case was designed by the late Sir G. G. Scott, and is of good outline, but too "fussy" in detail. The ancient rood-screen is a magnificent specimen, with three large openings with folding doors. There are two other remarkably fine oak screens in the choir, that between the south choir aisle and the Jesus Chapel, and that to the Lady Chapel. Both are excellent pieces of work, but the Lady Chapel screen is of more original and unusual design. On either side of the opening to the Lady Chapel—which has been before alluded to—occurs the rebus of the first Warden Huntington, on one side a hunting scene for *Hunting*, and on the other a tun, or cask, for *ton*. This same rebus occurs in the choir roof. On the north side of the choir is the Derby Chapel, entirely surrounded by oak screen-work, of good design, but of much inferior workmanship to the stalls and the rest of the screens.

The outside of the Cathedral is of considerably less interest than the interior. The western tower was rebuilt and its design "improved" (rather questionably) in 1864. It is more or less a reproduction of the old one, and is undoubtedly fine, though it is to be regretted

that it is not what the old one was. It is the chief feature of the exterior, and from many points is very commanding, particularly from the other side of the river, where the height of the site is most apparent. The parapet of the clearstory, too, has unfortunately been "improved." It is now battlemented, but was originally in one straight line from end to end of the church, giving a much greater appearance of length, an effect much wanted from most points of view, and on the evidence of old drawings a great improvement on the present arrangement.

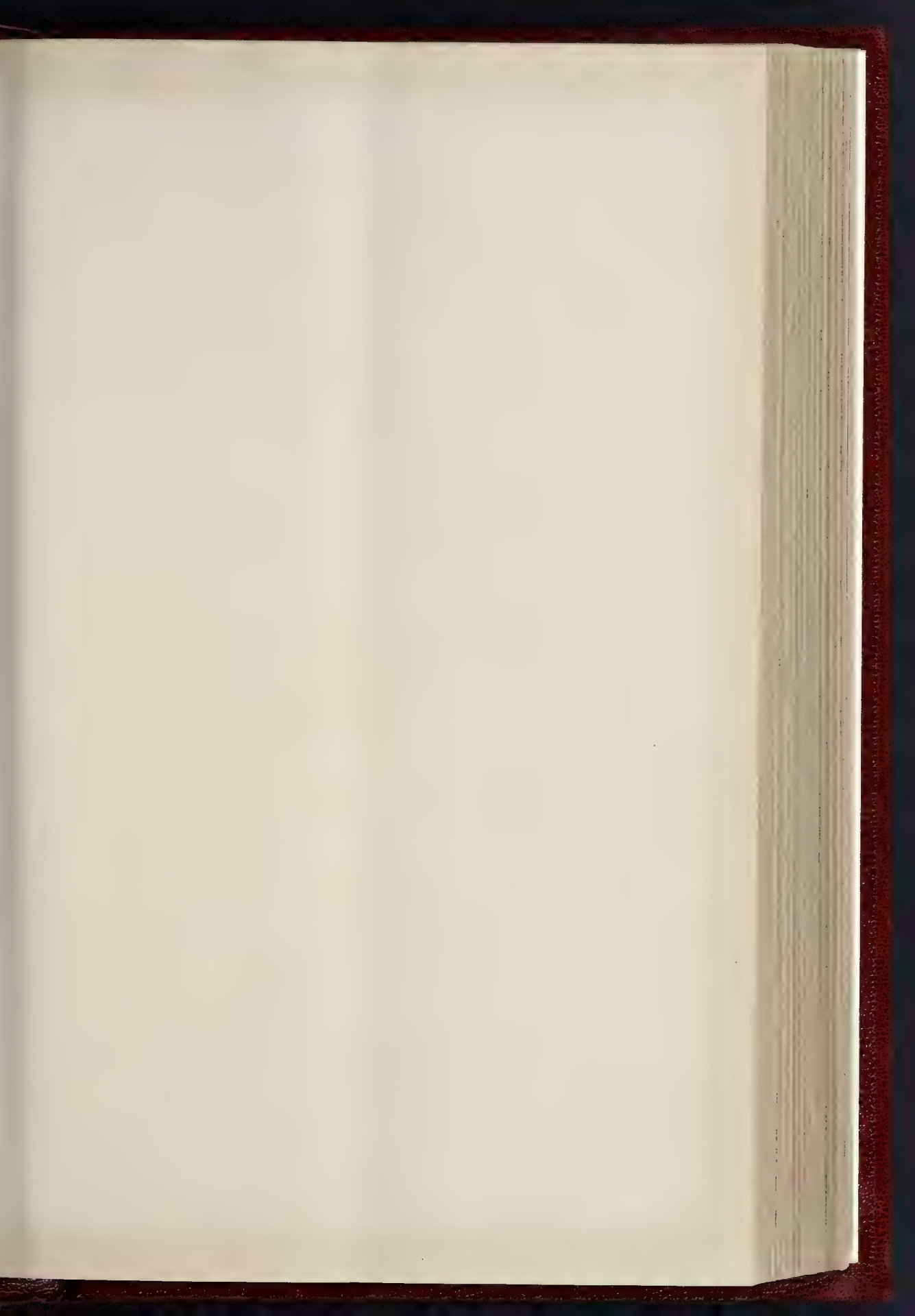
The steep conical roof of the Chapter House, too, another important external feature, is entirely modern, and though it is uncertain whether such a roof originally existed, it cannot be denied that it adds greatly to the effect of the view from the south.

F. P. O.

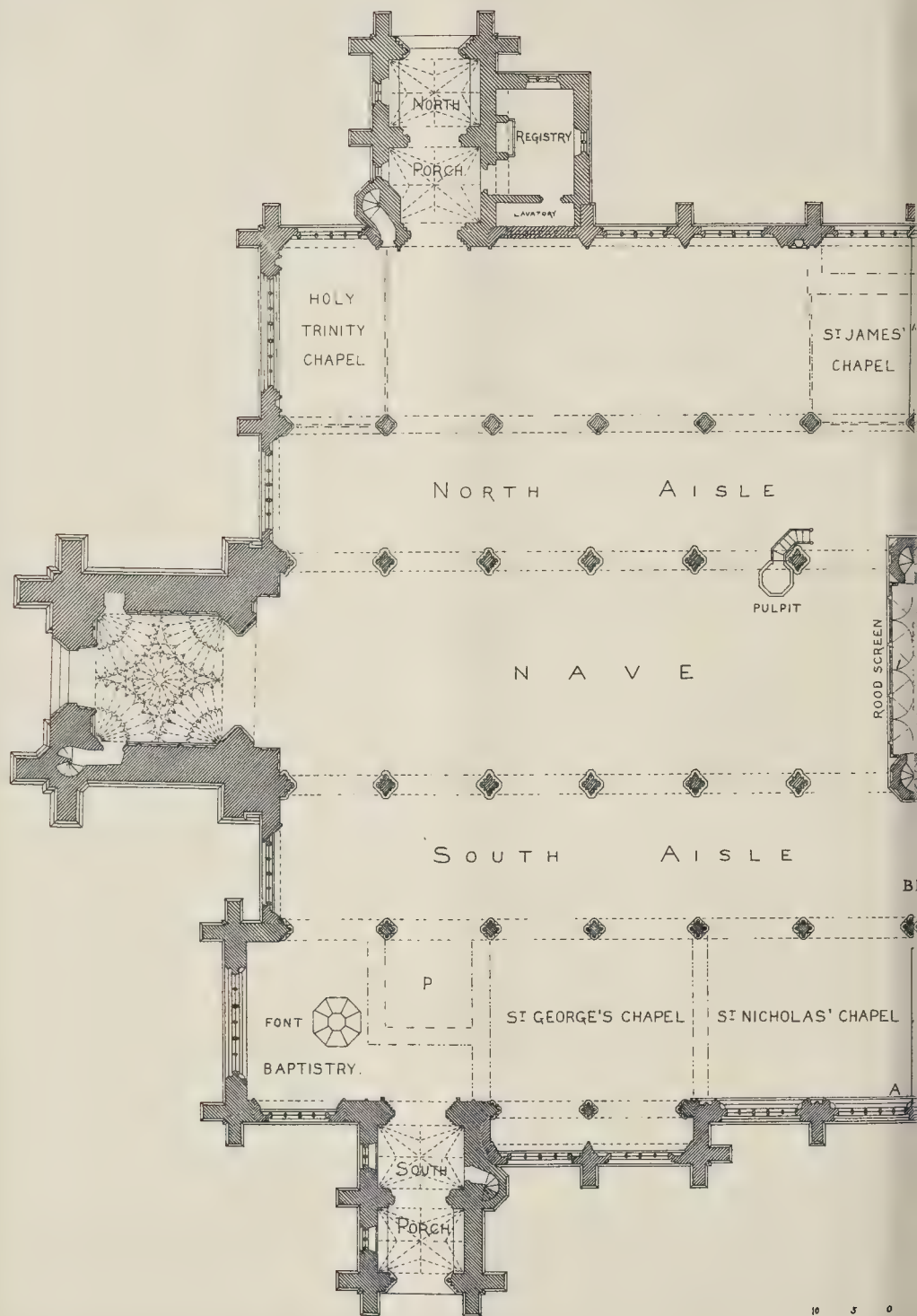
WINDOW, MANCHESTER CATHEDRAL.

THIS is the west window of the new portion of the cathedral at the south-west angle, erected from the designs of the late Mr. Crowther. The glass is carried out by Messrs. Percy Bacon & Bros., from a design made in their house.

This portion of the cathedral being intended for use as a baptistery, the subject of the window was treated in reference to this position, and represents baptism by blood, water, and fire,

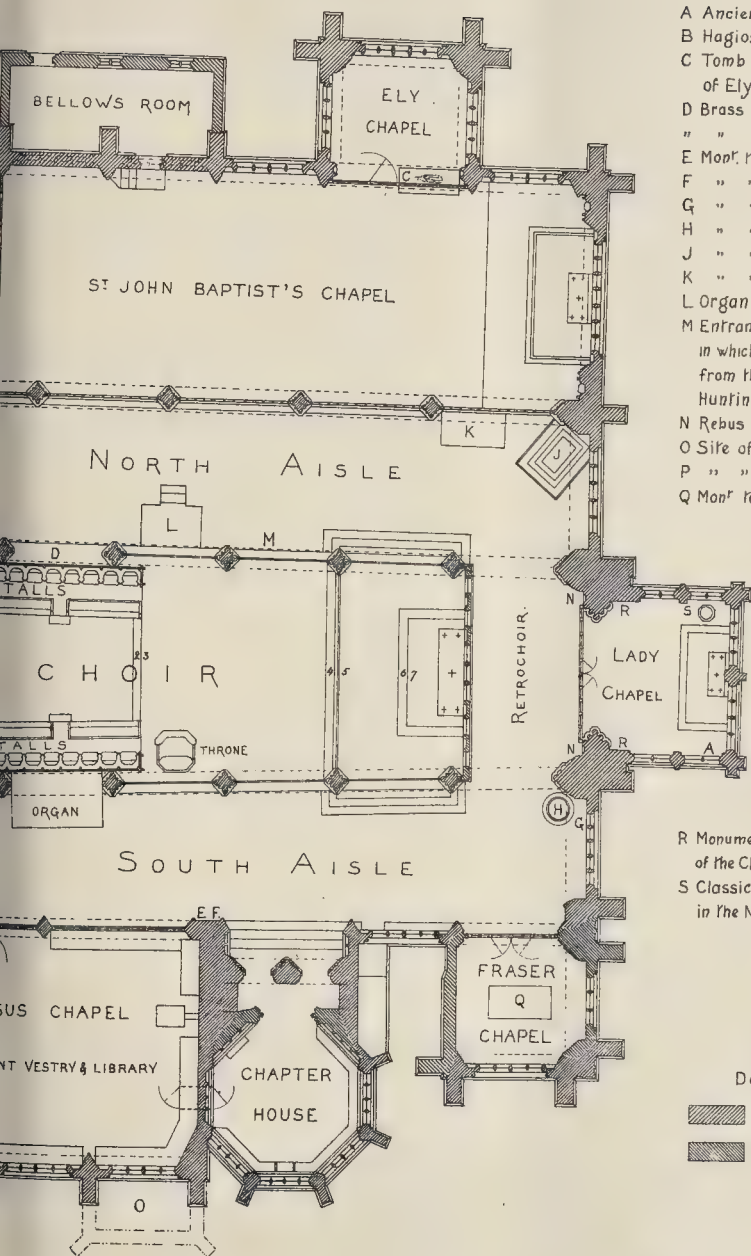


MANCHE



CATHEDRAL.

GROUND PLAN.



Reference.

- A Ancient Piscina.
- B Hagioscope.
- C Tomb of Warden Stanley, Bishop of Ely. d. 1515.
- D Brass to Antony Moseley 1607.
- " " " Oswald Moseley 1630.
- E Mon^t. to Rich^d Heyrick. 1667.
- F " " Tho^s Ogden 1763.
- G " " Rev. Geo. Ogden B.D. 1706.
- H " " Thos. Fleming 1848.
- J " " Humphrey Chelham
- K " " Hugh Birley.
- L Organ by Father Smith 1684.
- M Entrance to Vault below Choir, in which is preserved the brass from the Tomb of Sir John Huntington, first Warden.
- N Rebus of Sir J. Huntington.
- O Sile of Hulme's Chapel.
- P " " Bibby's Porch.
- Q Mon^t to Bishop Fraser.

- R Monuments of various members of the Chelham Family
- S Classical Font, formerly in use in the Nave.

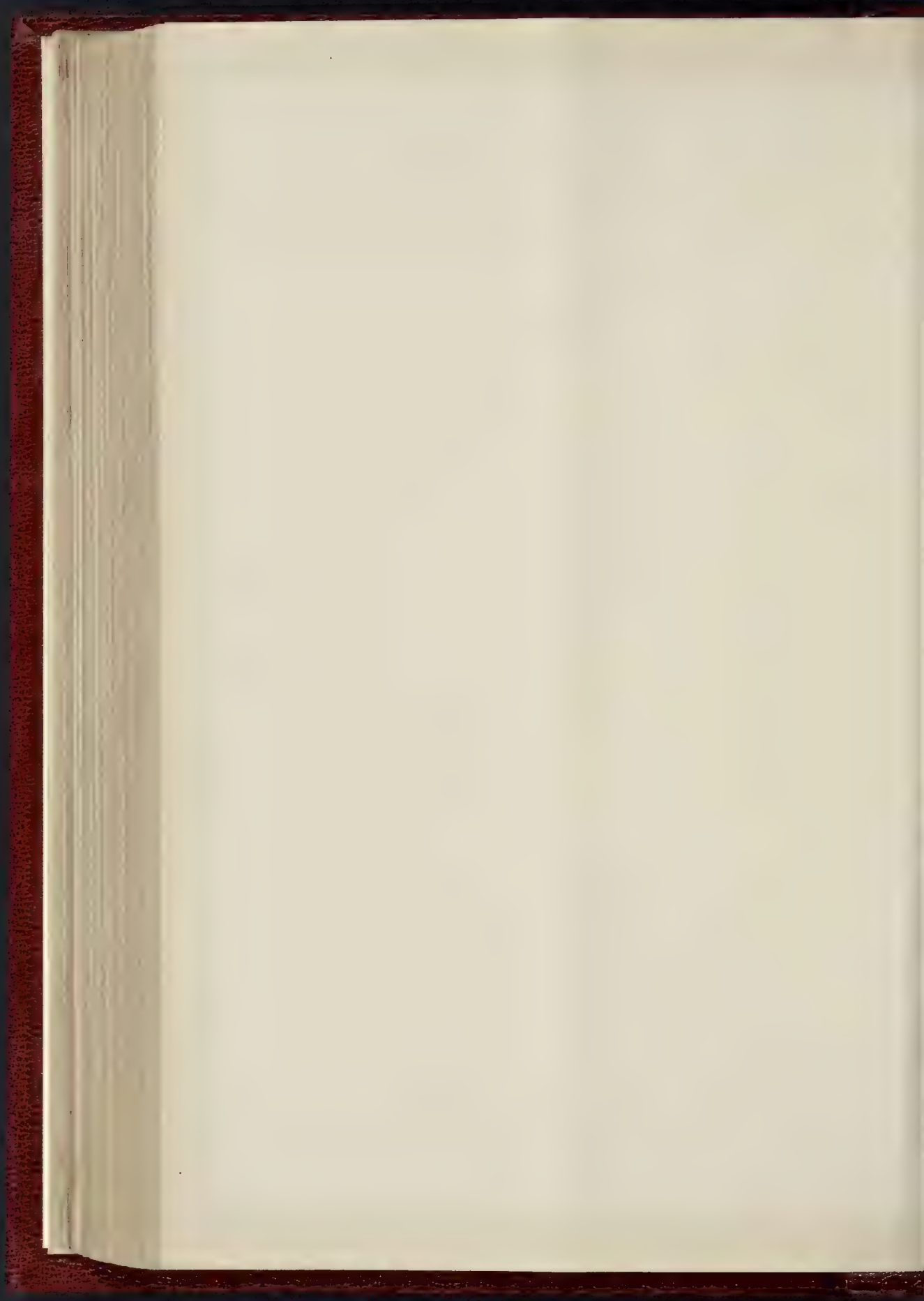
Dates.

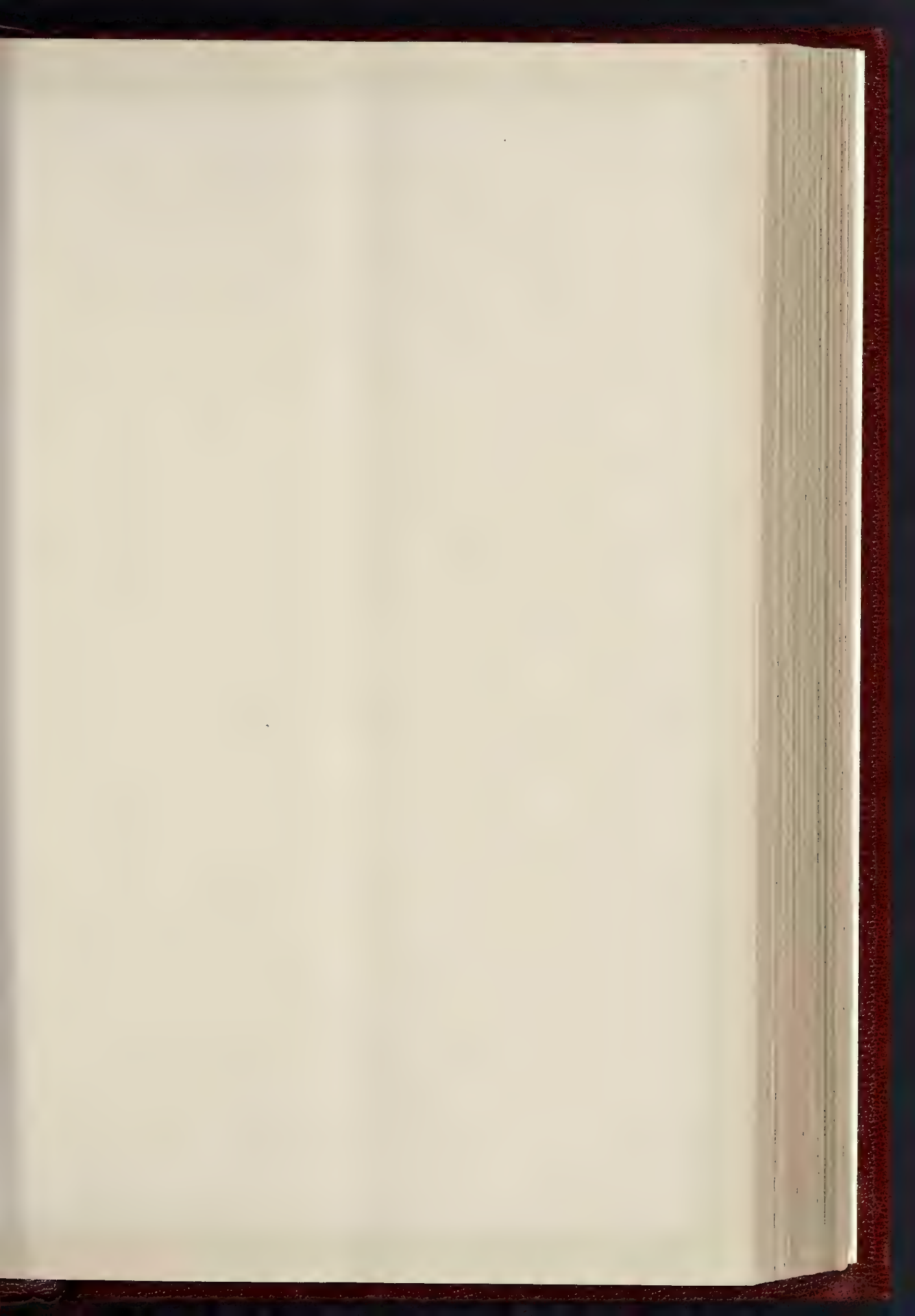
- Perpendicular.
- Modern.

Frank. P. Oakley.
Invent. et del. 1893.

SCALE

30 40 50 60 70 80 90 100 Feet.





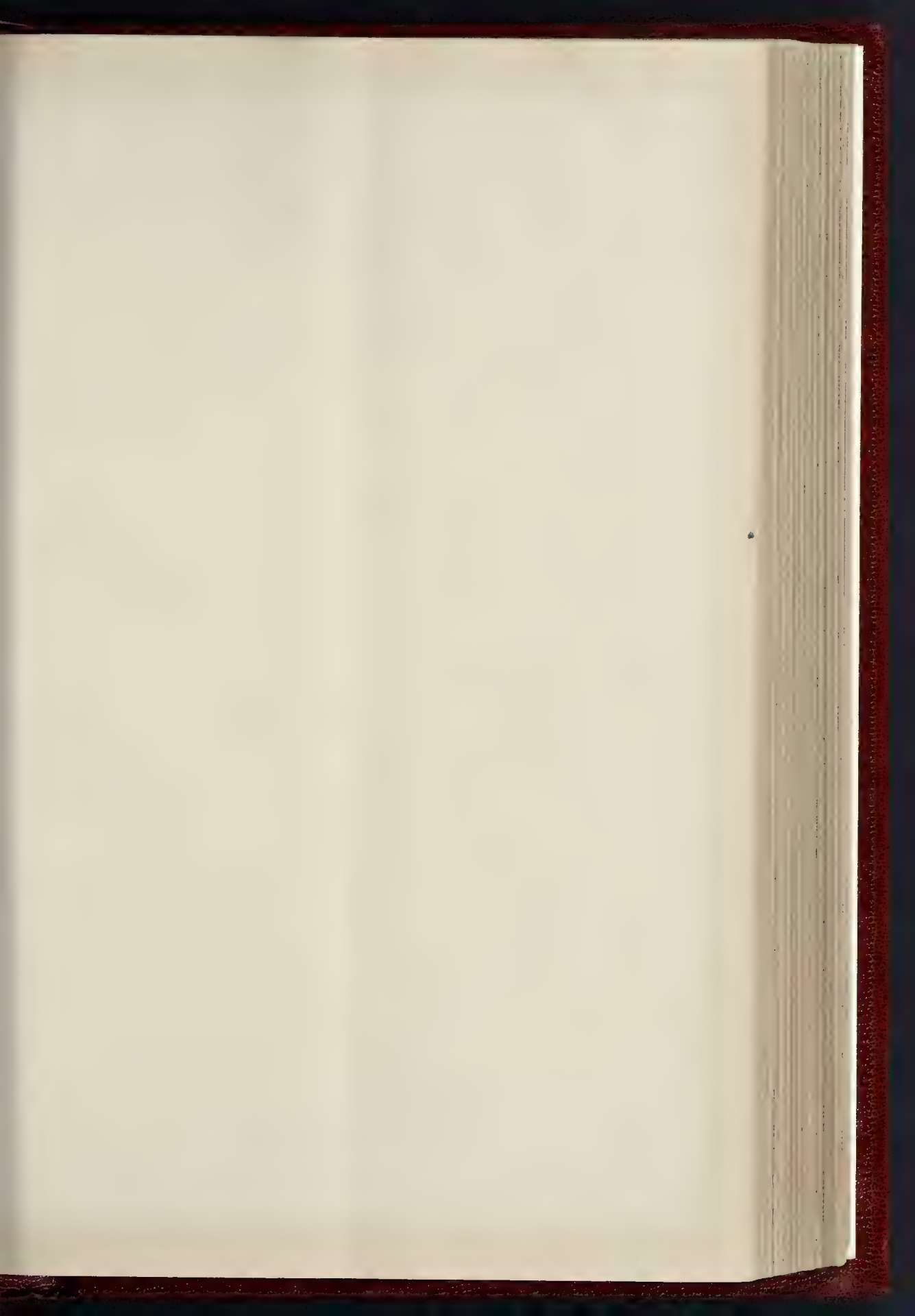




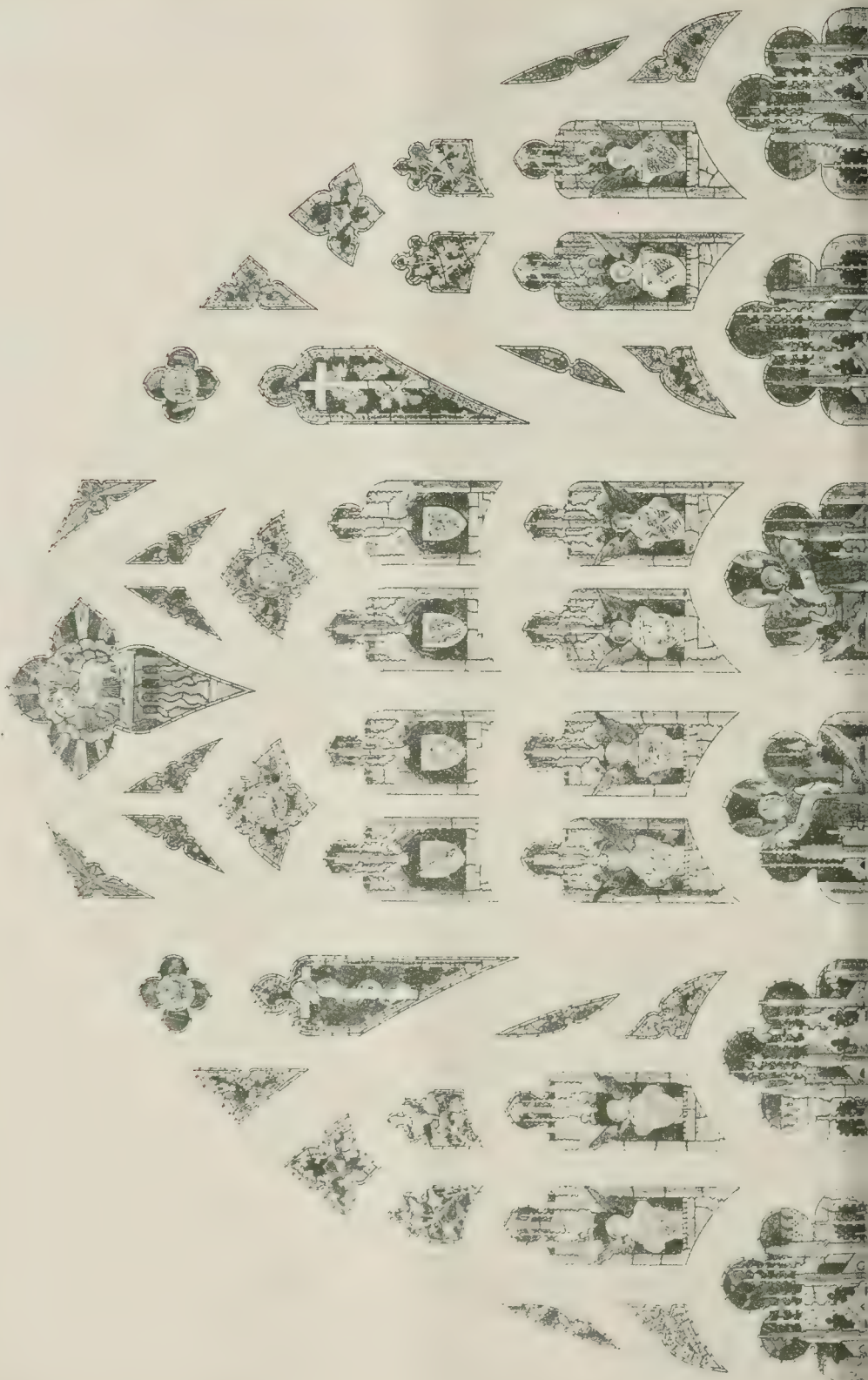
TOMB, SAN LORENZO, ROME.

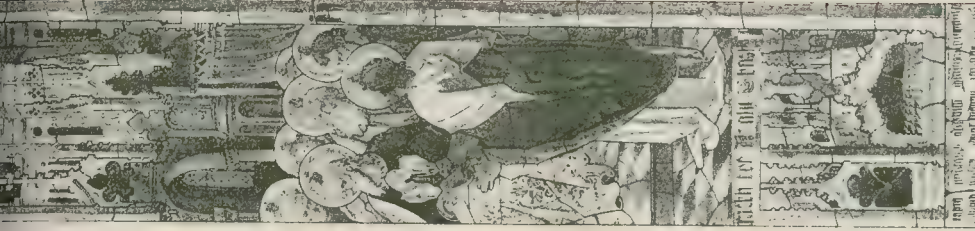
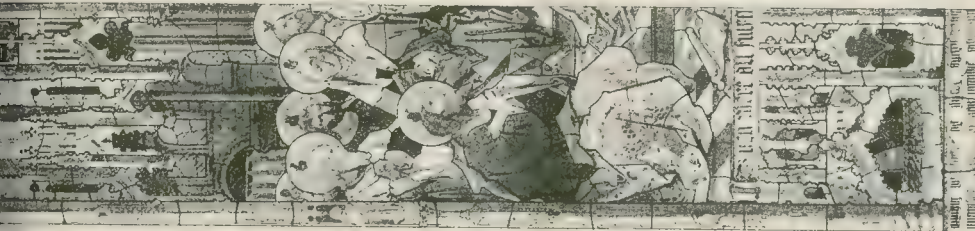
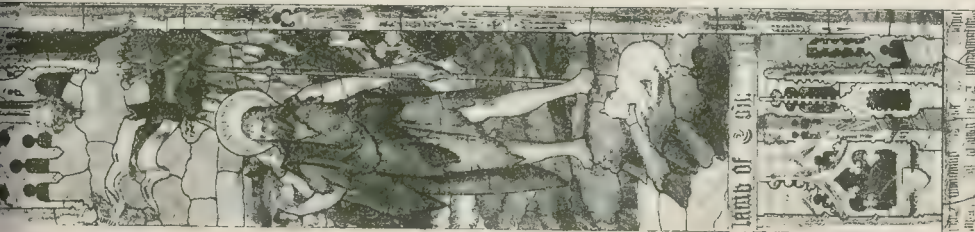
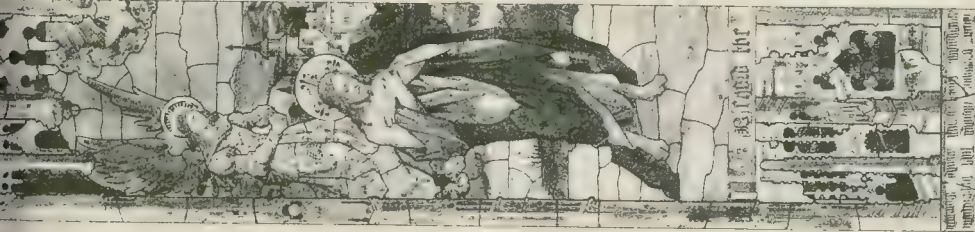
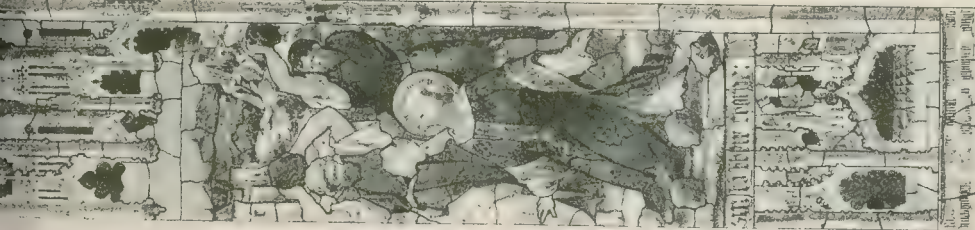
H. W. LONGDALE, 3-4-93

TOMB, SAN LORENZO, ROME.—FROM A DRAWING BY MR. H. W. LONGDALE.

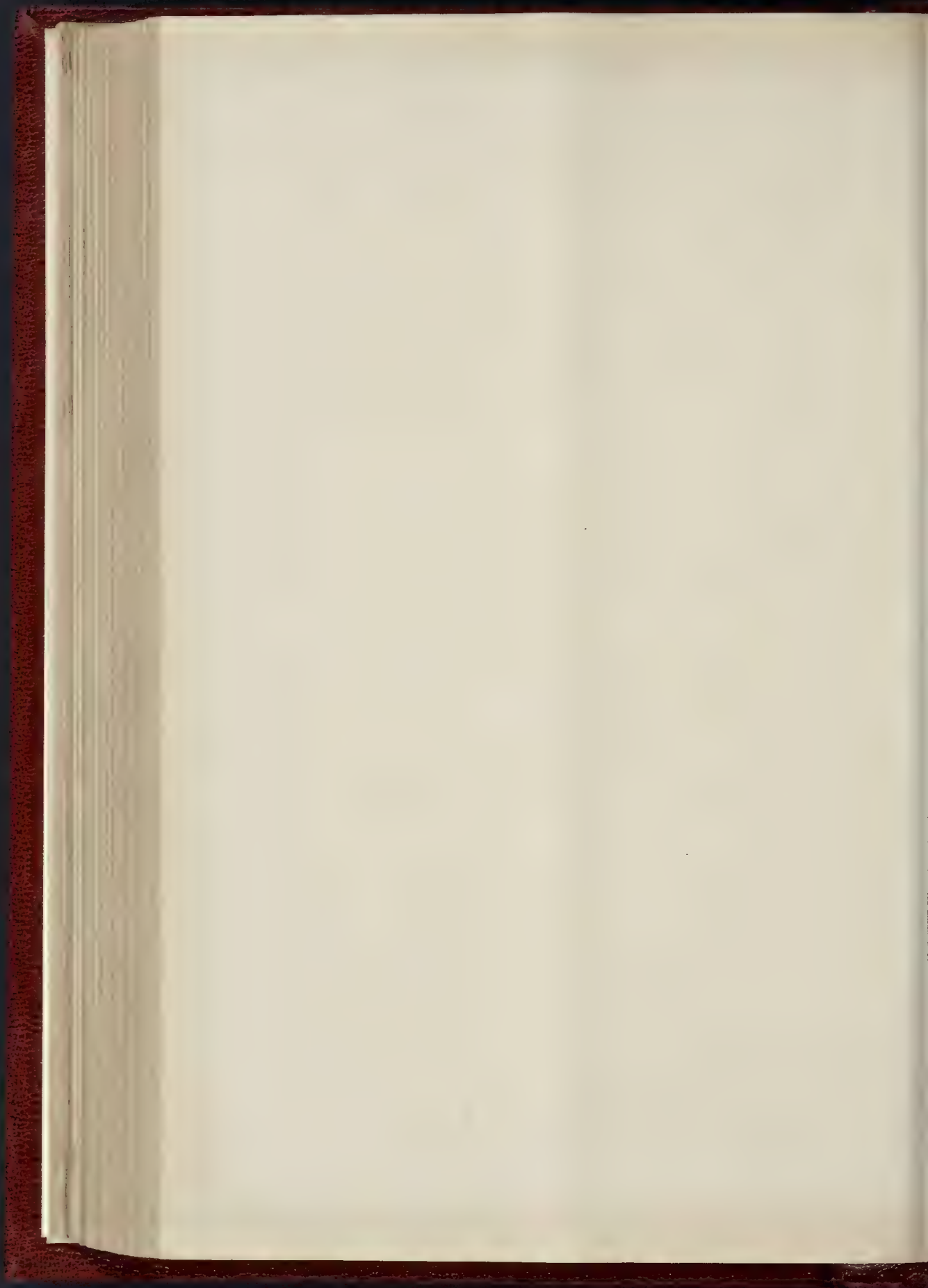


THE BUILDER, APRIL 1 1893.





NEW WINDOW, MANCHESTER CATHEDRAL, BY MESSRS. PERCY BACON & BROS.—MR. J. CROWTHER, ARCHITECT.



Books.

Laxton's Builders' Price-Book for 1893. Seventy-sixth edition. London: Kelly & Co., Limited, 51, Great Queen-street, Lincoln's Inn Fields.

THE publishers of this book claim that in the new edition the prices have been revised, the matter re-arranged, and the work considerably enlarged. We are glad to be able to admit the claim, and to recognise that a notable improvement has taken place. A general inspection of the prices shows that many changes have been made—the prices for hire of plant and for strutting and flanking sides of trenches having, for example, been considerably reduced—and we think the book may now be regarded as a fair statement of the London rates. Needless to say, in competitive tendering lower prices are adopted, but, with few exceptions, those here given represent reasonable charges for good work. The prices for doors and for sashes and frames might be re-considered and perhaps somewhat reduced; but we put forward a suggestion of this kind with diffidence in the case of a trade like the joiner's, in which the cost of labour is high relatively to that of materials, as we have an impression that the recent increase in wages has been accompanied by a diminution, and not an increase of effectiveness. We would ask, by the way, what is meant by a “ $\frac{1}{2}$ in. head” in the description of a sash frame (p. 156)? Some of the prices in the Painter need not have been lowered, e.g., in good work 11d. per yard superficial is scarcely enough for four oils. Builders commonly tender much too low for work in this trade. In the Bricklayer (p. 36) a price should be inserted for brickwork in cement (3 to 1), which is a usual proportion. It is almost a pity to continue the jejune instructions for measurement here put forward. In the space at disposal it is idle to attempt to deal with the subject satisfactorily. This part of the book has, consequently, been allowed to fall somewhat out of date, and is in our opinion of little value.

We welcome the chapter “On the adaptation of a price-book to meet varying rates of wages,” in which an effort is made to apportion the cost of labour and materials in the several trades; and still more the adoption of the system of bringing the prices for “labour only” and those for “labour and materials” together in adjacent columns on the same page. Thus, on page 44 we have this item given in one line:—“Paving of grey stocks laid flat in sand 3s. per yard superficial, labour only 6d.; laid in mortar 3s. 9d., labour only 7d.; laid in cement 4s. 3d., labour only 8d.” Consideration of this example will show how enormously the usefulness of a price-book is increased by being compiled upon this method. Two elements only in a price are approximately constant—the effectiveness of labour and the quantity of material. The cost of labour and the cost of material vary from time to time and from place to place, and, of course, do not vary similarly. From this it is obvious that a price-book, to be capable of adaptation—or, in other words, of intelligent use—must necessarily set out separately in each case the time occupied and the material consumed, or, which is the same thing, their values at stated rates. We cordially commend the effort here made to work on this plan, on which alone, as we have previously pointed out, scientific value can be given to a price-book for builder's work. The compilers of this edition are to be congratulated on having greatly enhanced the value of the work.

Lockwood's Builders', Architects', Contractors', and Engineers' Price-Book for 1893. Rewritten, greatly enlarged, and edited by FRANCIS T. W. MILLER. London: Crosby Lockwood & Son.

ALTHOUGH described on the title page as “Rewritten and greatly enlarged,” this edition is practically the same as that of last year. No account is even taken in the prices for measured work, of the rise in carpenters' and joiners' wages last autumn. As this affects over 100 pages of the book, we think it ought to have been attended to. The reason given in the preface for the omission is that time did not permit of the revision. Perhaps not, after the advance was conceded. But the dispute was long matter of notoriety, and an enterprising publisher would have anticipated the change, and prepared his calculations accordingly. To suggest that the contractor himself, when estimating, should make such additions to the prices here given as his experience may suggest” is virtually

to abdicate the functions of a price-book. This the writer appears to have felt, for he adds “roughly, the necessary addition, all round, may be taken at from 5 to 7 per cent. above the rates quoted in the price-book.” This is, indeed, “rough” when we bear in mind that some prices being for labour only, some for material only, and the rest for both in varying proportions, a rise in wages must affect them very differently. Again, “the high standard of excellence assumed in these prices should be borne in mind, while the necessity of revising the prices on account of the advance in wages is under consideration.” This oracular statement is somewhat puzzling. We were informed last year, as well as this, that all the prices given in the volume are for workmanship and materials of the best description, and, indeed, a price-book for bad work would be of no value. Nor would builders be wise to estimate at the old rates, and attempt to recoup themselves by lowering the quality of their work. A review of the prices generally, we are glad to say, shows them to have been arranged with a good deal of intelligence, and they also hang well together; so that when a builder recognises a particular price as being in accordance with his experience, he may safely rely on a number of cognate prices in the book. As, however, we have frequently pointed out in these columns, unless a price book exhibits separately how much it includes for labour and how much for materials, it can never escape the suspicion of empiricism.

The appendix (of nearly 200 pages) contains a well-arranged mass of information of great value to both architects and builders.

Spon's Architects' and Builders' Price-Book, with Useful Memoranda and Tables. By W. YOUNG, Architect. London: E. & F. N. Spon, 125, Strand.

OF making price-books there is no end, and this little work also is called an “Architects' and Builders' Price-Book.” Fortunately, however, that is not a correct description of its contents or it would be without *raison d'être*, for *quid* price-book it is entirely eclipsed by “Laxton” and “Lockwood.” Yet it has its place amongst the books of reference connected with building, and we can believe the statement in this (the twentieth) edition that the demand for it is increasing. It is written by an architect and from the architect's point of view, and the memoranda and tables, arranged in alphabetical order, which form a large proportion of its contents, are such as could only have been compiled by a writer who united theoretical knowledge with varied practical experience. Architects and surveyors will find it an exceedingly useful handbook.

Valuations and Compensations: A Text-Book for Surveyors, in tabulated form. By BANISTER FLETCHER, Professor of Architecture, King's College, London. London: R. T. Batsford, 1893.

THIS book in its original form was only a work on the Law and Practice of Compensation. Mr. Fletcher has now added to it two chapters on valuations. It is therefore partly a second edition and partly a new book, the new part being placed in the beginning. There is a great deal of sound and sensible advice in the book, which will be useful to beginners, but an intelligent and experienced practitioner will necessarily be aware of most of the contents, though even to him it may serve as an aid to memory. Occasionally, it must be confessed, the writer becomes a little “mixed,” as in the following extract:—“The class of society in the immediate neighbourhood is a factor in the purchase value, and though involving delicate inquiries on the part of the valuer, should not be overlooked, as it carries with it, if satisfactory, many facilities. Hunting and shooting being among these, in the latter inquiries should be made as to the state and size of the coverts on the estate within the district of the ‘hunt,’ the description of shooting, and the facility for obtaining more if needed. Fishing and boating are also attractions, and where hilly the stream may be utilised as a power for producing many improvements” (p. 3). This sentence needs no gloss.

Arbitrations: A Text-Book for Surveyors, in tabulated form. By BANISTER FLETCHER. Second edition. London: Batsford, 1893.

IF the various handbooks which have recently been published on the subject of Arbitration are any indication, it would appear as if the occupation of a large number of persons was that of being engaged in arbitrations, either as arbitrators

or parties. It may be assumed, from the fact that this book has reached a second edition, that it has been found useful. Being written in an easy sort of style, and being also accurate, it is a book which a layman may peruse with advantage. There is really no more to be said about it.

The Mechanics of Daily Life. By V. PERRONET SELLS, M.A., New College, Oxford. London: Methuen & Co. 1893.

THIS book is written in an interesting style, so as to commend itself as suitable for home reading circles, and possesses the advantage of being free from scientific errors, a commendation which cannot be passed upon all popular books of a similar character. No attempt is made at mathematical investigation, but actual applications of the abstract principles taught in text-books are presented to the reader in a broad and philosophic spirit. The mechanical principle of gain in power being accompanied by loss of time is very clearly set forth. The reason why a beam passed over a loose or free roller travels with twice the velocity of the centre of the wheel or roller is very practically demonstrated; the remarks upon various forms of barrows is excellent, and the chapters upon the water-level, barometer, pumps, and syphons are both well explained and illustrated. A suitable index is added at the end of the volume.

Correspondence.

To the Editor of THE BUILDER.

NORMAN ORNAMENT.

SIR,—The coincidence noted by your correspondent “G. H. R.” suggests the question whether it is not a fact that Norman ornament is of a much earlier origin than the period during which that style of architecture prevailed, which, in appropriating certain forms, has given to them its own name? The following quotation supports such a view:—

“The zig-zag ornament used so profusely in buildings of the Norman age is also found in buildings of the age of Diocletian. . . . Almost every architectural ornament of the ancient Irish edifices has its counterpart in buildings of the most remote antiquity throughout the world. . . . The chevron or zig-zag ornament abounds among the ruins of America as it does also in those of Ireland. It is found both straight and curved in Cormac's Chapel, and is the commonest, as well as the richest, ornament of Irish doorways.”

The pellet ornament, or balls, is also found adorning several buildings, from the plain specimens upon the most ancient churches, such as that of Temple Cronan, Co. Clare, to the richly ornamented arch, such as the doorway of Aghadoe. They may also be seen adorning the stone doors in the Giant Cities of Bashan. The curved spiral—an imitation of a twisted rope—is found on several ancient Irish crosses.”—(Keane's “Temples and Towers of Ireland,” p. 284.)

As many of the forms and charges in heraldry, such as the chevron, billet, lozenge, roundel, are identical with Norman forms of ornament, the following opinion of the author* of the “Antiquities of Heraldry” as to their derivation is relevant to this question:—

“What, then, is the conclusion of the whole matter?” The problem is to ascertain the origin of heraldry. If a solution is attempted on insufficient data, and that involves assumptions at variance with acknowledged facts, analogies, and established propositions, it is obviously a false one. Such a one I believe that to be which dates the origin of armorial bearings from the twelfth century; and its inadmissible conclusions necessarily lead to others, which constitute the proposition that modern heraldry was in existence at the Norman Conquest, is an inheritance from the ancient Gauls and Germans, and from the nations of antiquity, as directly and in the same sense as the Italian language was derived from the Latin; and this, I conceive, is proved both deductively and inductively, but above all by that indirect demonstration called by mathematicians a *reductio ad absurdum*.”

And if we take one ornament, one symbol, not confined nominally to the Norman period, than which, perhaps, no other emblem is better known—the cross is the one referred to—it will be seen, notwithstanding the popular idea that it derives its significance solely from its connexion with Christianity, that it is probably as a pre-Christian religious sign, with certain mystical meanings attached to it, more widely distributed than any other, so that there are few countries in which archaeological inquiries have been instituted where it has not been found to have existed at a period when its association with Christianity was impossible.

It, therefore, seems to be a result of comparatively modern research that our symbolic ornament is seen to be not a thing of yesterday, and that its origin must be sought in a very remote period, and probably in that part of the world which cradled the primeval nations.

J. HOUGHTON SPENCER.

Taunton, March 27, 1893.

* The conclusions to which our correspondent points have long been familiar to students of the history of ornament.—ED.

* William Smith Ellis of the Middle Temple.

THE ORIENTATION OF CHURCHES.

SIR.—Mr. James Ardenstone's extract from "Bartram's Travels" (March 4) does not state which St. Mary's Church in York is referred to, but none of the four churches so dedicated have a direction of axis of north-east-by-north. I am indebted to Capt. Ruck, of the Ordnance Survey, for the following table, which shows the bearing of the axes of the ancient churches of York, to the North or South of True East:—

The Minster (St. Peter)	2° 0' N.
St. Mary's Abbey	34° 0' N.
All Saints, Pavement	32° 0' N.
All Saints, North-street	26° 0' N.
St. Crux	30° 0' N.
St. Cuthbert	33° 0' N.
St. Dennis	17° 30' N.
St. Helen	20° 0' N.
St. John (Evangelist), North-street	3° 0' N.
St. Lawrence-outside-Walgrave	8° 0' N.
St. Martin, Coney-street	22° 40' N.
St. Martin, Micklegate	5° 0' N.
St. Michael-le-Belfrey	53° 30' S.
St. Michael, Spurrier-gate	33° 0' N.
St. Mary, Castlegate	12° 0' N.
St. Mary, Bishophill, Senior	38° 0' N.
St. Mary, Bishophill, Junior	48° 0' N.
St. Margaret	17° 30' N.
St. Olave	43° 0' N.
St. Saviour	29° 0' N.
Holy Trinity, or Christ Church	60° 0' S.
Holy Trinity, Goodramgate	49° 0' N.
Holy Trinity, Micklegate	22° 0' N.
St. Sampson	36° 0' N.
St. Oswald, Fulford	17° 0' N.

The remarkable variations of angle shown by this table may, doubtless, be accounted for to some extent by assuming that the direction of the axis of the church was fixed by the direction of the street up to which the church was built. But this consideration would not apply to every case—certainly not to St. Mary's Abbey, for example. Of these twenty-five churches, the bearings of five only approximate to the point of the sun's rising on the day indicated by their dedication. It is clear that the builders of these churches followed no uniform rule of orientation.

The directions of twenty-three other churches, chosen at random, point to the same conclusion. These include Durham Cathedral, the two churches of Lindisfarne, Hexham, Selby, and thirteen churches in East Yorkshire, which look eastward over the flat lands of Holderness. Five appear to agree approximately with the angle of the sun's rising on a day which may be connected with their dedication. Of these five, St. Patrick's, Patrington (1 deg. 30 min. S.) was, doubtless, intended to be true East; Beverley Minster (16 deg. 0 min. N.) may be referred to August 29 (the Beheading of St. John Baptist), though it is not clear to which St. John the church is dedicated; St. Mary's, Beverley (22 deg. 0 min. N.) and St. Mary's, Cottingham (9 deg. 0 min. S.) may be referred to the Assumption and Nativity of the Virgin. But it is doubtful whether these are more than accidental coincidences; at any rate, the remaining eighteen show no such approximate agreement, though all lie within the possible limits of sunrise. Probably more extensive inquiry would only confirm the opinion expressed in Mr. William White's letter (February 4).

JOHN HILSON.

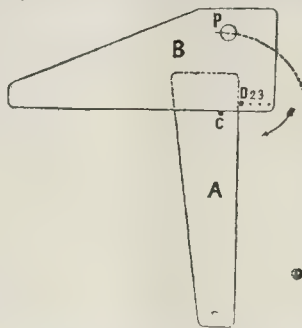
Hull, March 27, 1893.

THE EGYPTIAN CAVETTO.

SIR.—As is well known, the ancient Egyptians made use of only two mouldings in their architecture—a cavetto, or hollow, formed by a curve of subtle character; and a small torus, or convex moulding, generally placed below the first. The upper part of the cavetto, I have heard the late Joseph Bonomi say, was of just such an angle that water would drip from it and not run down the sides of the building. There happens to be a remarkably well preserved specimen of these mouldings in the British Museum (No. 22 in the Grand Egyptian Saloon), and it is described as an intercolumnar slab of the period 358 B.C.

Taking an accurate template of this curve I experimented on the means by which it could be produced, and the result was the contrivance of the two rulers shown in the diagram, and by means of which a curve can be drawn differing much less from the actual moulding than do parts of the same from each other. It is clear on inspection that the curve is neither elliptic nor parabolic, and it is, without doubt, a near relative of the Class of Diocles. This was a curve used by the ancient geometers in the solution of various problems relating to proportional lines and to the duplication of the cube. Its equation is $x^2 = y^2(a-x)$, and it is more than likely that it came originally from Egypt. The apparatus which I found would produce the actual curve of the moulding in the British Museum consists of two flat pieces of wood or metal, one of which is fixed and the other moveable. A is the fixed piece which may be held down by the left hand. B is the moving piece which has a pencil or scriber at P. On the piece A is a pin C projecting from its upper surface, and a little longer than the

thickness of the piece B. B has also a pin or pivot D, which projects downwards, and is a little shorter than the thickness of A. On taking hold of the piece B with the right hand and giving it such a movement in the direction shown by the arrow) that its lower edge always touches C while the right edge of A is always in contact with D, the pencil or scriber P marks out the correct curve of the cavetto P F.



Considerable variations in the proportions of the moulding may be made by altering the positions of the pivots, such as placing D at 2, 3, &c., and so causing the point P to describe a flatter or steeper curve. The position of the scriber may be also altered, but the curve produced is always of the same general character, and has, like the parabola, the property of always getting nearer to the condition of a straight line without ever attaining it. That this moulding should have been so exclusively used by the Egyptian architects over the whole Nile Valley and during so many centuries, is remarkable, and I think, can only be accounted for by the veneration which they must have had for the science of geometry, and by their natural admiration for this, one of its earliest and noblest achievements.

The true cissoid curve is drawn by a very similar apparatus which was invented by Newton and described in his "Universal Arithmetical." It would be very interesting to investigate the question as to whether in the older temples the curve was of the pure theoretical form, and if it afterwards became more or less modified.

RICHARD INWARDS.

CARPENTERS' HALL LECTURES.

SIR.—Will you please allow me a small portion of your valuable space that I may publicly thank the Worshipful Company of Carpenters for the set of splendidly conducted and interesting free lectures on building matters, now unfortunately concluded, at the Carpenters' Hall? I feel confident that in doing so I shall only be giving voice to the hundreds who attended them, and whose appreciation was shown by the frequent outbursts of applause. The public cannot have too much of a good thing, and I trust the corporation may see their way to give many lectures of the same kind.

ALEXANDER MACDOUGALL, JUN.

The Student's Column.

CHEMISTRY.—XIII.

Classification of the Metals.

ANY of the metals bear close resemblance to one another in their chemical properties, and are therefore arranged into groups—

- Group 1.—*Metals of the Alkalies*: Potassium, Sodium, Lithium (Ammonium), &c.*
- Group 2.—*Metals of the Alkaline Earths*: Calcium, Strontium, and Barium.
- Group 3.—*Metals of the Earths*: Aluminium, &c.
- Group 4.—*The Zinc Class*: Zinc, Magnesium, Cadmium, &c.
- Group 5.—*The Iron Class*: Iron, Manganese, Cobalt, and Nickel.
- Group 6.—*The Tin Class*: Tin, &c.
- Group 7.—*The Chromium Class*: Chromium, &c.
- Group 8.—*The Antimony Class*: Antimony, Bismuth, &c.
- Group 9.—*The Lead Class*: Lead, &c.
- Group 10.—*The Silver Class*: Silver, Mercury, and Copper.
- Group 11.—*The Gold Class*: Gold, Platinum, Palladium, &c.

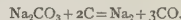
Metals of the Alkalies.

Symbol Na. Sodium (Natrium). Atomic Weight 23. Sodium is a silver-white metal, but rapidly

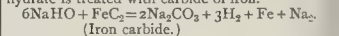
* In the above list all the rarer elements have been omitted, as being merely of scientific interest.

tarnishes in the air through the formation of a coating of sodium oxide. When heated, sodium burns with an intensely yellow flame, and when thrown upon water, decomposes it.

Sodium is largely used for the manufacture of aluminium, and as an amalgam with mercury for extracting gold from its ores. Sodium is prepared by heating sodium carbonate with powdered charcoal.



Of late years it has been manufactured more cheaply by Castner's process, by which sodium hydrate is treated with carbide of iron.



There are two oxides of sodium, viz., sodium monoxide, Na_2O , and sodium dioxide, Na_2O_2 . Neither is of much importance commercially, but both form sodium hydrate, with water. Sodium hydrate (caustic soda) NaHO is used in large quantities for soap manufacture, and for boiling with raw fibre, to prepare it for paper making.

It is prepared by boiling sodium carbonate with slaked lime, and subsequently evaporating the clear solution.



The residue of caustic soda thus obtained is usually fused and cast into sticks. It is a white, solid substance, which is very soluble in water. It is a powerful alkali, neutralises acids, and dissolves organic matter. When boiled with fats, it forms ordinary soap (sodium stearate) and glycerine.

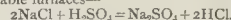
Sodium chloride, NaCl , or common salt, occurs naturally in large quantities in Cheshire, Poland, Cardona in Spain, and in various parts of America. In some places it is mined, but is now more frequently obtained by sinking a pipe into the bed, passing water down this pipe and pumping up the solution of brine thus obtained. This solution is then evaporated, and the salt obtained is purified by recrystallisation. Salt is sometimes obtained by evaporating sea-water. When found in a crystalline form sodium chloride is termed "rock salt."

In addition to its domestic uses, salt is largely employed for the preparation of sodium carbonate, and for glazing stoneware.

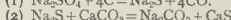
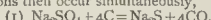
Sodium carbonate, Na_2CO_3 . Ordinary washing soda, is a carbonate of soda containing 10 molecules of water of crystallisation ($\text{Na}_2\text{CO}_3 + 10\text{H}_2\text{O}$).

Sodium carbonate is known in the crude anhydrous state as soda ash. It is prepared either by the Leblanc process or by the ammonia soda process.

The *Leblanc* or *Black Ash* process.—In this process common salt is heated with sulphuric acid in suitable furnaces—

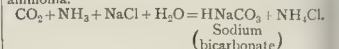


The hydrochloric acid gas thus formed is passed into towers through which water is streaming. This dissolves the acid, and the solution goes to form commercial "spirits of salt." The mass of sodium sulphate (Na_2SO_4), which is known as "salt cake," is mixed with powdered chalk and coal, and the whole is heated strongly. Two reactions then occur simultaneously,

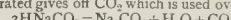


The carbon, of course, comes from the coal. The carbonate of soda is dissolved out of the residual mass with hot water, and the clear solution is evaporated in iron pans.

The *Ammonia-Soda* process consists in passing a stream of CO_2 through a solution of salt and ammonia.



The solution of bicarbonate of soda when evaporated gives off CO_2 , which is used over again,



while the ammonium chloride, which is treated with lime, yields ammonia, which is also again utilised. The only waste product is, therefore, calcium chloride.

In order to obtain soda crystals, soda ash is treated with hot water and allowed to evaporate comparatively slowly.

The crystals obtained have the composition $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$. The water thus held in the crystals is termed "water of crystallisation." If the crystals are strongly heated, all the water is expelled, and the sodium carbonate remains as a white anhydrous powder (Na_2CO_3).

Sodium Bicarbonate, HNaCO_3 , is prepared by passing carbon dioxide over moist sodium carbonate.



Its chief use is for the preparation of effervescent drinks and in medicine. When heated to redness

it evolves CO_2 , and is converted into ordinary sodium carbonate.

Sodium Nitrate, NaNO_3 , is found in immense beds in some of the rainless districts of Chili and Peru. Hence it is known as Chili saltpetre. It is used for the preparation of nitric acid, but chiefly as a manure. For the latter purpose it is exported in large quantities as "nitrates." It is very soluble in water, and is deliquescent.

Symbol K. **Potassium (kalium).** *Atomic weight 39.*

Potassium is a metal greatly resembling sodium in most of its properties.

Caustic potash or potassium hydrate, KHO , is largely employed for the manufacture of "soft soap."

Potassium chloride, KCl , much resembles common salt, and is found native in large beds at Stassfurt, in Germany.

Potassium chlorate, KClO_3 , is obtained by passing chlorine through slaked lime made into the consistency of paste with water.

Potassium carbonate, K_2CO_3 , is obtained by dissolving it out of wood ashes and evaporating the solution to dryness. When the carbonate thus obtained is calcined, it forms *pearl ash*.

Potassium nitrate (nitre, saltpetre) KNO_3 , is perhaps the most important salt of potassium, because it is so largely employed for the manufacture of gunpowder. Sodium nitrate, although cheaper, is not employed for this purpose, because it is deliquescent. Nitre is imported from India, where it often occurs as an efflorescence upon the soil and rocks. The composition of gunpowder varies slightly in different countries, but it is always a mixture of about 75 per cent. of nitre with the remaining portion consisting of charcoal and sulphur, the charcoal being usually slightly in excess of the sulphur. When heated with charcoal and sulphur the nitre yields up its oxygen thus—



Hence as gunpowder itself contains all the elements necessary for combustion it will readily burn under water.

Lithium.

Lithium is a comparatively rare metal. Its salts, especially the oxide, lithia, occur in small quantities in milk, tobacco, and many similar substances, and also in many waters.

Symbol NH₄. **Ammonium.** *Molecular Weight 18.* The positive radical NH_4 , called ammonium, has never been isolated, but is believed to exist, because so many salts of ammonia contain it. Thus, NH_4Cl , NH_4NO_3 , &c. Sometimes NH_4 is written Am; thus AmCl instead of NH_4Cl , AmNO_3 instead of NH_4NO_3 , &c.

Ammonium Sulphate, $(\text{NH}_4)_2\text{SO}_4$, is largely employed as a manure and for manufacturing other ammonium compounds. It is prepared from the ammoniacal liquor of the gasworks by bringing the ammonia in the form of vapour into contact with sulphuric acid.

Ammonium Chloride, NH_4Cl , is generally met with in commerce in the form of colourless, crystalline, fibrous lumps. It is known as *sal ammoniac*, and is prepared by heating a mixture of sulphate of ammonium and sodium chloride.

Ammonium Carbonate, $(\text{NH}_4)_2\text{CO}_3$, is comparatively unstable. The ammonium carbonate of commerce is a sesquicarbonate. It is generally prepared by heating chalk with sal ammoniac (NH_4Cl). It is a semi-transparent salt, smelling strongly of ammonia. It is often recommended as a better cleansing material than common soda crystals.

All ammonium salts when warmed with caustic soda evolve ammonia.

Metals of the Alkaline Earths.

Calcium, Strontium, and Barium.

Their hydrates are soluble in water, giving alkaline solutions. Their carbonates, sulphates, and phosphates are almost insoluble.

Symbol Ca. **Calcium.** *Atomic Weight 40.*

Calcium is a light yellow metal of no commercial importance. Lime is an oxide of calcium, while as *carbonate*, calcium occurs naturally as chalk, marble and limestone. Gypsum, selenite, and alabaster are *sulphates* of calcium, while Derbyshire spar or fluor-spar is a fluoride of calcium.

Substances containing calcium oxide are said to be calcareous.

Calcium Carbonate (Carbonate of Lime), CaCO_3 . Our coral reefs, chalk-hills, and limestone

mountains are all composed mainly of calcium carbonate. Calcium carbonate is insoluble in water, but is soluble in water containing carbonic acid. If a current of carbon dioxide gas is passed through lime water—i.e., a solution of calcium hydrate, a precipitate of carbonate of lime (CaCO_3) is obtained. If, however, the current of carbon dioxide is then allowed to continue passing through the solution for a sufficient length of time, the precipitate will re-dissolve, because bicarbonate of calcium ($\text{CaCO}_3\text{H}_2\text{CO}_3$) is formed, which is soluble in water.

The formation of hanging masses of calcium carbonate, termed *stalactites*, in caverns within limestone mountains is accounted for by this fact. Rain in falling through the atmosphere absorbs CO_2 , and the solution thus formed, falling upon the mountain, dissolves some of the calcium carbonate. The solution of bicarbonate of calcium which is formed, trickles through to the roof of the cave, where, by evaporation, the bicarbonate is decomposed into CO_2 and insoluble carbonate of lime. The evaporation takes place partly while the drops are suspended from the ceiling, but a portion of each original drop will probably fall to the floor of the cave, where the evaporation will in time become completed. The masses of carbonate which are formed upon the floor are termed *stalagmites*. Occasionally, through the continual increase in size of the stalactite and stalagmite, the two meet and form one solid pillar.

Calc spar and Iceland spar are crystalline forms of calcium carbonate. Shells also contain much carbonate of lime.

Limestone.

Any stone that consists principally of calcium carbonate is termed a limestone. Chalk, marble, and Portland stone are nearly pure carbonates of lime; the dolomites contain a large proportion of carbonate of magnesia; while some limestones contain clay, and others much silica and iron, and sometimes bitumen.

The different varieties of limestone are almost innumerable; they are, however, usually divided into five classes, viz.:—

1. Marbles.
2. Compact limestones.
3. Granular limestones.
4. Shelly limestones.
5. Magnesian limestones.

(1) Marbles.

Any limestone that can be well polished by the usual method is termed a *marble*. Black marble owes its colour to the presence of bituminous matter, red-veined marble usually to oxide of iron, and other coloured marbles to other metallic oxides. Black marble is supplied from Galway and Kilkenny, red from County Cork, dark grey and sienna from King's County, and white from Donegal, in Ireland. Various coloured marbles are also found in England and Scotland.

Madrepore marbles are composed of fossilised corals. *Encrinal and shell marbles* are composed of fossilised shells and encrinurals.

(2) Compact Limestone.

These limestones may be pure carbonate of lime or may be a mixture of carbonate of lime with a certain proportion of clay or of sand. They may be dark blue, grey, mottled, or black in colour. Some of these stones, which contain a considerable amount of clay, are employed for making hydraulic lime.

Kentish Rag is a compact limestone. It is found in beds varying from 6 in. to 3 ft. in thickness, alternating with fine sand known as *hassock*, which is generally found attached to the ragstone. The ragstone varies much in its quality, some of it being worthless. The *hassock* is a calcareous sandstone. The following are analyses of Kentish Rag and Hassock respectively:—

Kentish Rag.

Carbonate of lime, with a little magnesia	92.6
Earthy matter	6.5
Oxide of iron	0.5
Carbonaceous matter	0.4
100.0	

Hassock.

Carbonate of lime	26.2
Earthy matter	72.0
Oxide of iron	1.8
100.0	

(3) Granular Limestones.

The grains in granular limestones vary greatly in size. In some, the grains are very small and of uniform size throughout, while in others the grains are not of uniform size, some being very small and others as large as peas. Fossil shells are found in nearly all granular limestones.

Chilmark stone is a granular limestone having very fine grains, Portland has rather larger grains, while the grains in Bath stone are large and egg-shaped.

The following are analyses of these three forms of granular limestones. Different specimens, of course, vary somewhat in composition:—

	Portland stone.	Chilmark stone.	Bath stone.
Silica	1.20	1.04	1.0
Carbonate of lime ...	95.16	79.0	97.2
Carbonate of magnesia	1.20	3.1	0.2
Oxide of iron and alumina	0.50	2.0	1.6
Water and loss	1.94	4.2	—
Bitumen	trace	—	—
100.00	99.3	100.0	
Analyst or Authority.	Daniel and Wheatstone.	Daniel and Wheatstone.	Spon's Price Book.

Chilmark stone is also known as Wardour stone, and in London as Tisbury stone.

GENERAL BUILDING NEWS.

RESTORATION OF WOODBOROUGH CHURCH.—The Bishop of Southwell on March 25 reopened the parish church of St. Swithin, Woodborough, which has been restored. Woodborough was a Saxon town in Sherwood Forest, and though it is scarcely more than conjecture that there was a Saxon church of wood, with latticed windows, the remains of a Norman church were (according to the *Notts Guardian*) laid bare during the present restoration, the foundations extending from the tower beneath the pillars of the arcade and the doorway in the north wall being unmistakably Norman. The present edifice belongs to the Decorated period, and the chancel is considered one of the finest specimens of fourteenth century work in the county, the great east window being a notable feature. Before the recent works were undertaken, the roof was so bad that water found its way in copiously, and, indeed, the whole structure was found to require serious attention. The matter was placed in the hands of Messrs. Naylor & Gale, architects, Derby, and Mr. Thompson, of Louth, was entrusted with the contract.

PUBLIC LAVATORY, &c., FOR HULL.—The new public lavatory in St. John-street, Hull, has been opened. The lavatory is divided into three sections, admission to each being obtained from the St. John-street frontage, which is Classic in style. The public urinal constitutes the central section, and at the east end are offices for gentlemen, and at the west rooms for ladies. Provision has been made for the attendants in these sections, in which dressing-tables are also placed with toilet conveniences for the use of both sexes. The whole building is lighted by lantern lights in the roof. The public urinal is furnished with five groups of urinals, each group consisting of three, with white enamelled slabs, glazed brick nosings, dado and slate cappings. Each group is supplied with copper automatic flush tanks. Ventilation is afforded by inlets through the outer walls, and by extracts in the lantern lights. Floors of cement have been laid down, and the internal woodwork is stained and furnished. Inside the walls are faced with red bricks, with glazed brick dado and strings. The contractors were Messrs. Hockney & Liggins, who have done the brick work and joinery. Heating, gas-fitting, and general sanitary arrangements have been carried out by Mr. W. L. Harrison, George-street, Hull; masonry, by Messrs. Quibell & Son, Fountain-road; painting, by Mr. Dixon, Wincolmlee. The stone work carving has been executed by Mr. Gilbert Seal, London.

ADDITIONS TO A CONVALESCENT HOME, EDINBURGH.—The Convalescent Home of the Edinburgh Royal Infirmary at Corstorphine, to which two wings have recently been added by the munificence of the late Mr. James Nasmyth, engineer, was reopened on March 15 by the Marchioness of Tweeddale. Each of the new wings contains a large day-room in the front, behind which, on the male side, is a smoking-room, and on the female side a private ward. The day-rooms are 15 ft. high, 40 ft. long, and 30 ft. wide. At the junction of the new wings with the old building new lavatories and other offices have been erected. The second floor of the new wings is given up to large dormitories, containing in both cases 20 beds, each of which has about 20 cubic feet space. Adjoining the dormitories are new lavatories, &c. In the small square turrets which have been erected at both ends between the wings and the main block, is provided bath-room accommodation. Externally the new wings advance a little in front of the line of the old building and terminate in gables at the oriel windows

* Rivington's "Notes on Building Construction."

on the ground floor, with ornamental four-light windows above. An entrance porch has been added to the main block, and between the centre of the block and the wings a wooden verandah has been erected, which has a glass roof. A considerable addition has also been made to the offices behind the Home. The new wing will give accommodation for forty additional patients, the Home thus being able to contain 100 in all. The cost has been about 8,000*l.*, and the architects are Messrs. Kinnear & Peddie, Edinburgh.

SHERIFF'S COURT-HOUSE AT KIRKCALDY.—The building intended for the accommodation of the Sheriff's Courts of the Kirkcaldy district of Fife is, says the *Scotsman*, in an advanced state. It is from the design of Mr. Gillespie, architect, St. Andrews, and is situated in the High-street. Architecturally, it may be described as a combination of styles—chiefly Tudor and Scottish Baronial. There are two principal elevations—that towards Wemyssfield showing the entrance doorway in a massive centre block, which at the third story terminates in a balcony with balustrade. At the angle of this block is a tower, circular below, and of octagon shape in the upper stages, reaching about 70 ft. in height to the apex of the conical top, and ornamented with bands, mouldings, shields, &c. Next to the tower the most conspicuous feature is three very large Tudor windows, with double transoms, lighting the hall, or Court-house proper. One of these windows is to the front, and the other two are in the Fergus-place elevation, and all three are surmounted with crow-stepped gables, which are plentiful all over the building. Internally, the Court-room is a lofty apartment, about 40 ft. long by about 20 ft. in width, with a high-pitched roof. The subsidiary rooms, as well as the domestic portion of the building, are at the back. The builders are George Smith & Son, Kirkcaldy.

ALTERATIONS AT PERTH GENERAL STATION.—According to the *Glasgow Herald*, several important improvements have been commenced at the Perth General Station. For some time past it has been found that the siding accommodation on the up-line side was much too small, and a new leading bank 400 ft. long for horse traffic has been erected adjoining Caledonian-road, and additional sidings are being laid down. To enable this to be done, about 30 ft. of the main front wall had to be taken away, and means had to be adopted to support the station roof, as the rails leading to the new leading bank pass underneath it. This has been done by resting steel girders on the centre station wall and on cast-iron columns. A steel bridge for foot passengers is to be thrown across the rails to the south of the Station Hotel entrance. It has been arranged to cover in eight lines of rails in the "up" shunting yard for a distance of 330 ft. The shed will have cast-iron columns, with steel lattice girders on top, carrying a light steel roof, glazed with Pennycok's patent glazing. The old sleeper fence on the west side of Caledonian-road has been replaced with a new stone wall. The bookstall on the "down" platform has been enlarged, and a new bookstall has been provided at the south end of the station. The whole of the works, which are estimated to cost over 9,000*l.*, were designed by Mr. N. A. Paterson, C.E., and they are being carried out under his supervision, Mr. Gow being inspector of works. The contractors are:—For the alterations in sidings, &c., Messrs. John Paton & Co., Glasgow; overbridge to the hotel, Messrs. A. Findlay & Co., Motherwell; carriage shed, Messrs. Hanna, Donald, & Wilson, Paisley; glazing of shed, Pennycok Patent Glazing Company; bookstalls, Mr. Ritchie, Edinburgh.

NEW HALL, GLASGOW ATHENEUM.—The extensions which have been in progress in Buchanan-street, Glasgow, in connexion with the Athenaeum buildings, are now nearly completed. In the beginning of December the new building, with the exception of the hall and smoking-room, was formally opened, and on March 17 the hall was declared open. The hall is centrally situated, and occupies the entire street and basement floors of the new building. It measures nearly 150 ft. by 80 ft., by 50 ft. in height, and provides accommodation for about 1,000 people, the audience being equally divided between the area and the gallery. The principal entrance is from Buchanan-street, but an entrance is also gained through the St. George's place building, and the same may be used as exit, as well as a large emergency door from the balcony to the lane. A cloak-room is provided for each of the different parts of the house. The stage, which is situated at the west end of the hall, measures 30 ft. in depth, and has an opening measuring 40 ft. Retiring-rooms and lavatories are close proximity to the stage. The walls are finished with timber lining and the ceilings with ornamental plaster work. The decorative scheme is principally in the Japanese style. The predominant colours are blue, yellow, and gold. A feature of the internal arrangements in the Athenaeum is a system of combined heating and ventilation. The building is lighted by electricity, the installation being by Messrs. Holmes & Co., Newcastle, from the plans and specifications of Professor Jamieson, Glasgow. The floors of the building are constructed of Fawcett's fireproof flooring, supplied by Mr. Rud. A. Stoffer, Glasgow. The architects are Messrs. J. Burnet, Son, & Campbell; and the various trades-

men are—Messrs. Anderson & Henderson, joiners and masons; Messrs. Mitchell & Davis, plasterers; Messrs. Brown & Young, plumbers; Messrs. J. Cormack & Sons, heating and ventilating engineers; and Messrs. McCulloch & Co., painters, all of Glasgow, with Mr. Thomas Douglas as master of works.

THE PARISH CHURCH, REDDITCH.—On March 23 a meeting of the committee for the renovation of the parish church was held at Redditch, the vicar presiding. Mr. Temple Moor, architect, London, presented his plans for the proposed alterations, which included a clearstory the entire length of the chancel, which was to be lengthened, double ceilings put to the nave and the aisle, and better arrangements made for heating and ventilation. The estimated cost is about 4,000*l.*

NEW BOARD SCHOOL AT HORNSEY.—A new Board-school in the Falkland-road, Hornsey, was opened last week. The school has been built by the Hornsey School Board to accommodate the growing district of Harringay. Accommodation is provided for 1,475 children. Mr. Charles Bell is the architect. The new schools have cost 28,478*l.*, or about 19*l.* per head for the 1,500 children accommodated. These figures were given by Mr. W. Reynolds, the chairman of the Board.

SANITARY AND ENGINEERING NEWS.

SEWAGE DISPOSAL, REDDISH (LANCASHIRE).—On March 9 a Local Government Board inquiry was held at Reddish, by Colonel Hasted, R.E., relative to the proposed Provisional Order for renewing the Local Board's powers for the acquisition of about 8 acres of land on which to treat the sewage of the district. There was no opposition. The method of purification is supposed to be precipitation in tanks and intermittent filtration through land. It was explained that most of the main sewers have been completed; but the erection of the works is being delayed pending the decision regarding the amalgamation of the district with Stockport. The engineer for the sewage scheme is Mr. T. S. McCallum, of Manchester.

WATER SUPPLY, CHESTER.—Grave complaints having been made as to the water supply of this city, which is now derived from the River Dee, the Corporation have instructed Mr. Charles H. Beloe, M.Inst.C.E., of Westminster and Liverpool, to report upon the best means of obtaining a supply from another source, having special regard to the capabilities of the red sandstone formation in the locality.

THE RIVERS POLLUTION ACT.—A case under the provisions of this Act has been recently decided in the Court of Chancery, whereby damages to the amount of 550*l.*, together with 250*l.* legal expenses, have had to be paid by the Knaresborough (Yorkshire) Improvement Commissioners and Local Board of Health, in respect of a claim preferred against the Board, by Lady Hewley's trustees, the owners of two farms through which a brook polluted by the town sewage flows. An injunction was also granted by the Court restraining further pollution after a period of eight months under penalty. The Local Board last week, at a Government inquiry, submitted plans of a scheme for main sewerage and sewage disposal prepared by Mr. D. Balfour, M.Inst.C.E., Newcastle-on-Tyne. The loan applied for is 7,000*l.*

DRAINAGE SCHEME, GRIMSBY.—A Local Government Board inquiry was held at the Grimsby Town Hall, on March 10, by Major-General H. D. Crozier, R.E., with reference to the application of the Grimsby Corporation for sanction to borrow 25,000*l.* for carrying out the new drainage scheme and 6,000*l.* for making a pleasure-ground and roads in the West Marsh. The Mayor (Ald. Doughty), as Chairman of the Drainage Committee, explained the details of the drainage scheme, pointing to the fact that the Grimsby drains were tide-locked 5½ hours out of every twelve, necessitating the provision of a pumping-station. Mr. J. Buchan, consulting engineer, presented and explained the plans. After hearing other evidence for and against the proposed works, the Commissioner made a personal inspection of the town and docks.

PROPOSED PIER AT BANGOR.—On March 15, Mr. Rienzi Walton, M.Inst.C.E., one of the inspectors of the Local Government Board, held an inquiry at Bangor touching the matter of a Provisional Order applied for by the Bangor City Council, for powers to erect a pier at Garth Point, Bangor. The sum sought to be borrowed is 25,000*l.* In the course of the proceedings, Mr. Gill, Borough Surveyor, stated that the pier, as designed by Messrs. Mayoh Brothers, Manchester, would cost 13,000*l.*

COMPLETION OF PIER, CLEVEDON, SOMERSET.—The pier at Clevedon has just been completed, and was formally handed over to the town by the engineer (Mr. Abernethy) and the contractor (Mr. Double) on March 10. The new head is 100 ft. in length by 50 ft. wide. Some 600 tons of greenheart and pitchpine timber have been used in the construction and re-decking. In erecting the landing-stage and head some 24 iron columns and 42 greenheart piles, of 25 ft. length, have been used. From the deck to the mud is a depth of 65 ft. The total length of the

pier is now 850 ft. The landing-stage has been constructed at an angle with the pier, in a line with the channel current, and has been made large and strong enough to accommodate the largest excursion steamer plying in the Bristol Channel.

SEWAGE DISPOSAL WORKS, MOSLEY.—A Local Government Board inquiry was held at Mossley, by Colonel John Ord Hasted, R.E., relative to the application made by the Town Council for sanction to borrow 19,000*l.* for the purposes of sewerage and sewage purification. The Town Clerk (Joseph Hyde) explained to the inspectors the position of the town as regards population, and finances, &c., pointed out that in respect of the latter the Corporation is in a particularly good position. He also drew attention to the peculiar situation of Mossley, being situated in three different counties, as well as several different parishes and townships. In making the present application, the Corporation had had the work forced upon them by the operation of the recent Act of Parliament which constituted the Mersey and Irwell Watershed Committee for the purpose of enforcing the Rivers Pollution Prevention Act. The Mayor and Chairman of the committee supported the application and described the steps taken to deal with the matter, and pointed out that the Corporation had engaged an engineer, who had had an extensive experience in sewage schemes, and they had after careful consideration unanimously approved of the scheme and plans had prepared. A letter was also read from the Chief Inspector of the Mersey and Irwell Joint Committee, signifying his approval of the scheme. The engineer, Mr. Theo. S. McCallum, of Manchester, then explained the scheme, which included a main sewer about two miles of main intercepting sewer besides branches, and purification works. In considering the question of gradients, the inspector acknowledged the many difficulties of a very unusual nature presented by the peculiar physical features of Mossley. The purification of the sewage is to be effected by the international system, there being six settling tanks and eight filters, together with mixer, sludge presses, and other appurtenances. The Corporation have arranged to purchase a plot of land 6½ acres in extent, and they already possess an additional 6 acres in proximity thereto. The inspector, after fully considering the details and capacity of the proposed purification works, visited the line of sewer and the proposed site of works. There was no opposition.

NEW WATERWORKS, NORTON, YORKSHIRE.—The new waterworks just completed for the Norton (Malton) Local Board were inaugurated on Monday last. The well from which the supply is drawn is situated at the foot of Home Hill, and the reservoir is at the top of the hill. The water is pumped up by a Crossley's engine at 1,000 gallons an hour, and the reservoir holds 25,000 gallons. The water is then conveyed to the town by gravitation. Messrs. Fairbank & Son, of Westminster, are the engineers of the work; Mr. Bell, of Market Weighton, contractor for the reservoir; Mr. Villiers, of Beverley, for the well and pumping machinery; and Mr. Millington, Driffield, clerk of the works.

STAINED GLASS AND DECORATION.

MEMORIAL WINDOW, ST. MARGARET'S CHURCH, WESTMINSTER.—On March 18 the memorial window to the late Right Hon. W. H. Smith, subscribed for by the members of the House of Commons was unveiled in St. Margaret's Church, Westminster, by Mr. A. J. Balfour. The window was designed by Mr. John P. Seddon, F.R.I.B.A., architect, and the execution was by Messrs. Ballham.

MEMORIAL WINDOW, FALLOWFIELD.—On March 11 the Bishop of Manchester unveiled a memorial window in the Chapel of Holy Innocents' Church, Fallowfield, to the Rev. J. J. Twist, who, after twenty years' service as Rector of the parish, had been compelled to resign owing to ill-health. The idea represented by the subjects in the window is that of Christ, as the Good Shepherd, in His public and private ministrations, illustrative of the duties and responsibilities of pastoral office in the Christian Church, as set forth in the Lord's words to His Apostles: "As My Father hath sent Me, even so send I you." Messrs. Lavers & Westlake, of London, designed and executed the window in the style which prevailed at the fifteenth century, so far as the ornamental accessories and details are concerned.

MEMORIAL WINDOW, PARISH CHURCH, NEW WORTLEY.—On March 13 the Bishop of Ripon unveiled a stained-glass window which has been presented to the Parish Church, New Wortley, Yorkshire, by the Vicar, the Rev. E. H. Palmer, in memory of his mother and wife. The window, which is in the east end of the church, is from the design of Messrs. Powell Brothers, Leeds. It consists of five chief openings with tracery above, and the stained-glass illustrates the closing incidents in the Passion and death of Christ. On the left-hand is the Crucifixion; on the right the Resurrection; and the Ascension is carried upwards. The whole of the three central compartments. Each picture is surmounted by a canopy. The tracery above the chief lights contains Angels, some in adoration, others holding emblems of the Passion, &c.

FOREIGN AND COLONIAL.

FRANCE.—M. Dubuisson, architect, and M. Motte, decorative artist, of the French section at Chicago, have just sailed for the States with a numerous staff. They take with them more than 6,000 square metres of painted canvas to adorn the walls of the French Pavilion, the interior treatment of which has already been commenced under the direction of MM. Jacques Hérnaut, Yvon, & Marteau. M. Hérnaut, the painter, has presented to the Louvre a vase in bronze, enamelled, found at Famars near Valenciennes; and M. Corroyer, the architect, has presented a gold ring of the twelfth century found at Notre Dame, and believed to have belonged to Maurice de Sully, Bishop of Paris.—A committee, of which M. Alexandre Dumas is chairman, has been formed to erect a monument to Meissonnier in the town of Fontenay, opposite the house where he lived and where he painted many of his pictures.—The Department of Fine Arts has presented to the town of Lyons the picture by M. Raffaelli, "Chez le Fondeur," hitherto in the Luxembourg.—Last week was solemnly inaugurated at Rouen Cathedral the funeral monument of Cardinal de Bonnechose, in the centre of the left-hand apse of the choir. The monument, which was exhibited at the Salon of 1891, was the last work of Chapu. It shows the white marble figure of the Cardinal kneeling and enveloped in the large folds of a cloak. This figure, of exceedingly dignified expression, is accompanied by a bronze figure representing "Christian France" laying one hand on the hilt of a sword and with the other the crown of thorns, the symbol of immortality. This last-named figure was only commenced by Chapu, and terminated by his young pupil M. Jean Carls. The whole group has a very fine effect.—The committee formed at Sedan to erect a monument to those slain in battle has adopted the project of M. Croisy, sculptor. The monument is composed of a granite pedestal surmounted by a group of bronze, on which is a winged figure representing "Glorie" crowns a dying soldier. On the pedestal is a figure of France in mourning, and on the sides are two bas-reliefs, one representing the defence of the bridge of Bazailles, and the other the charge of the Chasseurs d'Afrique under General Marguerite.—An International Industrial and artistic exhibition will be opened at Limoges on May 14, to continue open till July 15.—The construction of a harbour of refuge at Salins d'Hyères is being rapidly pushed on. The harbour will bear the name of a former Minister of Marine, Admiral Potthaut.

—The library of the Ecole des Beaux-Arts has received an important addition in the shape of drawings by old masters of the sixteenth, seventeenth, and eighteenth centuries. A certain number of artists have formed themselves into a society under the title of "Société des Artistes Français de la Rive Gauche," the object of which is to defend the Salon exhibition against the invasion of amateurs, to the detriment of the painters who live by their works.—An exhibition is shortly to be organized at the Ecole des Beaux-Arts, of documents relating to the history of decorative painting in France from the eleventh to the sixteenth century.—The committee for considering the rebuilding of the Opéra-Comique met on Monday under the presidency of M. Jules Comte, Directeur des Bâtimens Civiles. The majority of the committee are architects. It is proposed that there should be only one competition; premiums are to be awarded of 20,000 francs, and 4,000 francs for the first, second, and third places to the next five competitors. It is expected that the first premiated architect will be commissioned to carry out the work.

LEIPZIG.—A new museum building is being erected on the "Koenigsplatz," according to the drawings of Herr "Stadtbau-director" Hugo Licht. The building is to the Leipzig Artists and Crafts as well as the Ethnological collections. The cost of the building (50,000 l.) will be covered by the bequest of a prominent citizen who left all his property to the town.

RUSSIA.—Moscow nearly lost one of its most interesting architectural monuments by the occurrence of a fire in the great Kremlin Cathedral. The cathedral was commenced in 1333, and about 1800 was extensively altered and restored. Since that date little has been done to it in the way of repairs, and its state has been disgraceful. The fire, which nearly caused a national loss, at all events has drawn public attention to the dilapidated state of one of Moscow's chief sights.

THE BUILDING TRADES IN SYDNEY.—According to the Sydney Mail of February 2, the wall of the unemployed is no longer so loud in the land, large numbers of them having, with the aid of the Labour Bureau and a slight brightening of the prospect, been absorbed into various parts of the colony. But to this general good fortune the building trades form an exception. Little or no building is being done, for the very good reason that it is not wanted. In prosperous times, when the population of the colony was increasing rapidly, and its industries extending, building was brisk. Large numbers of men, tempted by the good wages and the constant demand, entered the ranks of the various building trades; capitalists, large and small, sought it a profitable investment to erect dwellings—houses of all descriptions; the Government was

liberal in the matter of post-offices, court-houses, and other public buildings; and for a time all went merrily. But the pace was too fast to last, and the result was that within the last few years building has been overdone.

MISCELLANEOUS.

SUSSEX ARCHEOLOGICAL SOCIETY.—The annual general meeting of the members of this Society was held on March 23, in the Barbican of Lewes Castle. In their annual report for 1892, the Committee referred with satisfaction to the work accomplished and to the progress made by the Society since the last report was issued. They then went on to deal at length with the work of the Society during the past year. The annual meeting in August was held at Rye, and, contrary to the usual custom, lasted over two days. The Marquis of Abergavenny was elected president in place of the late Viscount Hampden. Papers which will appear in the society's Proceedings, were read by Mr. Inderwick, Q.C., Mr. R. T. Blomfield, Sir George Duckett, Bart., and Mr. R. G. Rice, F.S.A. On the second day of the meeting the members visited Winchelsea. On June 30, some of the members paid a visit to Silechester which was much enjoyed. With the valuable assistance of Mr. G. F. Fox, F.S.A., and Mr. W. H. St. John Hope, the study of the site of the Anglo-Roman city was made most interesting. In July Vol. xxviii. of the society's Proceedings was published. During the year several finds of interest had been made in Sussex, those at Highdown Hill, near Goring, and at Lavan, calling for special remark. At Goring the discovery was one of the most important yet made in the country, and the Committee could not refrain from expressing their regret that so much of the work of excavation was carried out in the absence of such supervision as their Society could give, so that it was now impossible to secure a complete account of the results. Generally the find resembled that at Saxenburg, but there were, however, details calling for careful study which would in all probability have yielded valuable results. So far as could be ascertained about fifty interments were made within that portion of the earthwork surrounding Highdown Hill. A number of Anglo-Saxon arms and ornaments were found, many cinerary urns and several Roman coins, but mixed with these were indications of a much earlier occupation of the site. The Committee hoped that such arrangements had been made as would enable the Sussex Archaeological Society to secure a complete record of any further finds if the intention of trenching another portion of the site during 1893 should be carried out. The discovery at Lavan of some ancient caves (the account of which was not communicated in the first instance to the Society) appeared to have been of peculiar interest, and the details, with plans and drawing, should find a place in the Society's collections. The restoration of the Wilmington Giant, which had for some time occupied the attention of the Sub-Committee, was at last in a fair way of being successfully carried out, his Grace the Duke of Devonshire having undertaken to defray the expense of the restoration, which was being carried out by Mr. John Stephen Ade. On July 20 and 21, the Congress of Archaeological Societies in union with the Society of Antiquaries was held at Burlington House, London, when the Sussex Society was again represented by the Hon. Curator and Librarian (Mr. Phillips) and the Clerk (Mr. Sawyer). During 1892 twenty-two new members were added to the Society, and, after deducting all losses from death and other causes, there was a net gain of six members upon the year. By the lamented death of Mr. Clay Lucas, F.S.A., the Society had sustained a loss which it would be almost impossible to repair. The report was adopted, and it was decided to hold the next annual meeting of the Society at Chichester.

ICE IN PARIS.—The Paris correspondent of the *Lancet* writes:—"Visitors to this 'city of light' cannot fail to note the enormous consumption of ice in the cafés and restaurants, and many of them must have indulged in speculations on the origin of such a vast supply of the refreshing commodity. Most of it is natural ice collected during the winter months from various lakes in the neighbourhood of the capital. Of the total amount thus garnered (30,000 tons) the Lac Daumesnil at Vincennes is responsible for from 12,000 to 15,000 tons, and the Bois de Boulogne lake for half that quantity. The remainder comes from ponds at La Briche, St. Ouen, Chaville, St. Cloud, Châteaufort, and Trappes. The original cost of this natural ice varies from three to four francs a ton. Of the artificial product the Société Anonyme des Glacières de Paris supplies 24,000 tons, and the Société Anglaise from 2,000 to 3,000 tons, the manufacturing cost being eighteen or nineteen francs per ton. With regard to the natural ice I have already drawn attention to its frequent impurity. Take, for instance the Daumesnil Lake, from which is drawn half the supply of natural ice consumed in Paris. The *Médecine Moderne* informs its readers that a sewer opens at the top of that sheet of water, and that, besides, it is fed by an artificial stream, which, rising in the plateau of Gravelle, crosses a large part of the Vincennes wood. A visit to that wood on a

fine Sunday will easily enable the observant sanitarian to judge of the manner in which the waters of this artificial river are adulterated by the numerous holiday-makers strolling on its banks. Until provisions are made by the authorities to safeguard the purity of the natural product I should strongly recommend visitors to this city who indulge in the consumption of ice to insist upon being supplied with that manufactured artificially by the companies above mentioned."

OLYMPIA, WEST KENSINGTON.—A subscription list was opened last week for debentures and shares amounting to a total of 225,000 l., in view of purchasing for 180,000 l. the premises known as "Olympia," originally built as the National Agricultural Hall, near Addison-road railway station. The property covers an area of about 64 acres, and is officially valued by Messrs. Drivers & Co. at 197,866 l. The Grand and Minor Halls were completed in 1886, from the plans and designs of the late H. E. Coe, architect, whom Mr. James Edmondson succeeded on the resignation, owing to ill-health, of the former. The engineers were Mr. M. and Ende and Mr. A. T. Walmisley, Messrs. Handyside & Co., of Derby, contracting for the iron-work, and Messrs. Lucas & Son, of Kensington, taking the general contract at 131,573 l. Our article of May 29, 1886, upon "Large-Span Iron Roofs," is illustrated with a diagram to show the comparative sizes of this roof, which is semi-circular, with 170 ft. clear span, rising as high as that of St. Pancras terminus, and those of other similar structures; together with drawings of the staging that was made for its building. We published a drawing of Mr. Coe's elevation, and plan and section, on October 3, 1885. See also our account of July 25, 1885, and "Note" of April 17, 1886. A skating-rink floor of American maple was laid down in 1880.

OLD IRONWORK OF WARWICKSHIRE.—On March 22 a paper was read to the members of the Archaeological Section of the Birmingham and Midland Institute by Mr. Charles J. Hart, on "Old Ironwork of Warwickshire." Mr. Hart dealt with ironwork from the twelfth to the end of the eighteenth century, and illustrated his remarks by limelight views of examples of ironwork, existing in the county of Warwick. Mr. Hart gave views of old ironwork to be found at Kenilworth Church, Bickenhill Church, St. Michael's Church, Coventry, and Stratford Church, at Maxstoke Priory and Castle, at Wooten Wawen, Temple Balsall, and many other places in the county, and explained their peculiar characteristics.

LEGAL.

LIABILITY FOR PAVING APPORTIONMENTS.

THE TOTTENHAM LOCAL BOARD v. WILLIAMSON.

JUDGMENT was given in this case on Monday last. It was tried before Lord Justice Lopes, without a jury, and decided an important question as to the liability of persons mere agents, or not beneficial owners, as owners of houses under the Public Health Act, 1875, for the expenses of paving, sewerage, &c., new streets. According to the *Times* report, it was an action by the Board against a party mortgagee of houses in Glenwood-road, Tottenham, to recover a sum of 134 l., as his share, as apportioned by their surveyor, of the expenses of paving and sewerage of the road. The district is under a Local Act of 1830, but it adopts the definition of owner given in the Public Health Act, and that is in the 4th section:—"That the owner is the person for the time being receiving the rack-rent of the lands or premises, whether on his own account or as agent or trustee for any other person." In the present case the houses were mortgaged, and Williamson, the person sued, was second mortgagee, and, as he admitted, had at the time in question received the rents of the houses and paid the ground-rent, paying over the rest to the first mortgagee, there being no surplus for himself. He had so received and applied the rents until June, 1892, when the first mortgagee took possession. The expenses were "estimated" while the defendant received the rents, and the action was brought in March, 1892. The question was whether he was chargeable as "owner" under the Act.

Mr. R. C. Glen had argued for the plaintiffs—the Board; Mr. Wedderburn for the defendant.

The Lord Justice had taken time to consider his judgment, and now delivered it in favour of the Board. It appeared to him, he said, that the question was whether the defendant was "owner" of the houses at the time when the expenses were "estimated" which were afterwards apportioned by the surveyor. The Act pointed, in his opinion, to the time when the expenses were estimated, not when the work was completed. (The case of "The Queen v. the Swindon Water Board" [4 Q. D.] was in this respect different from the present.) Now, the defendant had at the time been in receipt of the rent, and so up to the time of action. The question was whether at that time the defendant was the "owner" of the houses within the meaning of the Act. I think, said the Lord Justice, that he was. It appears to me that the intention of the Legislature was that any person who has received the rents from the occupier

COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITION.

Nature of Work.	By whom Advertised	Prize.	Designs to be delivered.
* Technical School	Harris Inst. Preston..	.....	June 24

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
School Buildings, &c. Hirsland, Aberdare.	Rev. W. J. Williams.	T. Roderick	April 4
Limestone Capping (1,000 ft.)	Torquay Town Council	H. A. Garrett	do
School Buildings	Taistock Grammar School Governors	P. B. Bond	do
Technical, & School	Felling Local Board	H. Miller	do
Electric Arc Lamps, Switches, &c.	Brighton Corporation	Official	do
Surveyor's Stores	Edinburgh and Leigh Corporations	do	April 5
Stores and Materials	Walton-on-the-Hill Local Board	do	do
Large Dock Gates	Swansea Harb. Trust.	A. J. Schenk	do
Two Shops and Two Houses, High Street, Newcastle.	Joseph Murray	T. C. Nicholson	do
* Construction of Drain, &c. Works, Carlton, Temple Gate, Bristol.	Marion, Son, & Hall.	E. W. Jones	April 6
* Painting and Repairs at Western Hospital	Met. Asylum Board.	A. & C. Harston	do
Two Ref. Refr. House, &c.	Met. Asylum Board.	Official	do
* Completion of Cottages, Iwerth	Thingoe R.S.A.	do	April 7
* Paving Works	M. R. Co.	do	do
Refrigerator House, Kildare, Wales	Rev. D. J. Jones	Mr. Arnold	do
* Extension of Public Library	Canterbury Vestry	do	do
* Painting, Repairs, &c. at Infirmary	St. Mary's Hosp. Board	Meers, Clarkson	April 10
* Portland Cement	Borough of West Ham	Official	do
* Tar Paving Works	Kingsley, upon Thames Corporation	do	do
* Wood Paving	St. George's, Bathurst	do	do
* Paving Works	Healdon Local Board	O. S. Grinley	do
* Foundation Works, New Schools	Manchester Corp.	do	do

Those marked with an Asterisk (*) are advertised in this number. Competition, p. iv. Contracts, pp. iv., vi., viii. and xli. Public Appointments, pp. xx.

CONTRACTS—Continued.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
School Buildings	Whickham Sch. Bd.	T. C. Nicholson	April 10
Refrigerator Works	South. St. W. L. S. A.	H. J. P. Piddich	April 11
* Works and Materials	Battersea Vestry	J. L. V. Ing	do
* Macgillivray and Farningham	South. St. W. L. S. A.	Official	do
* Six Almshouses	W. Vestry	W. Skyles	April 11
* New Station, & Pangbourne	Trust, Alchester	R. E. J. Barker	do
* New Boiler at W. House	G. W. R. Co.	Official	do
* Wood Paving Works	H. H. H. H. H. H.	H. H. H. H. H.	do
* Road and Paving Works	H. H. H. H. H.	G. W. Holmes	April 14
* Surveyor's Stores	City of H. M. Works	Official	do
* Construction of Two Reservoirs	Gloucester Police Comm.	Official	do
* Construction of Two Reservoirs	Staffordshire C. C.	H. T. Hare	do
* Water Supply	Rushley Local Board	R. E. Middleton	do
* Six Sheds, Clapham	Rye Town Council	C. Smith	April 10
* Farm Buildings, Llanedoch, near Pontypool	Athlete T. W. Collins	P. F. Conner	May 1
* School Buildings, Wisbury, N.B.	J. W. Stevens	do	No date
* Wing at Workhouse Infirmary, Harton	Can. H. H. H. H. H.	D. M. Llewellyn	do
* Master's House, Reading	South Shields Union	J. H. Morton	do
* Whistling Caseway	Gr. H. H. H. H.	A. Waterhouse & Son	do
* Work at Asylum Walls	Motherwell (N. B.) Trustees	Official	do
	Southern & Bath Local Asylum Visitors	do	do

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Appointments to be made.
* Clerk of Works	Dartmouth C. P.	200	Mar. 31
* Assistant Surveyor	Haverhill Local Board	150	April 11

should be deemed the "owner." One can conceive of cases where it may be difficult to find the real owner, and therefore it was deemed desirable to make the actual receiver of the rents liable, and I think the Legislature intended to fix the actual receiver, whoever he may be, with the liability. I, therefore, am of opinion that the Board are entitled to recover, and must give judgment accordingly.

MEETINGS.

MONDAY, APRIL 3.

Leeds and Yorkshire Architectural Society.—Nomination of Officers. 7.30 p.m.

TUESDAY, APRIL 4.

Glasgow Architectural Association.—Mr. J. Rogerson, on "Woods." 8 p.m.

WEDNESDAY, APRIL 5.

British Archaeological Association.—(1) Mr. C. H. Compton on "The History of the Early British Church in Wales." (2) Lieutenant-Colonel Lambert on "Caerleon-on-Uk." 8 p.m.

Institution of Civil Engineers of Ireland (Dublin).—Meeting in the New Hall, 35, Dawson-street.

THURSDAY, APRIL 6.

Institution of Civil Engineers.—Students' visit to the new Lock and Weir Works, at St. Margaret's, Richmond. 2.30 p.m.

FRIDAY, APRIL 7.

Edinburgh Architectural Association.—Visit to White Kirk, Tynninghame, and Prestonkirk.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

6,950.—WATER-CLOSETS: S. S. Hellyer.—This specification refers more particularly to water-closets, but is also applicable to other sanitary appliances in which water flushing is required. It consists of means for a more efficient flushing. As applied to a "wash-down" water-closet, there is formed in the flushing run of the closet basin, where the water enters, a projection or guiding piece, shaped and placed so that the incoming water is divided and directed so as to flow in equal streams in opposite directions along the run, to ensure an equal flushing on both sides of the basin. There is also provided, preferably opposite where the flushing water enters, and facing the outlet of the basin, an obstruction which not only prevents the two currents of water from meeting, but it also forms in a projecting curve below the run to direct the water into the basin and to cause a cascade therein. The basin is made with a continuation covering the lower part of the metal trap. The same arrangement will apply to urinals, slop sinks, &c.

6,956.—CLOSET FITTINGS: J. T. Harris.—The object of this invention is to combine the advantages of a so-called combination wash-out closet fitting with those of a valve closet. It relates principally to a simplified valve action, to the form of the valve box and pan hold, and to the disposal of the overflow and trap.

3,943.—SEWERS TESTING: W. Simpson.—This patent refers to an apparatus for testing sewers, drains, and other pipes, and for indicating the extent of pressure and defects in the same by means of fumes generated by the burning of cotton waste, or other like substance. It consists essentially of a fume generator and an air-pressure generator, the former being placed immediately above the latter.

5,989.—STONE DRESSING: A. Taylor.—This patent relates to apparatus for dressing stone for door-steps, window-heads, and the like. The apparatus consists of oppositely-arranged sets of tools, caused to alternately advance towards and recede from each other by means of eccentrics, or the like; the tools of one set being arranged opposite spaces between the tools of the other set to permit the points of the tools to overlap, the stone being maintained in such a position that the tools act upon the face of the stone to be dressed. The stone is held in position by means of a clamping-frame, guided and retained in position by adjustable holding-up bars. It is also provided with means for being intermittently moved for the purpose of laterally feeding the stone. Means are provided for supporting the stone, consisting of trucks running on rails, supported on cross-beams, and provided with screw-threaded lugs or nuts, in which work screw-threaded spindles, with means for simultaneously rotating the same. The tool-holders are provided with tubular tool carriers, so arranged and operated as to impart partial rotary movement to the tools at each stroke.

7,650.—WATER-CLOSETS: S. S. Hellyer.—This invention has for its object to provide a water, or slop-closet, cheaply made and compactly and firmly fixable, so as to project from a wall, and leave the floor space free and accessible. In one with the basin of the closet is formed one or more projections of a length to allow of being built into a wall sufficiently deep to give a firm hold, and of sufficient thickness to afford the requisite strength. The materials should be such as fireclay or iron, so as not to be liable to fracture when the weight of the person is upon the seat of the closet. The iron of the closet may pass through or along the wall at the back, or at one of the sides, and may form a further means of firmly securing the basin to the wall.

12,221.—CHIMNEYS: J. G. Hartell.—The object of this invention is to prevent down-draught in chimneys, and this is proposed to be accomplished by the arrangement of a deflector of a conical shape supported within the cowl near the top.

15,474.—VENTILATORS: G. Cooper.—Relates to improvements in apparatus for ventilating public and private buildings, and consists of a round tube at the top of which is a revolving drum or cylinder secured to a central perpendicular spindle. In the interior of the drum and attached to it are one, two, or more rotary suction fans, each fan consisting of a number of louvers, which extend at right angles from the central spindle to the circumference of the drum, and which are placed at an angle of 30 deg. or thereabouts. On the outside of the drum are attached a number of vanes, so placed that the wind causes the drum to revolve. Above the revolving drum is a stationary cover or rain-guard.

20,475.—COWLS: J. C. Hayward.—Relates to chimney and ventilator cowls, and consists in the provision of a cowl as to obtain an increased up-draught in the flue or ventilator without a down-draught. This is effected by providing, in any suitable part of the circumference of the upper part of the cowl, an air-port terminating in a tube inside the cowl.

NEW APPLICATIONS FOR LETTERS PATENT.

March 13.—5,349, M. D'Audria, Red Oxide Paints.—5,380, H. Godward, Anti-down Draught Smoke Cure.—5,386, M. P. Coffey, Ventilating Appliances for Windows.—5,421, J. Fell, Devices for Fastening and Unfastening Window-shutters.—5,427, G. Law, Join, Ventilating House Drains.

March 14.—5,437, F. Dejeny, Manhole Covers for Sewers.—5,453, W. Odry, Alarm Door-bell.—5,466, J. and F. Jones, Drain Traps.—5,488, F. Prasil, Construction of Braided Metallic Girders.—5,519, F. Schweitzer, Connecting or Fastening together Stones and Plates for the Construction of Walls or Ceilings.—5,520, F. Schweitzer, Plaster Boards or Slabs for the Construction of Ceilings, Walls, and Partitions.—5,535, R. Astley, Fireproof Floors.—5,538, H. Lake, Wood Screws.

March 15.—5,551, Automatic Saw-sharpening Machine.—5,560, N. C. Underwood, Building and Constructional Blocks.—5,576, R. Peppers, Jointing Eye on Oval and

Round Improved Sanitary Glazed Fire-clay Drain Pipes.—5,588, W. Cook, Combination Burglar Proof Sash-lock.—5,597, J. Fairfax, Sash-holder for Sliding Window.

March 16.—5,642, M. Syer, Syphon Water-waste Preventer for Toilets, Lavatories, White Lead, &c. D. L. Syphon Flush-out Cistern for Water-closets.—5,662, E. Stephens, Self-acting Flush Valve for Urinals, &c.—5,709, F. White, Reversible Sashes and Frames therefor.—5,709, T. Roberts, Portable Tea-cotta Stoves.—5,711, R. Sironi and A. Gordon, Artificial Stone.

March 17.—3,742, T. Watson, Workmen's Dwelling houses.—5,754, W. Richards, Ladders, &c.—5,759, A. Ford, Glassing without Putty.

March 18.—5,839, H. Ward, Pedestal Water-closet with seat attached.—5,851, G. Mecenero and G. Lenterie, Artificial Marbles.—5,871, W. Osment, Cutting the Pocket Pieces out of the Pulley Stiles of Sash Frames.

PROVISIONAL SPECIFICATIONS ACCEPTED.

8,826, W. Dieltzsch, Door-check.—21,288, D. Menzies, Tanks, Baths, Cisterns, &c.—22,303, D. Atkinson and J. Kaye, Fasteners for Window-sashes, &c.—22,310, J. Laing, Travelling Iron Roof.—96, H. Champness, Bakers' Ovens.—459, T. Deucherry, Fall-Pipe.—602, F. Hayward, Line-holder for Bricklayers or Masons.—720, B. and A. Dickson, Drain and Other Pipes.—1,399, G. Sykes, Cupboard Fastener.—1,415, W. Carey, Supplying Water to Lavatory, Wash-hand Basins, &c.—2,014, W. Shear and A. Kanati, Device for Bricklayers' Lines.—2,129, W. D. W. Drayton, Water-closet.—2,497, J. Deane, Fireplaces.—2,771, J. Mohlberg, Brick.—2,885, A. Smith, Feed Mechanism for Planing Machines, &c.—3,015, G. Goddard and E. Brown, Mitre and Groove-cutting Machine.—3,056, A. Fowler, Fan Water-closet, Urinals.—3,220, R. Bateman, Nails.—3,366, W. Smith, Pedestal Valve Water-closet.—3,476, J. Joleh, Checking Workmen's Time.—3,613, D. Gardner, Parquetry.—3,750, H. Smith, Pedestal Water-closet.—3,809, H. Smith, Pedestal Wash-down Water-closet.—4,158, J. Jameson, Locks or Door Fastenings.—4,201, J. Bark, Hot Water Supply Apparatus.—4,250, A. Adams-Randall, Bolts or Fastenings for Doors and Windows.—4,259, R. W. Taylor, Bolts or Fastenings for Bricks and Tiles.—4,615, J. Blakey, Columns or Pillars.—4,638, R. Newbery, Lead Lights, &c.—4,643, Wade, Producing Dove-tailed or Undercut Surfaces of Tile Bricks.—4,653, J. Matthews, Portable Circular Saw-mill.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

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The Employers' Liability Bill.



HE desire, which is very pronounced among some politicians, to push a large number of important measures through the House of Commons within a given space of time, does not seem

to the non-partisan and non-political mind very commendable. As the saying is, more haste is often worse speed; and the slow progress gives full time for outside consideration. Thus if the progress of the Employers' Liability Bill has not been quick, such tardiness has given opportunity for its provisions to be considered, so that when Committee is reached, members will be aware of the wishes of their constituents and will also have formed—it may be hoped—definite opinions upon the whole measure. For example, the exhaustive speech of Mr. Gerald Balfour, one of the members for Leeds, which, by the way, was somewhat unreasonably interrupted from time to time, on the occasion of the second day of the second reading, was a careful consideration of the principles of the Bill which could not fail to be instructive.

It has already been pointed out in these columns that the Bill abolishes the somewhat artificial doctrine known as that of "common employment," and makes the master answerable for the negligence of a person in his employment through whom a fellow-servant is injured. Mr. Woods, one of the miners' representatives in the House of Commons, urged during the debate on the second reading that the present state of the law is the cause of injury to workmen, and he instanced a case where thirteen men lost their lives through the negligence of a boy of thirteen, and he contended that, if the law as it is proposed to be made by the new Bill had been in existence, the lad would never have been placed in a responsible position for which he was unfit. It is doubtful whether the pro-

posed change in the law will have as much effect as is supposed. It is not usually in the preliminary selection by the employer of the workman that negligence occurs, but in the manner in which the work is done by the servant. Moreover, it has to be borne in mind that the fact that a workman if injured by the negligent act of a fellow workman cannot obtain compensation, is likely to make workmen more careful of the limbs and lives of their fellows than they will be when they know that if an injury is caused the master will have to pay for it. This is a feature which is just as worthy of notice as the so-called negligence of the master in the selection and management of his servants. But it may fairly be doubted whether all these and similar questions will not soon become somewhat academic. No feature of modern life is more conspicuous than the growth of insurance in every walk of business; and it is certain that this principle is now rapidly extending to the loss caused by personal injuries, and will soon make the liability for injuries to workmen rather a question between an insurance company and the workman than between the employer and employed, just as when two vessels injure each other by a collision, the real parties to the litigation which follows are generally the underwriters on the vessels and not the owners, who are only nominally interested. For this reason also it is not improbable that the principle for which Mr. Chamberlain contended—namely, that the master should be liable for injuries to workmen in his employ, whether caused by negligence or not—will, in due time, become incorporated in the law, though at present the Legislature is not prepared to go to this extent. Whether such a change would be one which would bear the test of criticism may be doubted, and as we have pointed out on a previous occasion, there is no more reason why a workman should be compensated for accidents caused without negligence than any member of the public. The change which Mr. Chamberlain desires would place a person who is a workman in a better position than other persons. For example, if

A, a workman, is purely by accident run over by a cart driven by B, the servant of C, the employer of both, A would, under Mr. Chamberlain's scheme, be able to recover against C. If, however, he is at the same place, and purely by accident run over by a cart driven by D, the servant of E, with whom he is in no way connected, he would not be able to recover. But the tendency of legislation is so much in favour of workmen that we should not be surprised, as we have said, if in course of time this exceptionally favourable law towards workmen were passed by a democratic legislature. But if insurance by employers becomes universal, the opposition to such a change would, from a practical point of view, be greatly weakened.

The question whether or not a workman should be allowed to contract himself out of the provisions of the Bill, which, as it is now drawn, he would not be able to do, raises a question of principle which has been fitly discussed on the second reading. If a workman is willing with his eyes open to make some arrangement by which he gives up his right of action in exchange for some fair equivalent it is difficult to see why he should be prevented. The only ground for the change proposed by this Bill is that in some cases a workman is not a free agent. Mr. Gerald Balfour made a very strong point when he stated that "there was no authentic case of contracting out except for consideration given." Freedom to do what a man desires should not be abolished except on very strong grounds, and it does not appear that the grounds for the withdrawal of the right which now exists, for a workman to contract himself out of his legal right to sue his employer, have been proved. Obviously, if masters and men can agree upon some common scheme by which, in a friendly way, the necessity for going to law can be prevented, it tends to mutual goodwill between employer and employed, and to the saving of money, which would, in a sense, be thrown away by litigation. There is a great difference between a man having no right to go to law and obliging him to go to law. The question is one not only of evidence, but of practical good sense. The

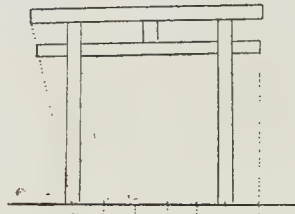


Fig. 1, Shinto Torii.

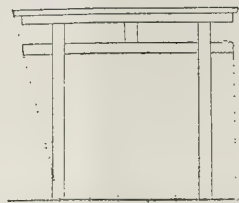


Fig. 2, Shinto Torii.

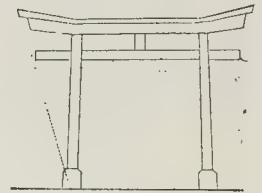


Fig. 3, Buddhist Torii.

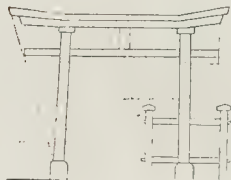


Fig. 4, "Four-footed" Buddhist Torii.

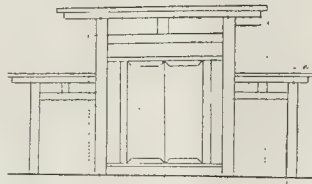


Fig. 5, Torii modified into Gateway.

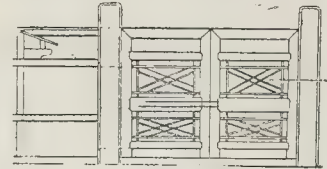
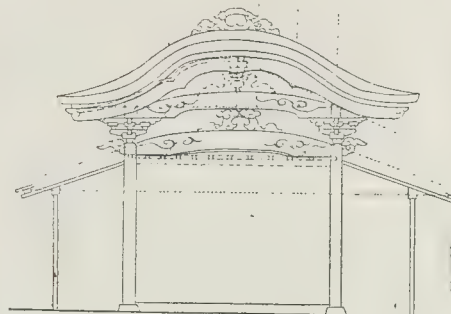
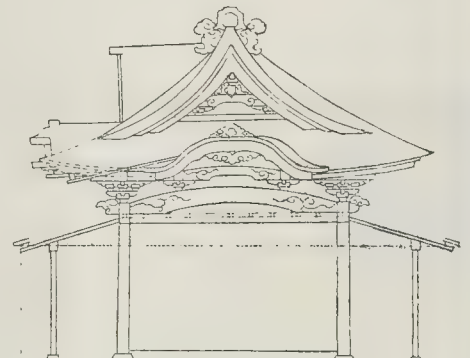


Fig. 6, Private Gateway.



A.



B.

Fig. 7, Covered Entrances to Shinto Temple.

workman is protected by powerful trades unions, and it is desirable, wherever possible, to draw together employer and employed by mutual conciliation and common interest. To make employer and employed antagonistic, is to tend to increase labour troubles, and it must be confessed that the prevention of the power of a workman to contract himself out of the Act seems likely to produce opposition rather than friendliness between these two classes.

In addition to the points which we have just touched on there are various others in this Bill more in the nature of details. The main question of principle on the second reading debate really was whether the abolition of the doctrine of common employment was desirable, and whether that change should be carried out or the more extensive one of making masters responsible for all injuries to their servant, whether caused by negligence or by mere accident. There are many details which will require careful consideration when the Bill gets into Committee, which in due course and at the proper time we shall necessarily have to note. For the present, we confine our remarks to what may be termed the cardinal principles of this important measure.

A LANCASHIRE ARCHITECT.—The *Daily Times* for April 1 contains some interesting notes, by Mr. Albert Nicholson, on John Harper, architect, who erected many buildings in Lancashire. He was born at Dunkenhall Hall, near Blackburn, in 1800, and died at Naples in 1842. He was a friend of William Etty and David Roberts.

SOME NOTES ON JAPANESE ARCHITECTURE.

BY F. T. PIGGOTT.

THE lay mind at first turns instinctively to the pictorial side of architecture; not to the peculiar nature of the building, but to the place which it holds in the picture which he sees before him in the landscape; and it is in this that the traveller in Japan finds his first sense of keen enjoyment. In the way in which the Japanese have treated their buildings, both small and large, the art-instinct of the people has revealed itself at its highest. Their cardinal principle is that architecture should not ignore, but form part of, the things which surround it. The temple in Japan is as much a part of the landscape as the hill on which it stands and the trees in which it is embosomed.

Now, although the forms are entirely novel, strange, and, from a pictorial point of view, a little difficult perhaps to appreciate at once when they are removed from their surroundings, in the country itself one gets used to them immediately. Even the *torii*, the sacred gateway, which, I suppose, is the most unfamiliar object to Western eyes, strikes one as part only of the general effect, so much is it in harmony with its surroundings. It becomes your familiar friend at once. The temples of India, more marvellous in their effect, built, externally at least, of far more costly material, are more splendid objects to look upon than those of

Japan. But they excite admiration for themselves. In the temples of Japan there is costly work, the unique gold lacquer, the lavish decoration, all worthy of admiration in the highest degree, but it comes second; it is their relation to their surroundings that strikes one first. The inattentive traveller hardly sees them, certainly does not observe them, except when they stand up like vast tents above the wilderness of low-built houses in a city. In the country they are swallowed up in the landscape: the sweeping roofs, the spacious courtyards, the massive lanterns, the painted gates, the glitter of gold throughout, all fit in, and are part of, the hillside forest which frames them in.

One of the chief elements of the harmony of any important group of buildings in Japan is the continuity of the style: the temple is the house glorified. Its walls are the walls of the domestic dwelling place, with the same sliding doors, the same sliding shutters, but on a larger scale, and raised from the ground as places wherein men worship should be raised from the ground on which their daily toil goes on. The temple's massive roof is the roof of the humble house, but with a finer sweep; and even the ridge and end-tiles are the ridge and end-tiles of the streets magnified, so that the place of worship stands in the same relation to the place where everyday life passes, as the worship itself to the thoughts which fill the moments of everyday life; the same idea, the same thoughts, the

same hopes and fears, put on a higher level: magnified. Thus was it once, indeed, in Gothic days with us.

It may not be inappropriate to note here, though it is, of course, known to all Eastern travellers, that there are two forms of worship, and two sets of temples, in Japan—Shinto, the resuscitated primeval ancestral worship of the country; and Buddhism, which came with much attendant art from India. When the talk is of temples with gorgeous colouring and glitter of gold, the Hindu's eye has before it the sumptuous Buddhist shrines; but the almost unique simplicity of the Shinto temples cannot be forgotten, for they too have an individuality and a charm. In a few places only has the addition of the thatched hut been preserved: the missionary spirit of Buddhism has so far left its mark on the national religion that its temples have borrowed many of the features of Buddhist architecture. They preserve, however, the original notion of simplicity—the complete absence of colour. They are built entirely of plain wood, but of the best quality; and, though the thatch is no longer on the roof, its place is taken by in wooden shingles in layers often a foot thick.

The direct sources from which Japan drew its inspiration in architecture as in other things were China and Corea; these countries, too, in the reverse order, were the channels through which filtered the indirect influence of India. The origin, therefore, of Japanese art and architecture rendered unity possible, for there are no such wide chasms between the fundamental ideas of the diverse national arts in the East as there are in the West; the elements were in their nature simple: everything lent itself to the welding process. One thing only was necessary, the welding and assimilating faculty; and this, which neither Chinese nor Korean possessed, was almost the chief characteristic of the Japanese race. The result in every branch of art, and in architecture with its attendant decoration above all, was harmony without uniformity: consistency without monotony. Paradox is bred in Japan, and I must seek refuge in paradox to make my meaning plain. The point which is so astonishing about the architecture of Japan is a repetition wherein no two things are alike: a sameness wherein everything differs.

In putting Corea, China, and India as the main sources of Japanese art, I do not mean together to exclude other influences. Though the intercourse with the outer world was limited, the foreign trader was not known even at the time when Japanese architecture was at its highest point, in the early years of the dynasty of the Tokugawa shoguns, about 250 years ago. And it would have been impossible for such ardent eclectics as the native workmen wholly to have ignored such samples as came to them of Western art, itself then rather at a high pitch. The influence of Dutch art at a later period, when a colony of merchants had been established on the Island of Deshima, undoubtedly filtered northwards to the studios of Kyoto and Tokyo; but its influence was limited to certain forms of pictorial art, no traces of somewhat bucolic decoration being visible. When we go back to the early part of the seventeenth century, we are confessedly at sea in endeavouring to say precisely what is and what countries can have influenced Japanese builders and decorators. And yet occasionally we come across some astonishing resemblances to Persian art (but this perhaps is a matter of course, for the spirit of communication reigned supreme in all the uttermost countries of the Eastern continent, though the means were wanting or tardy in their methods), to Renaissance in its best and floral aspect, and to the graceful forms of Elizabethan decoration. And these resemblances I confess are fairly startling; they are the remains, perhaps, of the remains, of the Catholic missions which, at various times, visited the country. Yet

even to these there is something Japanese added, and they do not appear to be incongruous, or to jar with their surroundings. The pure line work of the Tudors would undoubtedly appeal to the severer side of Japanese taste. Of the louder vulgarities of the Renaissance, however, there is, there could not be, so much as a trace.

The illustrations which accompany this article are taken from the classical Japanese Handbook of Architecture. This book abounds with illustrations of every form of gateway and temple which has been devised, and contains innumerable plates showing the structure of the roofs and the joinery of all the parts. Those which have been reproduced have been chosen with a view to illustrate what has been dwelt on as the chief characteristic of the architecture—its homogeneity: the gradual development from the simple forms of the gateway to the more elaborate buildings of the temple.

And first of the torii, or sacred gate, which one meets everywhere at the entrance to temples, shrines, villages, and sacred mountains. The preceding cuts are a few only among its many shapes. The Shinto torii is, like the Shinto temple, perfectly simple; its lines are rigid, and it is of plain wood or stone. It is a typical entrance to a place of worship unadorned. Figs. 1 and 2 show two varieties. The Buddhist torii, shown in figs. 3 and 4, assumes more graceful lines; it is of wood, or bronze, or stone. The horizontal beams are often enriched with a finely-cut diaper, in which the sacred *hakawa* is sure to play its part. The upper beam bends upwards at the ends, the feet slanting outwards rest in plinths of lotus leaves, treated classically like the acanthus, and the golden crest of the Shogun, before whose shrine it is set up, often glitters both on the upright columns and the horizontal beams. But whether its lines are severe or graceful, whether it is in stone or iron, before the temples, or of wood, red lacquered, standing in the trees, before some hillside shrine, the torii is always a delightful feature in the landscape, a pleasant object for the eye to rest on.

The common gateways of the houses are based more or less upon the torii. Often, indeed, there is nothing more than the two uprights with horizontal beam, made of plain natural wood that has been selected for its beauty or its grotesqueness; but the more severe architectural form is a reproduction of the torii without its uppermost beam: the peculiar characteristic projections of the lower beam beyond the uprights on either side being preserved; the ends of both being capped with copper to preserve them from the weather, these caps become oxidised and add charming points of delicate green colour. Fig. 5 is a temple gateway based on a modified form of the torii. Fig. 6 shows an ordinary gateway to a private house. The roofing-in of the more solid walls with a miniature tiled roof, furnished completely with ridge and end-tiles, indicated in Fig. 6, is a curious and interesting feature of the town streets. And this brings me naturally to the roofs of the houses, so massive that they seem to squeeze the tiny houses down into the ground, and withal so scientifically constructed, and so admirably suited to the condition of the country. The framework of their roofs is a miracle of dovetailing and mortising; and on this framework, when it is boarded in, is deposited a thick layer of mud, and in the mud the tiles are set, row upon row. Above the tiles the ridge, a massive piece of masonry taking the place of the ridge-pole which keeps the thatch on humbler buildings in its place. On the sides of the ridge and at its extremities are often drawn in high relief some pattern based, in more or less conventional manner, either on the cloud or on the ebb and flow of many waters. The water designs in this place are an appropriate and propitiatory emblem to ward off perils by fire. In the same way the end tile of each horizontal row is ornamented with a *mitsu-tomoye*, the

"triple-comma" pattern, which is supposed to have been derived from the lines given by water stirred into a swirl.

(To be concluded in our next.)

NOTES.



UR readers may remember that in an article on the case of "Burr v. Ridout" we commented strongly on the extraordinary remarks made by the Lord Chief Justice on that occasion in regard to the supposed principles and rules of the Institute of Architects. We are glad to find that these remarks have not been allowed to pass over without notice, and the last issue of the *R.I.B.A. Journal* contains a correspondence between the President of the Institute and the Lord Chief Justice, in the course of which the latter withdrew those words of his which seemed to impute a selfish and unfair motive to the Institute—the words "for their own advantage and to increase their own emolument." "These words," says Lord Coleridge, "seem to impute a motive, and so far as they do I regret them. I have no right to confound the consequences of a rule, though very plain, with the motives of those who passed it." So far this is satisfactory, but we cannot think that all Lord Coleridge's further reasoning is equally satisfactory. He says, further on in his letter, "where there is no specific sum for payment agreed upon, the law implies a contract to pay what is reasonable, and what is reasonable is for the jury, not for the Institute of Architects." And how are the jury, who may personally know nothing about the nature or the value of architects' work, to arrive at a sound conclusion as to what is reasonable? Surely, as we have already observed, one element in such a consideration is evidence as to usual and recognised practice. Such evidence has been admitted in courts of law over and over again, and acted upon as an element in the decision of a case; surely Lord Coleridge cannot mean to ignore that such is the fact. All people who read newspapers know it, at all events. On the other hand, it is of some interest to note one of the incidents which seems to have prejudiced the mind of the learned judge against architects and "Rules of the Institute." It is not insignificant:—

"Many years ago a great nobleman employed an architect of great eminence to give him designs and estimates for a great work of restoration and almost rebuilding which he desired to undertake. The architect made designs and gave estimates. These were so very large that the nobleman gave up the work as far beyond what he could afford. He purchased the drawings, paid the architect several hundred pounds for his trouble, and gave the matter up. More than ten years afterwards he had recourse to another architect, and executed under his control an entirely different building for less than half the money estimated by the first architect. When the work was completed the first architect demanded 2½ per cent. upon the nobleman's outlay, and justified this demand by the "Scale of Charges" of the Institute. I was consulted by the nobleman, and I advised that the claim was an extortion, and that the nobleman should decline to pay one penny. The nobleman took my advice, and the architect's demand was not further prosecuted. This is by no means a solitary, though perhaps the worst, instance within my own knowledge of the manner in which some architects, and architects of eminence, use the "Scale of Charges" of the Institute, and I must claim the right to speak of such conduct as I think it deserves, when the duty appears to me to be cast upon me of speaking at all."

We can hardly believe that such a claim was otherwise than very exceptional, but there is no doubt that it was an impudent attempt at extortion which deserves all Lord Coleridge says of it. Architects who attempt to wrest the Scale of Charges of the Institute in that kind of way are among the worst enemies of the profession.

THE case of Cunliffe v. The Hampton Wick Local Board, which came before the Queen's Bench Division last week, though

it should not pass without notice, yet decides no legal principle. It is remarkable for the combination of faults which appear to be possible in regard to a single and plain contract. The plaintiff was a contractor who entered into a contract to construct some sewers for the before-mentioned Board. By the contract it was stipulated that there should be concrete at the junctions, but there was no stipulation that the general lines of pipes should be laid on concrete. According to the opinion of the official referee, this was an omission which should not have occurred, as, owing to the nature of the ground, the pipes could not be properly laid without concrete. But he also found that the contractor had not fulfilled the part of the contract as to concrete at the junctions, and for the breach both the official referee and the Queen's Bench Division held the contractor to be liable. But in addition to these two "muddles," the surveyor gave a certificate that the works had been completed to his satisfaction, and for so doing the Board discharged him. The result of this mismanagement has been that the Board, at its own expense, has had to relay a considerable part of the piping on concrete and flagstones, and that the contractor has had to pay damages for his imperfect work at the junctions. On the one hand, the money of the ratepayers has been wasted because sufficient care was not taken to draw up a proper contract, and, on the other, the contractor did not fulfil the obligations into which he had entered, and the surveyor gave what his employers considered an improper certificate. To use a common phrase—comment is unnecessary.

THE sixth and concluding lecture of the Carpenters' Hall Series was given on Wednesday evening, March 29, by Mr. J. Wolfe Barry, on the Tower Bridge. The lecturer opened the subject by describing the early London bridges, mentioning that built by Peter the Monk, who was renowned for bridge-building skill; and the narrow arched structure, with its chapel midway, was illustrated by a lantern slide copied from an old print. The fact is a noticeable one that there was only one bridge across the Thames at London so recently as the early part of last century, and the building of Putney Bridge was strenuously opposed by the Corporation at the time, as it was thought that it would ruin the trade of London. The various plans that had been proposed for the Tower Bridge were briefly described and illustrated, and the lecturer then passed to a more concise description of the works of the present bridge. The construction of the caissons and their sinking into position, and the method of excavation, formed an interesting story. No less instructive was Mr. Wolfe Barry's explanation of the principles upon which the bridge was constructed, the steel skeleton of the towers, the steel cables and their anchorage. The lifting leaves of the bridge attracted most attention, and by means of a lantern slide, with movable parts, the centre of gravity was indicated, and the position of the girders and their counterbalances and the means of applying the hydraulic power was clearly described to the audience. The lecturer made amusing reference to the criticisms that have been made with regard to the steel skeleton and the brick and masonry envelope, and aptly compared it with the human form, its skeleton concealed by a cloak of flesh and muscle. It was stated that the bridge would probably be completed during this year, the construction having extended over about seven years. This period bears favourable comparison with old London Bridge, thirty-three years in building; old Westminster Bridge, twelve years; and the new London Bridge, over seven years. The lecture throughout was delivered in the clearest manner as to delivery and choice of words, and it was enthusiastically received by the largest

audience which has attended any of this series of lectures.

THE last number of the *Journal of the Franklin Institute* continues, among other papers, the subject of "Manganese Steel," and shows how the strength and ductility of the manufacture both increase as the cooling of the metal is hastened; in other words, the faster it is cooled the stronger and more ductile does it become. In slowly-cooled manganese steel, the carbon exists in both the hardening and the non-hardening state, whereas sudden cooling increases the proportion of hardening carbon, a change which would be expected to make the metal more brittle instead of very much more ductile, as the experiments recorded in this paper prove. Dredger link-pins, subject to the wearing action of sand and grit between the pin and the link, are stated to wear only one-tenth as fast when made of manganese steel as when made of carbon steel only and simultaneously used. For forging ingots of manganese steel, the metal must be raised in temperature very gradually, as it conducts heat so slowly that if exposed when cold to a high temperature the exterior becomes extremely hot, while the interior remains comparatively cold, and hence unequal expansion sets in. Once the material has been forged, however, it can be re-heated much more suddenly without danger of cracking, but in all varieties of steel care must be exercised to obviate deterioration of the desired properties for commercial purposes in the processes of heating and of cooling.

AS the majority of large buildings which are now being built, or which will be built during the next few years, will probably before long be fitted with electric light, it seems desirable that this probability should be taken into account in their construction. At present no one can calculate on the surprises in store for the electrical contractor. No superficial examination of a building can enable him to tell what sort of stuff he will encounter in running his mains from floor to floor and from room to room. There may be thick stonework, concrete, or steel girders; or there may be merely timbering or plaster. His men may be able to get a hole through a wall or floor in half-an-hour, or they may take more than half a day. If the contractor has estimated for the former, and it takes the latter, he loses; but, as a rule he is more wary, and the gain is on his side if he comes across a piece of soft material, while he is careful not to lose if it should prove tough. Contractors, however, would have a much clearer basis for estimate, and their rates of charges would be lower, if they could count on some preparation in the building for carrying electric cables through walls or flooring. It is too much to expect that the owner of a building which is in course of erection will put in all the necessary wiring for electric light unless there is the immediate prospect of that light being used. The cost of doing so would be considerable, and the money might lie idle for some time. But there is little or no cost involved in arranging that at every top corner of a wall there should be two circular holes in the solid material, one connecting the two sides of the wall and the other running up to the floor above. These holes might be carefully covered over so as not to disfigure the wall, and their existence would be an immense saving in cost and labour in putting wires throughout the house at any subsequent time.

THE *Nineteenth Century* contains another article by Lord Grimthorpe, fortunately a short one this time, supposed to be an answer to that by Mr. Jackson in the preceding number, but which is little more than a continued scold. The amusing (or we might say the amazing) part of it is that a man who has been guilty of such architectural

monstrosities as Lord Grimthorpe should have the assurance to pose as a kind of indignant defender of architecture against men like Mr. Jackson, and that the editor of the *Nineteenth Century*, who ought to know exactly what is the value of Lord Grimthorpe's architectural criticism, should allow the latter to rant in this way in his pages, simply because it amuses ignorant people and sells the magazine. Among other things, Lord Grimthorpe sneers at Mr. Jackson for writing at all, and observes that in old days architects did not write, "but produced beautiful works." Mr. Jackson is supposed by many people to have produced some very beautiful work, and, at any rate, the remark comes oddly from a man who is constantly scribbling, and who has produced the ugliest piece of architectural botching of the day, and while Lord Grimthorpe takes umbrage at being called an "amateur architect in his way," and says it is the "way of the bishops and monks who built all our cathedrals," he may be reminded that even if the said bishops and monks were really the practical architects of our cathedrals (which is "not proven") they produced architecture which everyone admires, while he has only produced architecture which everyone laughs at.

LETTER FROM PARIS.

We hear that this year architecture is no longer to be ignored at the Champ de Mars Salon, and that there is to be not only space devoted to drawings but also room provided for architectural models. If this is at all well taken up, it will be an important innovation in the illustration of architecture in annual exhibitions.

At the old Salon in the Champs Elysées the jury have commenced their laborious task of selection, which in the case of painting has become more delicate and difficult than usual, as the number of paintings to be admitted is now limited to 1,800. M. Bouguereau has preferred to resign his position on the jury of painting.

While we are awaiting the opening of the large exhibitions, the small ones continue to attract the Paris world. No juridical severity presided over the selection of works for the exhibition of the "Independents" in the Ville de Paris pavilion on the Champ de Mars; the 1,300 pictures seemed to have taken their places as they were sent in. With a few good pictures there are a quantity of mediocre works, and some most extraordinary productions which have at all events the merit of amusing the public immensely. Among the few rational works are the landscapes by MM. Duval, Goulan, Osbert, Avigdor, and Nardi, some interiors by M. Bellanger, effects of light by M. Guillaux, and some works by a Russian painter, Chéremetieff; all which deserve to be in better company.

The last of the small exhibitions is that in the Rue Chauchat, organised by the "Association Amicale des Elèves de l'Atelier Cormon." This is interesting and worth turning out of the way to see. There are sixty-seven exhibitors, represented each by several pictures, and the collection does honour to the young artists and their master. We may mention especially the landscapes by MM. Grasset and Burgraff and the drawings of M. Fild.

It is to be hoped, however, that the success of this exhibition will not have the result of bringing on us a multiplication of small exhibitions of the pupils of all the other important ateliers!

The result of the new competition for the decoration of the Salle des Banquets at the Hôtel de Ville has already been briefly noted in our "Foreign News" column. The first competition, two years ago, was cancelled on account of the poor character of the works submitted. On this occasion seventy-five competitors have entered, and MM. Georges Bertrand, Provost and François Lafon have been selected for the final competition. M. Georges Bertrand, who has for some years past disappeared from the annual salons, is the author of some very original, and powerful works, among which we may specially recall the one exhibited some years ago under the title "Patrie," and which has subsequently been photographed and engraved. His design for this competition is treated with vigour, and in a very modern style, and seems unlikely to be successful in the final competition. The second competition for the two rooms communicating with the Salle des Fêtes will have to be decided next week. The competitors at

MM. Bonis and Mouré, Danger, Delance, J. Ferry, Henri Martin and Rigaux, and Simas.

The organisation of these various competitions has given occasion for the utilisation of the Palais des Arts Libéraux, and the consequent justification of its continued existence. It has even been proposed to remove the contents of the Auteuil Museum into that building, considerably increasing the extent of the collection; but this proposal was abandoned at the last moment, lest it should seem to clash with the favoured scheme of the Municipality, to retain the exhibition of 1900 on the same site on the Champ de Mars. For it is evident that if this illjudged and disastrous decision is to be carried out, a clean sweep will have to be made of all the existing exhibition structures on the Champ de Mars, which are already losing all their interest and value, and becoming reduced to skating-rinks or to occasional use for some trivial foreign exhibition such as that from Dahomey; and are besides very much in need of repair. The monumental fountain of M. Coutan, of which the *Builder* gave an illustration, is in a wretched condition, the sculptures rotting away and even falling, to the occasional injury of passers by. Frémiet's animal statues opposite the Trocadéro are neglected and decaying in the same manner; and this state of things is certainly not creditable to the municipal authorities. However, the latter seem now to have determined on transporting the Auteuil collection into the pavilion on the Champs Elysées, which, in a practical point of view, is no doubt a more central situation for public convenience.

Paris will soon have one more fine monument, that to the memory of Barye, which is to be erected in the Quartier de l'Arsenal, near the Place de la Bastille. It is composed of three groups taken from the works of the great animal sculptor; at the base the "La Force et l'Ordre" executed in marble; then the "Lion au Serpent" in bronze; and, as the crowning group, "Thésée combattant le Centaure," also in bronze. A bronze medallion portrait of Barye by M. Marquette has been placed on the centre of the monument. The pedestal is designed by M. Louis Bernier.

The funeral monument of Anatole de la Forge, which M. Barrias is executing for Père la Chaise Cemetery, will soon be completed. The Republican Deputy is represented standing, bareheaded, in a military uniform, such as he wore when defending St. Quentin, in 1870, against the Germans. He raises his sword in one hand, and with the other points to the enemy. This bronze statue will be inaugurated on the 8th of October next. Another new monument appears on the horizon, in the shape of a statue of Bernardin de Saint-Pierre, author of "Paul and Virginia," which is to form a pendant to that of Rousseau on the Place du Panthéon.

For some years past the works of decoration in Paris churches have been entirely stopped, so far as the municipal authorities were concerned, and what little has been done in that way has been the work of private munificence. Among such work special mention may be made of the large frieze which the Committee of the Fabric of the Madeleine has had executed in the apex of the choir, and which has just been completed. This important piece of work is in enamelled mosaic on a gold ground, and has been carried out by the firm of Messrs. Guilbert Martin, of St. Denis, from the designs of M. Ch. Lameire. It is a fine work conceived in a truly decorative spirit.

The collection of drawings at the Louvre has received the addition of a number of original drawings by Chariot, and a collection of studies made by the painter Payvety in the course of his travels, including drawings of the principal architectural monuments of Greece. The Louvre has also acquired a bronze suit of armour formerly in the Pouthalis collection, and which has been at the museum of Saint-Germain. The portions of this armour are said to have been discovered at Ierulaneum, and offered in 1802, by the Queen of Naples, to the Empress Josephine.

The following is the list of works by Meissonier which, in accordance with the terms of his will, have been presented to the State: (1) "Etude de Paysage;" (2) "Blanchisseuses à Antibes;" (3) "Tête et Poitrail de Cheval Brun;" (4) "Cuirassier en Selle;" (5) "Tête de Cheval et Poitrail;" (6) "Etude de Cheval;" (7) "Etude de nos Evangelistes;" (8) "Etude pour le Dimanche à Paris." We may add that for some days back the exhibition of the works of Meissonier, which closed at six, has been reopened from eight p.m. to midnight.

The competitions for the Grand Prix de Rome were commenced at the Ecole de Beaux-Arts. In the section of architecture, the following candi-

dates have been admitted "en loges;"—MM. Deperthes, Léon Chiffot, Dalmas, Varcollier, Letourne, Recours, Renevey, Patrouillard, Ruel, Duval, and Chaussemiche.

The determination of the Government to put up the rebuilding of the Opéra Comique to competition has already been noted in our Foreign news column of last week. We need only add here that the "Union Syndicale des Architectes Français," presided over by M. Selmersheim, has demanded from the Minister of Public Works that the competitors should be required to accompany their designs with a statement of cost signed by contractors who undertake to carry it out for the sum named, and that M. Daumet, the President of the Société Centrale, has addressed to the Minister a formal protest against this demand.

Last week the Municipal Council of Paris officially attended at St. Cloud to preside over the inauguration of the additional water-supply from the Avre and the Vigne, which are already furnishing a considerable amount of the water supply to Paris from the Department of the Eure. It was to the late eminent engineer, Couche, a worthy successor to Belgrand, that Paris owes the first works undertaken for this portion of the water supply, which will afford a sufficient supply during the summer months to obviate the necessity of having any recourse to the Seine. At his death, about four years ago, the work was carried on by MM. Bechmann and Humblot, who were warmly congratulated by the Prefect of the Seine and the President of the Municipal Council on the completion of their work. The photographs exhibited in the tent in which the official speeches were made enable one to trace the whole course of the supply, which has required the construction of about 72 kilometres length of open conduits and 26 kilometres of subterranean tunnels, some of them more than 70 metres below the surface of the ground. The aqueduct has a circular section of 1.80 metres diameter, with a uniform thickness of 20 centimetres of cement masonry. The valleys are crossed by means of syphons composed of two lines of iron pipes, each 1 metre in diameter.

The reservoir at St. Cloud, whence we look over the extensive panorama of the Bois de Boulogne and Paris, will be composed of three compartments each containing 100,000 cubic metres. The first compartment alone is completed at present, and as the water has not yet been admitted, the public could promenade in the lighted interior, which looked very effective with its vaults sustained by 600 square piers, giving it the aspect of an Egyptian temple.

The reservoirs are about 800 metres distant from the Seine. The conduit for conveying them to Paris, constructed of steel plates and of a diameter 1.50 metres, is at the first part of its course enclosed in a shell of masonry, and crosses the railway on a series of arches, and then is carried over the river, on the supports of an iron footbridge which affords direct communication between the heights of St. Cloud and the meadows of Longchamps. On passing off this bridge, the conduit disappears under the Boulevard d'Auteuil, entering Paris near the gate of that name, and travelling thence to the various quarters where its supply is required, and is connected to the existing system of supply-pipes.

The difference of level between the reservoir and the foot bridge is 70 metres; and different fountains arranged for the occasion along the route of the service pipe gave a practical illustration of the difference in pressure at various points. It may be added that from the monumental point of view the structures connected with this addition to the Paris water supply deserve great praise, and are highly creditable to the good taste of M. Humblot and his coadjutors.

The painter Cabat, whose death took place in his eighty-first year, a fortnight ago, though he had lately been rather forgotten except among his numerous friends, was in his day an artist of no little importance, and in fact may be considered the pioneer of the modern landscape school. His first pictures, which date from 1833, proved that he could render nature interesting without the factitious accompaniments of ruins, statues, temples, and other theatrical accessories in the taste of that day; and indeed the public which was accustomed to these tricks reproached him with his realism. Subsequently he was regarded as a great painter; and to-day, such are the vicissitudes of taste, he is regarded as a rather worn-out "classic"; but he will probably retain his true place with posterity. The Luxembourg possesses two of his works: "L'Etang de Ville d'Avray," and "Soir d'Automne," which figured in the Salon of 1852;

and several of his most important works are to be found in various provincial museums. He became a member of the Institute in 1867, and in 1878 succeeded Leneveu as Director of the French Academy at Rome.

M. Taine, who has died at the age of sixty-seven, should also be included in our obituary notices, since he had been a professor at the Ecole des Beaux-Arts, and had written several books on subjects connected with art—"La Philosophie de l'Art en Italie," "l'Idéal dans l'Art," "l'Art dans les Pays-Bas," and "l'Art en Grèce." We ought also to give a word of recognition to M. Jules Ferry, who, though his name is chiefly connected with political life, had, during his occupation of the office of Minister of Public Instruction, taken an important part in the artistic movement of his day in France. It was owing to him that the organisation of the Salon of the Champs Elysées (then the only one) passed out of the hands of the Government into those of the artists themselves, who then founded the Society of which the venerable M. Bailly was President. Both as a private man and as a statesman he always interested himself greatly in art, and has left many friends to regret him in the artistic world.

ABBEY DORE.*

THIS is by no means the first occasion that the Abbey of Dore in Herefordshire has formed the subject of a paper. So far back as December, 1829, we find some notes on the church published in the *Gentleman's Magazine* (p. 497) written by Mr. Wm. Sawyer, and illustrated with a view of the north side of the presbytery and the remains of the nave, showing the building in much the same condition as at present. The next account of importance was one by Mr. John Clayton, published, I believe, in the "Quarterly Papers of the Institute of British Architects," and read in 1856. A report of this was also published in the *Hereford Times* on December 16, 1856. In 1870 it was visited by the British Archaeological Association, a paper being read on the abbey by Mr. Gordon Hills (see *Builder*, September 17, 1870), and in 1877 by the Royal Archaeological Institute (see *Builder*, August 25, 1877), on which occasion some notes were read by the late Sir G. G. Scott. Papers have been more recently read by Mr. Thomas Blashill before the British Archaeological Association and the Woolhope Club in 1885. It will be thus seen that from time to time Abbey Dore has received a very fair share of attention. There is in these accounts, however, an absence of any detailed ground-plan of the building. A plan was published, I believe, by Mr. Henman, but gives only the portion of the building now used (the transepts and presbytery), and in one of Mr. Blashill's papers (that in the "Proceedings of the British Archaeological Association, 1885") a general plan is given to a small scale. My first care, therefore, in preparing this paper was to make a complete ground-plan of the remains of this abbey church, and also to make some excavations for the purpose of discovering, if possible, the exact extent and position of some of the destroyed buildings. By the kind permission of the rector, Rev. A. Phillips, I have been able to make some excavations, both last year and this, and have been rewarded by finding the exact dimensions of the Chapter House, about which I will enter more into detail at a later stage.

It will be unnecessary for our present purpose to enter very fully into a detailed historical account of the foundation. It will be sufficient to note that it was founded in 1147 by Robert, Lord of Ewyas Harold (a village in the immediate neighbourhood, which still retains some traces of a castle), and consecrated by Thomas de Cantelupo, who was Bishop of Hereford 1275-1282. During this period several families of note made grants of land and other gifts to the monastery, amongst whom were the Alans of Alansmore, the Cliffords, and the Lords of Kilpeck.† The abbey was dissolved in 1534 with the abbey of less than £200 a year (the income at that time being given as £118), and the building and site were granted to John Scudamore. The church became ruinous, and, no doubt, at this time, most of the material of the monastic buildings and the nave of the church were removed, and used largely in the erection of other buildings in the neighbourhood. At the present time worked stones are constantly being

* A Paper read by Mr. Roland W. Paul before the Leeds and Yorkshire Architectural Society, March 20, 1893.
† See paper on Abbey Dore, by Mr. Thomas Blashill, in the British Archaeological Association's "Proceedings," 1885.

found in the walls of cottages in the parish, and stones, which doubtless formed part of the buildings, are at present lying in Gilbert's Hill woods, north of the abbey. The next period in its history was the restoration of that portion of the church which had not been already totally destroyed—namely, the transepts and presbytery. This took place in 1634, or a hundred years after the dissolution of the monastery. Against the north wall of the north transept is an inscription on a marble tablet which is of great interest as a record of the state of the church at that time, and the extent of the works which were carried out. It runs thus: "A great part of this church being broken down, and all of it, together with the Tithes of this Parish being made a Lay Fee by Act of Parliament at the Dissolution of the Abbey 27th Henry VIII. This Remainder of the said church was restored to a sacred use, the walls thereof being greatly repaired, the roof and tower entirely rebuilt, the rectory founded and very bountifully endowed with all the Parochial tithes and with Glebe and Manse, by the Pious and ever memorable John Lord Viscount Scudamore, upon the 22nd day of March, Anno Domini 1634." This was placed here by M. Gibson, Rector, A.D. 1739. The church was consecrated with much ceremony on this 22nd day of March, Palm Sunday, "about Eight of the clock in the morning." Since this time the church has been used as the parish church of Dore, and is the only Cistercian Presbytery in England which is in use at the present day. We may now pass to the examination of the present remains of the monastic church and buildings. Its architecture was described by the late Sir Gilbert Scott as being of an intermediate character, between the Transitional Style and the developed Early English. "Nothing could be more beautiful," he said "than the internal architecture of this church. It represented just the interval which elapsed between the Transitional work of Bishop de Vere and the building of the Lady Chapel at Hereford Cathedral, and was in his opinion more beautiful than either." Its situation, like other Cistercian houses, was very secluded. It stands in what is known as the Golden Valley, about twelve miles west of Hereford, and two miles north of the village of Pontrilas. The small river Dore runs near the monastery, and a smaller watercourse has been made forming first a millstream for the abbey mill and afterwards doubtless becoming a sewer and passing under the rere dorter of the monastery. This stream still exists and the site of the abbey mill is still occupied by a corn-mill. Some remains, doubtless those of the earlier mill, were discovered a little while ago in making repairs and deepening the mill stream. The valley at this point runs in a south-easterly direction, and the main axis of the church is parallel with it, and also those of the monastic buildings. The cardinal points are shown on the ground plan.

When the church was first built there is no reason to suppose that it differed in any important point from the usual Cistercian plan. The chief points in this plan were a long nave and a short eastern arm. The transepts had no western aisles, but had chapels on the eastern side, generally two in each transept, in some cases three. How generally this plan was kept to may be seen by comparing the Cistercian houses, not only of England, but of Wales and Ireland. The choir proper extended one bay, sometimes two, westward into the nave, and west of the stalls came the pulpitum, and still westward again the altar of the conversi, or lay brethren, who had their own apartments on the west side of the cloister, and a separate door of entrance to the church.

The nave of Abbey Dore is said to have been of ten bays. In setting out this portion of the church, however, it seems clear that this description applies to the ritual nave. The whole seems to have been eleven bays, of which one was taken up by the choir stalls. From traces of the west wall which are apparent on the north side of the present churchyard, it seems to have been 170 ft. in total length from the west wall of the central tower.

It will, however, be better to describe the eastern portion of the church first. The transepts are about 28 ft. square, and had two chapels in each arm. The central space, surmounted probably by a low tower, was 32 ft. square. East of this was the presbytery, which, in its early form, in all probability projected but one bay beyond the wall of the eastern chapels. Everything in this portion of the church is severely treated, ornament being very sparingly used, and such as there is (on the arches for instance) bearing traces of having

been done at a later period, when the rigid rules of the order had become somewhat relaxed. How far the original east end was completed we have now no means of ascertaining, but certain it is that at no very long period after the first foundation the grants, maybe of land and other contributions from wealthy laymen of the period, induced the monks to enlarge and considerably elaborate their church. We know that there are several examples of this later extension. Many Yorkshire abbeys are particularly prominent in this respect. The Abbey of Fountains had its east arm enlarged and seven altars arranged across it, somewhat in a similar manner as the "Nine Altars" at Durham. Byland was an important example of extension, similar in some respects to Dore. Bearing in mind the communication which was constantly kept up by the Cistercians between their various monasteries, doubtless there came to their knowledge a report of the grander schemes of other monasteries, and they thereupon, with the enlarged funds at their disposal, determined to do likewise. The result has been of great interest and beauty, and this elongation of the presbytery is one of the points which makes the church of Abbey Dore so valuable.

The process of extension seems to have been carried out by removing the east walls of the two inner chapels next the Presbytery, and also the east wall of the Presbytery itself. The Presbytery was extended two bays in length with side aisles and an eastern ambulatory. Further east was a row of five chapels, approached from this eastern ambulatory, and almost exactly resembling the addition, both in the jointing and the stopping of the string-course which had been carried round the vaulting shaft itself, but is now cut off eastward. The design of these newer bays differs also from the earlier one, moulded arches taking the place of what was a solid wall, and the clearstory windows being longer. At the east end over the altar was a triplet, and underneath three richly moulded arches on clustered columns, through which is seen the eastern aisle and its chapels. The subdivision of these chapels does not coincide with the eastern arches of the Presbytery, and this gives rise to an irregularity in the vaulting which will be better understood by reference to the ground plan (see double page photo-litho in the present number). The detail has been in most cases kept very simple. Some elaboration, however, is given to the caps, one or two of which have a peculiar scalloped ornament on the top of the abacus.

There were dwarf walls dividing the chapels, of which traces remain against the columns. This range of chapels appears to have been an after-thought. The detail throughout is distinctly later than that of the side aisles, and is interesting as an example of the "transition from a transition," as suggested by the late Sir G. G. Scott. None of the work here is purely Early English, although details have been found showing that work of this date occurred in the building. There are some bosses and other details of very beautiful work—the bosses would seem to have belonged to the vaulting of the Presbytery, which has been destroyed and replaced by a wooden roof and flat ceiling of Scudamore's time. With the exception of two lancets and a vesica in the south end of the transept and the triplet over the altar, the whole of the church now remaining is lighted by single lancets. The window in the northern transept chapel is roundheaded, and, if original, is the earliest window in the church.

The eastern chapels and ambulatory have been decorated with colour, and considerable traces of this remain under the whitewash with which the whole of the interior has been coated. If this whitewash was carefully removed we should have a highly interesting example of the colour decoration of the period. What is now visible in various places on the columns is a series of zig-zags treated in broad bands of yellow, red, and brown, and appears to be coeval with the portion of the building in which it occurs.

One notable fact about this church is that its choir is the only one in England belonging to a Cistercian monastery which is at present used for service. (At Margam the nave is still used, at Beaulieu, Hants, the refectory.) The present altar is the original slab, a large stone measuring 12 ft. long and 3 ft. broad, retaining the five crosses. It was found by Viscount Scudamore "abominably desecrated, and ordered to be restored, and set upon three pilasters of stone." These pilasters are portions of clusters of four columns round a

central drum. Underneath are some interesting tiles of the thirteenth century, green in colour, and glazed. They are lozenge-shape, measuring 11 in. by 6 in., and have a conventional foliage pattern in relief.* The altar-pave is paved with stones set diagonally 1 ft. square, probably dating only from the time of Scudamore's restoration.

Behind the altar is a low wall about 4 ft. in height and 1 ft. in breadth, which may have formed part of the reredos. The whole of the presbytery is raised two steps above the aisle level. On either side of the reredos, in the side archway at the east end, were doorways from the sanctuary to the eastern ambulatory. What appears to be the base of one of these doors is still visible on the north side.

In addition to the high altar were the five altars in the eastern chapels, two in the south aisle of the presbytery (their position still marked by recesses—probably aumbries—in the wall) and two others in the chapels of the transepts.

Even if any existed, no traces remain now of any glass of early date. The stained glass in the church dates only from Scudamore's time. The three lancets over the altar are filled with some effective glass in good preservation. In the centre-light is the Ascension, with figures of the twelve Apostles below. In the side-lights are figures of the Evangelists and SS. Peter, Andrew, James, and John. In one of the lancets on the south side is a coat of arms. A shield bearing the following arms: Sa. quarterly, first and fourth, an arrow-head inverted arg., in bend sinister a valmer's staff, arg., with strap and buckle. The supporters are two wild men. Over has been the usual helmet and crest. This has disappeared, but a part of the mantlings at the side still remain.

There are monuments of some interest in this portion of the church. On the north side of the presbytery, in a trefoiled recess (apparently built in at a later period), is the diminutive effigy of a bishop, measuring 15 in. in length by 9½ in. in breadth at the top and 9 in. at the bottom. Down the sides is an inscription in Lombardic letters—(SER)VA : PONTIFICIS : COR : SANCTVM : XPSTE : JOH(ANNES) (O Christ, preserve the holy heart of Pontiff John).† This commemorates John Breton or de Breton, described as "a man of great and profound judgement in the common laws, an excellent ornament to his profession, and a satisfaction and solace to himself."‡ He was Bishop of Hereford 1269-1275. His place of interment is not known. This small monument covered his heart—his body was most probably buried in his Cathedral. It is now uncertain whether the stone was inserted in the floor or covered a small tomb—probably the former. The effigy is in relief, and the inscription incised.

There are two excellent examples of knights in chain armour now resting on plain tombs against two of the windows of the Eastern Chapels. They are generally ascribed to the founder Robert de Ewyas, and Sir Roger de Clifford. Both have surcoats over, and carry shields and swords. On the front of the tombs on which they rest are two carved bosses, which were in all probability in the vault of the presbytery. They represent the Crowning of the Virgin, and the Virgin and Child, the latter having a kneeling figure of a Bishop introduced in the lower portion of the design. This boss bears a striking resemblance to the seal of Jordan, abbot of Dore (These three effigies will be found illustrated in our double-page lithograph.)

On the north side of the church at the thin bay from the west is a doorway which led to the cemetery. The doorway retains its original framing to a considerable extent, and also some very beautiful ironwork, consisting of two hinges with the scrolls and leafage characteristic of the thirteenth century. (See block.)

On one of the steps behind the altar is a portion of a shrine—(see double-page lithograph)—a gabled canopy of two bays of red sandstone retaining traces of gilding. It was found a few years ago whilst digging for the foundations of the west end of the nave.

In the chapel of the south transept is an altar tomb commemorating Serjeant Hoskyns, who died in 1636, "covered with Latin verses by Bonham, of Essex, Daniel, Dr. Donne, and others, in the extravagantly laudatory fashion of the day."§ On it are the following arms:—1, Sa.

* Embossed tiles also occur in the Presbytery at St Albans Abbey, Herts.

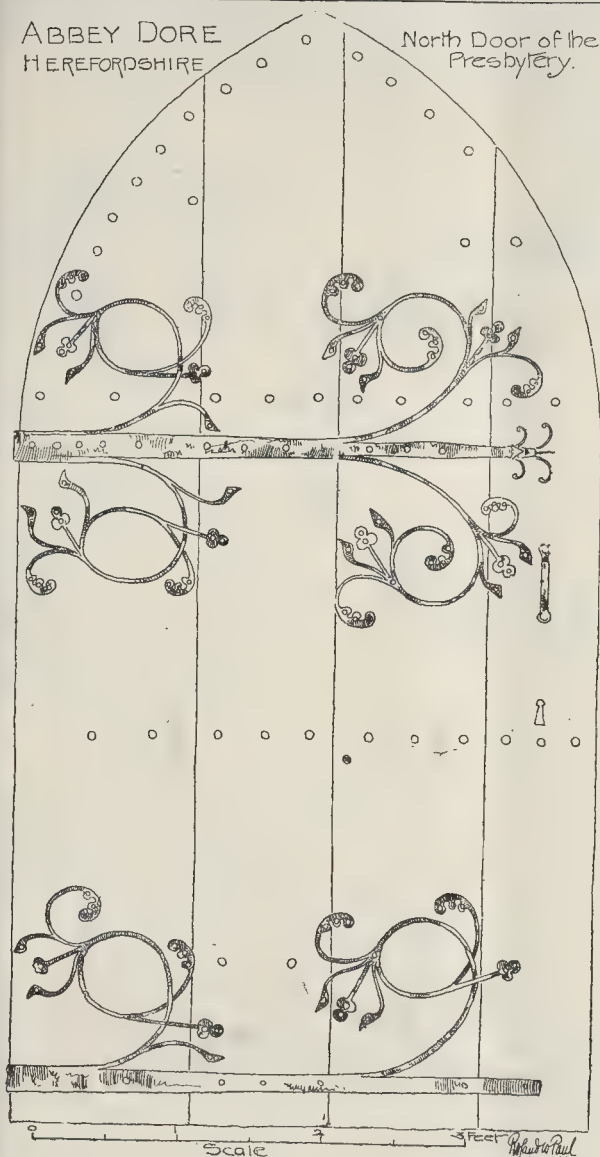
† See *Builder*, September 17, 1890.

‡ Britton's "Hist. of Hereford Cathedral," p. 16.

§ Woolhope Naturalists' Field Club. Trans., 1864, pp. 54-55.

ABBAY DORE HEREFORDSHIRE

North Door of the
Presbytery.



a chev. or between three lions rampant of the second; 2, Sa. within a bordure a lamb tripping arg.; 3, Gu. two bars or three bezants in chief; 4, a saltire Sa., between four estoils, or; 5, a shield quarterly, embattled arg. and Sa.; 6, Gu. three crescents or (two and one); 7, Arg., three torteaux (two and one). Crest, a greyhound arg., semée of ermine spots, holding in r. paw a shield of the first charged with a cross Sa.*

There is a small stone now lying in the south transept panelled on two sides and at one end, of hard grey limestone, measuring 2 ft. 5 in. by 1 ft. 2½ in. Its use is uncertain—one end has been against a wall and is left blank. Standing against the south-west pier of the crossing is a late and plain font. This, of course, only dates from Scudamore's day, and if in itself earlier was in all probability brought from some other church, as no font would have been necessary in the Cistercian monastery. The step on which it stands is, like the font, octagonal, jointed across the centre. Round one half of it is a highly inter-

* Some Account of the Parish Church of Abbey Dore, by J. H. James, Middle Temple.

esting inscription in Lombardic letters, now upside down. It is + HVGQ : OLIM : DECAN : DE : WEBBELY : ME : FE : This inscription is obviously unfinished, the last letters being the beginning of the word FECIT, and probably from their position set out as a guide for a second line which was never finished. At Weobley Church, some miles north of Hereford, in the south aisle, formerly the Chantry of St. Mary, is a slab with a very beautiful cross, and the inscription, HIC JACET HVGQ BISSOP +. The inscription at Dore undoubtedly refers to this Hugo Bissop, a well-known man in his day, and a great benefactor to the church, and is "mentioned frequently in the charters printed at the end of Dr. Rawlinson's 'History of Hereford Cathedral.'" (See "Arch. Camb." vol. xv., p. 18, where a drawing of the slab at Weobley is given.) It has been suggested that this font step was formerly the base of a cross standing either in the cloister, the cemetery, or outside the precincts. The inscription, if it had been completed, would perhaps have been "fieri fecit." He is hardly likely to have done the work him-

self—he more probably had it made as a gift to the monastery.

The other interesting details in the interior are the elaborate screen under the east arch of the crossing, put up by Scudamore, and decorated with his arms, those of the then Archbishop of Canterbury, and the royal arms in the centre; a gallery now against the west wall, and some pewing. At this same period the walls of the transepts were covered with texts in black letter, and two painted figures of King David and "Time," and these are still to be seen.

The inscription recording Scudamore's restoration already quoted mentions the rebuilding of the tower, doubtless referring to that which now exists at the junction of the south transept and south aisle of the presbytery. It is obviously a late addition to the fabric, with some earlier material re-used. The original tower, if there ever was one, was low and central, but it has entirely disappeared. The present tower rises well above the roofs of the church, is finished with an embattled parapet, and contains the bells, six in number.

The whole of the exterior is treated in the simplest possible manner. The jambs of the lancets of the presbytery are of two orders of chamfers, the windows of the south transept being the only ones with shafts. The walling is of random rubble laid for the most part in thin courses, with wide mortar joints, the material being red sandstone. A harder sandstone of greyish tint is used for the coigns, window jambs, arches, and dressings generally. The buttresses project but slightly, and the plinth proper is not carried round the walls, but only round the buttresses themselves. Each lancet in the side aisles of the presbytery, and those in the eastern chapels, had a gable over it with a roof running back into the main roof of the aisle. These gables and roofs were removed at the time of Viscount Scudamore's restoration, and the roof reconstructed with continuous eaves. A somewhat similar arrangement is still to be seen in the nave aisles of the Abbey Church at Shrewsbury, and there are traces in the nave aisles at Chichester Cathedral of gables having formerly existed.

The effective corbel-table of the presbytery is obviously an insertion, being earlier than the wall on which it is placed. In all probability it was brought from the nave and placed here at the restoration. A portion of it has also been placed along the present western wall and returned on the face of the north transept for a little distance.

Of the nave of the church the only remains at present are the first two columns of the arcade westward of the crossing, and the eastern responds. The arches over also remain with a fragment of wall above. A portion of the outer wall of the north aisle still projects from the transepts, and a fragment of the aisle corbel-table on the south is *in situ*. This corbel-table is later than the rest of the church.

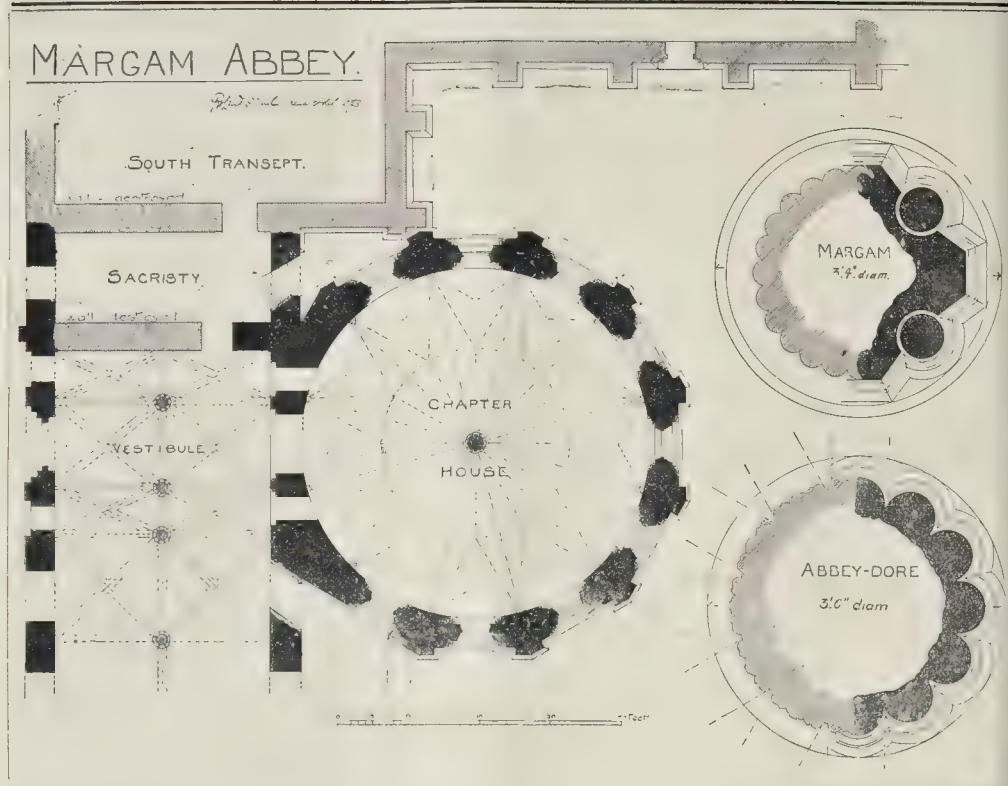
From time to time as graves are dug fragments of the nave are found. Only a week or so ago a base of one of the nave columns was found, a large number of vaulting ribs, and what appears to be a portion of one of the responds or vaulting shafts against the aisle wall.

The base of the column is Norman, the section of the vaulting ribs Early English, and from this it is reasonable to conclude that the arcade, and, possibly, the aisle walls, were Norman, and that the aisles had been re-roofed in the Early English period, which would account for the vaulting ribs of this date, and for the presence of the later corbel-table already mentioned.

It has been said that the nave was of ten bays and 169 ft. long. I am disposed to think it was of eleven bays and 170 ft. long. Taking the present arch and column, eleven of these would coincide with a fragment of a return wall at what was the north-west angle of the nave.

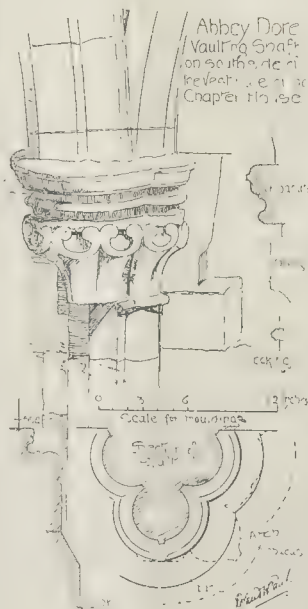
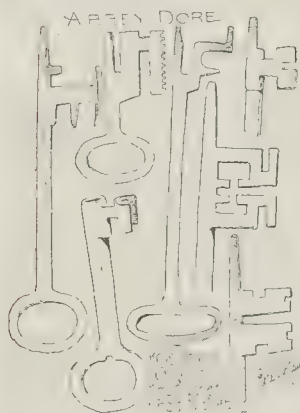
The north wall has been almost entirely destroyed, but a doorway still remains near the west end, which allowed the conversi or lay brothers to come into that portion of the church from their side of the monastery, west of the cloister. I will refer to this again later.

As to the monastic buildings there is no reason to suppose that the arrangement at Dore differed in any essential particular from the usual arrangement of monastic buildings of the Cistercian order. At Dore the cloister, with its surrounding buildings, was on the north side of the church. There was a cloister about 100 ft. square, with the refectory projecting northwards, the cellars and domus conversorum on the west, and the sacristy, chapter-house and day room on the east. Over this eastern alley was the dormitory or Dorter, access being obtained to it by the "day



stairs" at the north-east angle of the cloister, and by the "night stairs" from the north transept of the church. (These night stairs are indicated on the plan—the doorway itself still exists).

excavations to endeavour to find out the exact dimensions of this chapter-house at Dore, and the plan before you may, I think, be said to be reliable.



immediately adjoining the north wall of the transept was a sacristy 27 ft. long and 13 ft. 6 in. wide. There seems to have been a smaller room further east against the north wall of the transept chapel—traces remain of arches and a return wall.

Next to the sacristy came the chapter-house with its vestibule. In all probability the original chapter-house was a rectangular room, and projected slightly beyond the east wall of the sacristy. We see this arrangement very clearly and repeatedly at various other Cistercian houses.

But the desire for enlargement was not confined to that of the church itself. We know that at various places in England chapter-houses were built in other forms than that of a rectangle, such as York, Salisbury, Southwell, Wells, and Lincoln. Both last year and this I have made some

The only remains of the chapter-house above ground are an angle with a vaulting shaft, and a small portion of one side, with a stone bench projecting 15 in. from the wall still remaining. The foundation of this side was followed as far as its

junction with that of a cross-wall, which was found running north from the vaulting shaft, which still remains at the east end of the vestibule wall. The length of one side and an angle having been obtained, the twelve-sided figure has been restored, and the central column, already discovered by Mr. Blashill, restored to its proper position. The diameter internally at the angles of the chapter-house was 45 ft., being 4 ft. less than the one at Margam. The chapter-houses of York, Southwell, Salisbury, and Wells were eight-sided, and that at Lincoln Cathedral was ten-sided. It is a somewhat curious fact that there should be a group of chapter-houses differing as far as I know from all the others, and situated in the West of England within a few miles of each other. The earliest one is at Worcester Cathedral, which is a Norman one, and circular inside. (The outer face is polygonal, of Perpendicular date.) The chapter-house at Margam comes next, still retaining its circular form inside, but being twelve-sided outside. Then we may fairly consider that the one at Abbey Dore comes next, and here we have the circular form entirely discarded, and the polygonal shape both inside and outside. Two more chapter-houses are at Hereford Cathedral and Evesham Abbey, both being ten-sided but in ruins. There are many evidences of this chapter-house at Dore having been a development of the one at Margam. The first is its twelve-sided shape, the only example in England besides Margam. Again, the treatment of the walls at the east end of the vestibule flanking the entrance to the chapter-house at Margam is certainly somewhat clumsy in appearance, two arched openings (once probably glazed (but retaining no traces of it now) which were carried straight through the wall and look rather awkward on the inside. This at Abbey Dore was altered and improved upon. The walls of the chapter-house were made thinner on these sides, and a little triangular space vaulted over took the place of the solid wall at Margam, and probably formed a very picturesque feature in the vestibule. No remains of a stone bench are to be seen at Margam, but sufficient is left at the angle adjoining the vestibule at Dore to give the section of it. The central column at Margam is interesting to compare with that of Dore. Margam had eight shafts, four being circular and four semi-octagonal. The

springing of the vaulting still remains and consisted of a series of ribs, simple rolls, radiating from it to the columns against the outside wall.* The mouldings of this vaulting do not fill up the abacus of the cap at all well, and here again we find that the one at Abbey Dore was an improvement. The base, circular below and showing the bases of twelve shafts above, which was in the Rectory garden and has now been removed to the church, has been placed with its vaulting over it on the section (see block). This is the stone which has long been lying in the field, and which has proved to be the springing of the vaulting. It will be seen by the diagram that it would fill the cap a great deal better than at Margam. I think, gentlemen, that we have sufficient here to show that my claim for this chapter-house would not be an exaggerated one if I were to say that it was unique in England at the time it was in a perfect state, and it can only be regretted that we have no more left of it. The ground sinks rapidly to the east for a few yards, an indication that all the ashlar work has been removed, and perhaps even the foundation cleared away.

Fortunately the entire thickness of the wall remains at one point, and an angle of one of the buttresses. This has enabled me to restore this feature of the building with certainty. There was probably a lancet in each face as at Margam, but nothing remains above the string-course which ran immediately under the windows, and this only at one point. Of the vestibule which led to the chapter-house from the cloister only a portion of the south wall remains, and this in a very fragmentary state. The base of the doorway with its mouldings was, however, found, and also the foundation which supported the three entrances running a considerable distance northward. The destruction of the rest of the vestibule, and indeed, of the buildings situated north of it, has been very complete, and in places even the foundation and concrete used has been taken up. All the worked stone had entirely disappeared, and has probably been broken up and used in the construction of buildings in the neighbourhood. Passing further north, to the edge of the meadow, we come to a stream, now about 4 ft. wide. This stream was an offshoot of the river Dore, having been brought under the Abbey Mill, and afterwards acting as a sewer to the Abbey buildings. On account of its position, the large buildings, including the refectory, the day room, and perhaps the domus conversorum, were taken over the stream. All along its length, where opposite the Abbey, there are remains of the masonry which arched it over. On the north side of the stream is a very solid wall about 4 or 5 ft. in thickness, running north and south and extending for about 120 ft. It has all the appearance of an ancient wall, and may have been one of the walls of the Abbey buildings, but in its present state it is difficult to say. The cloister court itself is now the kitchen garden of the rectory, and its outer walls are built, to some extent, on the foundations of the old cloister walls. The ancient wall on the west side remains standing to a height of 8 or 9 ft., and at a little distance are remains of two windows—small lancets—which evidently lighted the upper room of the domus conversorum, and looked into the cloister court. On going round into what is now a cowhouse the doorway was found still remaining through which the *conversi* passed from their rooms to the church. It has sometimes been stated that there was an open yard between the cloister and the domus conversorum, but the presence of windows in the cloister wall, and the width of the building—25 ft.—seems to point to its having been immediately next the cloister court, as was the most usual arrangement.

Unfortunately this church is one of those to which the parish is totally disproportionate. The population is very scattered and poor, and the natural result is that the fabric itself is in a bad state. The danger, however, comes from below rather than above, and the amount of moisture which is at all times noticeable in the air is, I am afraid, also combined with vitiated air from former burials under the pavement. During the winter months the central portion of the presbytery is entirely divided off from the rest of the church by canvas screens, in order, if possible, to make that part warm which is used for divine service. As may be imagined the result is to entirely spoil this beautiful interior. I can only hope that possibly the publicity given to this state of things by this paper may draw attention to this building, which

is one of our most valuable national monuments of its kind. In order to put the church in at all a proper state, concrete would have to be laid entirely under the present paving, and the ground (which has accumulated in places to a higher level than the floor line) lowered and drained. It would be then possible not only to do away with the hideous screens which disfigured the interior, but the decoration at the east end already mentioned, and in other places, might be exposed without risk of its being quickly destroyed by the damp.

ROYAL INSTITUTE OF BRITISH ARCHITECTS:

THE PROGRESSIVE EXAMINATIONS.

At the meeting of the Institute held on March 27, the President, Mr. J. Macvicar Anderson, said: An Intermediate Examination to qualify for Registration as Student of the Royal Institute of British Architects was held here on Tuesday, Wednesday, and Thursday of last week. Of the 36 Probationers who applied, 31 (of whom I did not attend) were admitted, and 21 passed, the remaining 9 have been relegated to their studies, for a period. The 21 passed candidates, placed by the Board of Examiners in order of merit, are:—S. W. W. Delves, Tunbridge Wells; T. D. Brooks, South Elmsall, near Doncaster; H. H. Dunstall, Chatham; S. S. Dottridge, Bournemouth; H. G. Watkins, Lincoln; C. D. Rochester, Newcastle-on-Tyne; E. Coupe, Chorley; T. W. Hooley, Heaton Chapel; J. C. Southcombe, Arlington, near Barnstaple; J. D. Bland, Cambridge; C. H. Dorman, Northampton; H. V. Ashley, Woodside Park, N.; A. J. Singleton-Shaw, Newcastle-on-Tyne; D. G. Mootham, Bournemouth; F. C. Higgins, Caterham Valley; H. C. Simott, Westbury-on-Trym; T. Bullen, Sunderland; H. S. Chorley, B.A., Leeds; P. W. Meredith, Bideford; C. E. Salmon, Reigate; and W. Slater, Nottingham.

The President added:—A Preliminary Examination to qualify for Registration as Probationer was also held on Tuesday and Wednesday of last week. There were 111 applicants, of whom only 3 had been relegated from previous examinations; and of these 51 have been exempted. Of the remaining 60, 32 attended at the Institute, 19 at Manchester, and 9 at Bristol. All the answers, both written and graphic, are being marked in London, and the results will be reported to the next general meeting.

COMPETITIONS.

COUNTY COUNCIL OFFICES, WAKEFIELD.—The competition designs for these offices, for the West Riding of Yorkshire, will be on view to the public at the Corn Exchange, Wakefield, on Wednesday next, as announced in our advertisement columns.

ARTISANS' DWELLINGS, SALFORD.—The Salford Health Committee, having received 124 sets of plans in response to their invitation to architects, commissioned their sub-committee (which recently visited model dwellings in London, Edinburgh, and Glasgow), to select some of the plans, with the aid of the Borough Engineer, who examined and reported on the whole series. Eight designs being thus selected, the Health Committee awarded the premiums offered as follows:—First premium, 50*l.*, to Mr. Walter Sharp, architect, Manchester; second premium, 40*l.*, to Messrs. M'Murdo, Hornblower, and Walters, architects, London and Liverpool; third premium, 30*l.*, to Messrs. Mangnall and Littlewoods, architects, Manchester. It is proposed to appoint one of these architects to carry out the work of erecting dwellings in flats in Queen-street. The cost of the buildings is to be about 10,000*l.*

ARCHITECTURAL SOCIETIES.

THE ARCHITECTURAL ASSOCIATION (LONDON) DISCUSSION SECTION.—The tenth meeting of the Session was held on the 29th ult. at No. 56, Great Marlborough-street. Mr. C. H. Brodie, the Vice-Chairman, presided, and Mr. Frederick W. Marks, A.R.I.B.A., read an interesting paper on "Bricks and Brickwork," in which he traced the history of his subject from the earliest records through its development down to its practice in modern times. The paper was admirably illustrated by a series of fine examples drawn to a large scale kindly contributed for the occasion by Mr. John Slater, F.R.I.B.A. A good discussion followed, and Mr. Henry W. Burrows, A.R.I.B.A., who kindly came down as special Visitor, con-

tributed some very useful information and suggestions on the whole subject, especially on its geological side.

ARCHÆOLOGICAL SOCIETIES.

HAWICK ARCHÆOLOGICAL SOCIETY.—The annual meeting of this Society was held on the 21st ult. at Hawick, and among the papers read was one by Mr. J. C. Goodfellow on "The Status and Claims of Archaeology." This paper referred to the work done by the leading archaeological societies during the last fifty years. Office-bearers were elected for the ensuing year as follows:—President—Rev. W. A. P. Johnman; Vice-Presidents—Mr. R. F. Watson and Mr. James Oliver, of Thornwood; Secretary—Mr. J. C. Goodfellow; Treasurer—Mr. John W. Kennedy; Curators—Messrs. A. Kyle and W. G. Guthrie; Committee—Messrs. Wm. Melrose, R. Elliot, F. E. Rutherford, A. Waugh, James Marshall, John Turnbull, William Scott, Charles Watson, Wm. Hobkirk, D. M.B. Watson, F. Scott, James Cairns, Thomas Rutherford, and R. Hunter.

Illustrations.

THE CHÂTEAU OF ST. CLOUD.

WHEN it was decided that the Château of St. Cloud, partially ruined in the Franco-German war, should be demolished, we endeavoured to secure some memorial for our pages of a once celebrated building. This was not easy, for photography was little applied to architecture, in France at least, before 1870; but we were fortunate enough at last to secure a photograph taken by an amateur before the date of the war, and which puts on record the appearance of St. Cloud while it was still unharmed by fire or pick-axe.

St. Cloud, formerly called Novigentum (Nogent-sur-Seine), was a mere village under the first dynasty. In 533 Clodoald, son of Clodonier and grandson of Clovis, took refuge there, and, becoming a priest, built a hermitage there in which he ended his days. He was canonised after his death, and gave his name to Novigentum—"Sanctus Clodoaldus." The convent became in time a collegiate church, where the body of the saint was preserved in a bronze chest chased and gilt, and decorated with precious stones.

Up to the end of the fourteenth century history makes little mention of the village of St. Cloud, which was burned by Charles le Mauvais in 1358, and several times taken and retaken under Charles VI. Later it became, in the religious wars, the scenes of some desperate affrays. Henri III. was assassinated there by Jacques Clement, and murders took place there under the Fronde. With the advent of Louis XIV. the history of the little town begins to be directly connected with that of the reigning house of France. In 1660 the king acquired the house of a controller of finances named Hervard, who, in his desire to conceal his ill-gained wealth, was compelled by Mazarin to sign a sale contract at a price far below the real value of the property. Adjoining this house was that of Gondî the banker, in which Henri III. had been stabbed, also a property belonging to the Superintendent Fouquet, and another house. The artists Lepautre, Girard, and Hardouin Mansard were commissioned to transform these into a palace, which the king bestowed on his son Philippe d'Orléans. Le Nôtre, for his part, succeeded in metamorphosing the uncultivated territory of St. Cloud into an admirable park, considered by some his *chef d'œuvre*. These works made of the new property the most elegant domain of its day (for as yet Versailles and Marly were not), and the gazettes of the day describe the fêtes which "Monsieur" gave there.

In 1782, when the Orleans family made over the property to Marie Antoinette, the latter restored the place to more than its former splendour at a cost of six million francs.

To this brilliant period of fêtes and entertainments succeeded the dark days of the Revolution. On the 18th Brumaire "General Buonaparte," just returned from Egypt, turned out the Council of Five Hundred who sat in the Orangerie of the Château of St. Cloud, and made the place his favourite residence when he became First Consul.

Under the Empire new operations, to the extent of four million francs, added still further to the magnificence of the palace, which was the scene of various important events. In 1805 Pope Pius VII. baptised there the son of Louis Buona-

* A view of the interior of the Margam chapter-house, showing the vaulting before it fell, is given in "Wyndham's Tour through Wales and Monmouth."



Abbey Dore, Herefordshire. Ground Plan, showing Present remains and Recent discoveries.

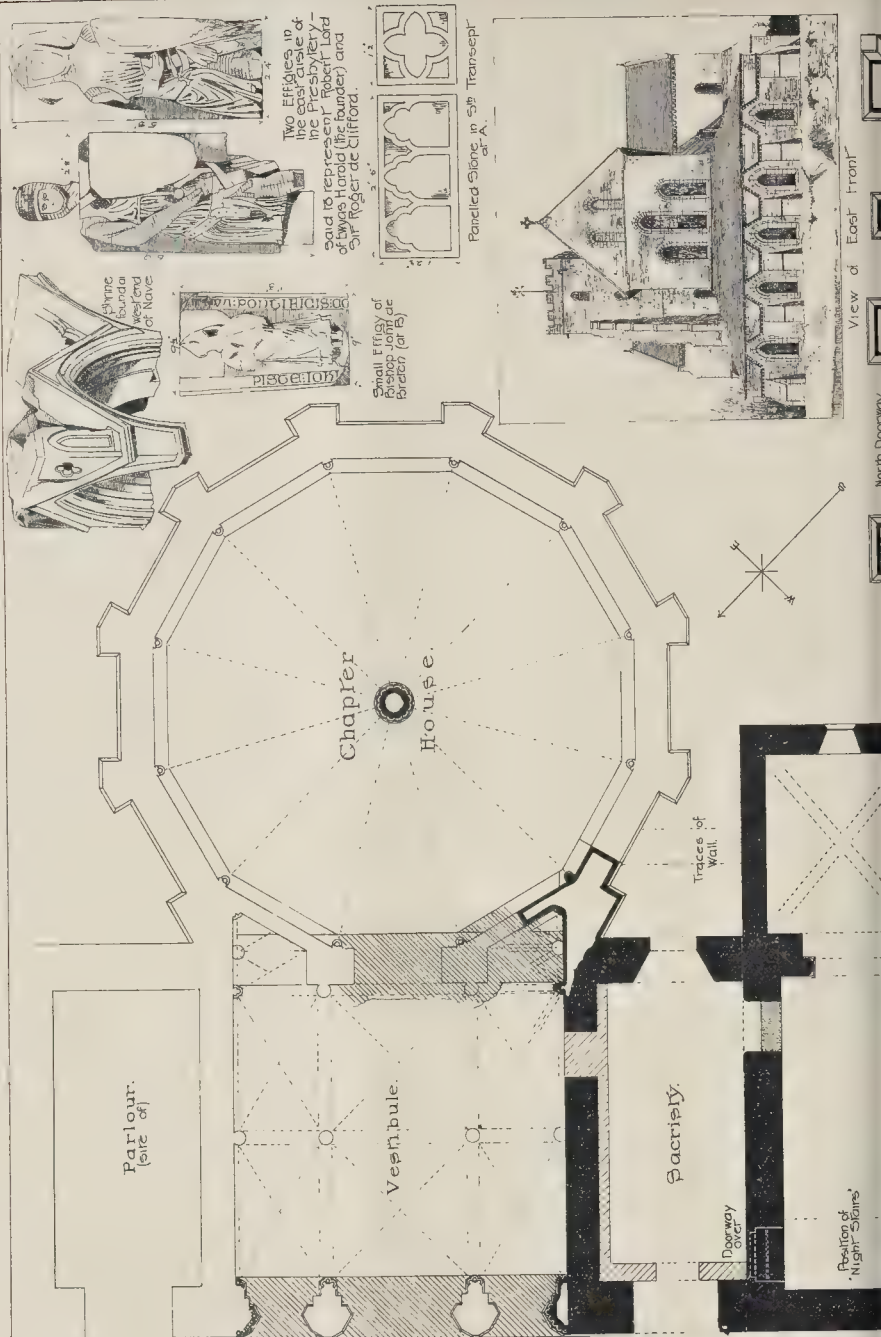
Reference.

- Original Building
- Extension
- Modern

Note.
Conjectural portions
of the plan, which
were discovered in 1892-3,
shown thus

Site
of
East
Walk
of
Cloister

Modern
Wall



Two Effigies in the Vestibule - one of Robert Lord of Wyke Harold (the founder) and Sir Roger de Clifford.

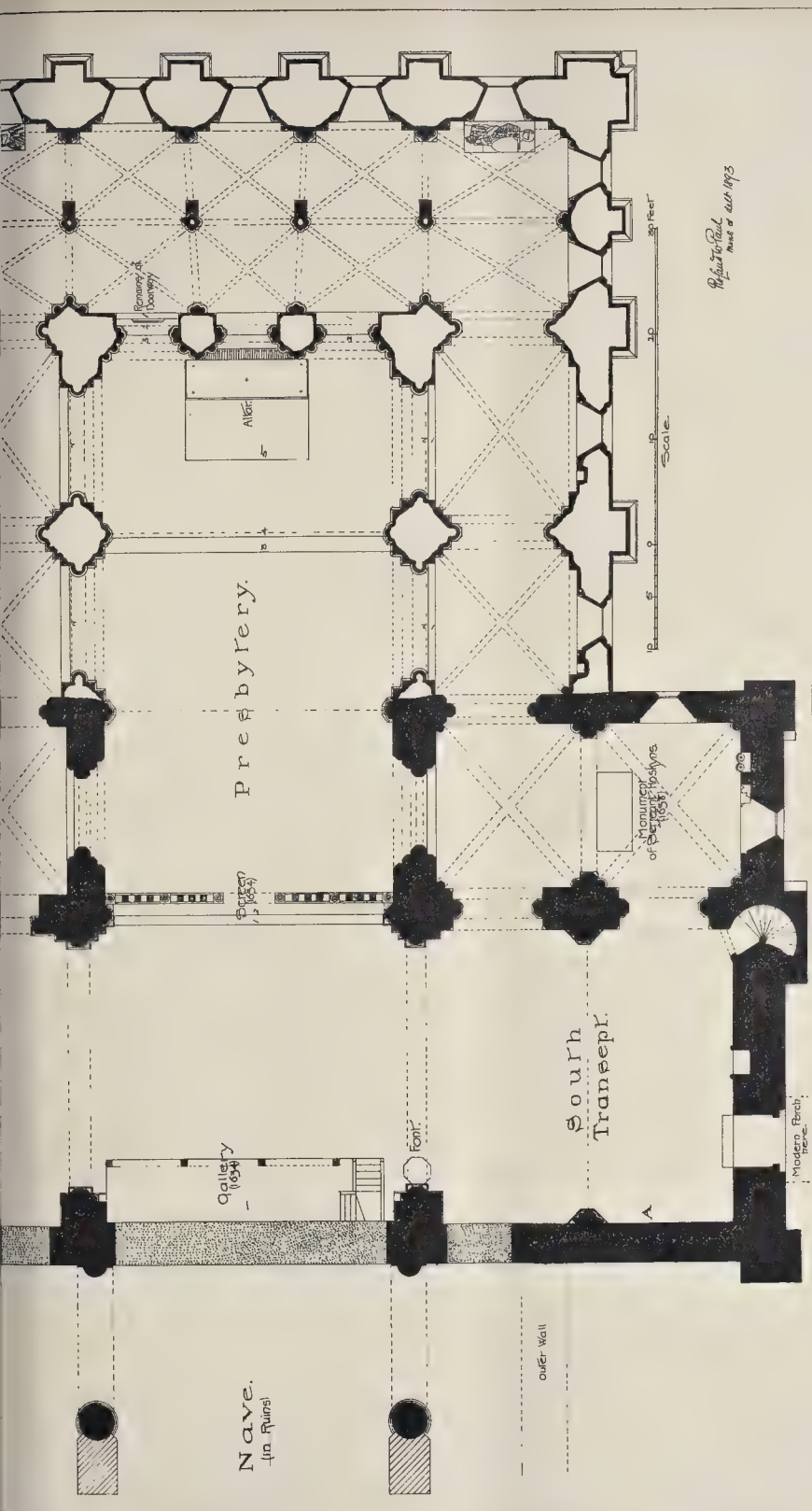
Small Effigy of Bishop John de Breton (or B)

Panelled Slab in Sth Transept

Stone Slab in West End of Nave

Stone Slab in West End of Nave





ILLUSTRATIONS TO PAPER ON "ABBEY DORE," BY MR R W PAUL

PHOTO LITHO SPRING & CO. 44, 45 EAST HIND STREET, LONDON, E.C.

Revised Plan
June 1893



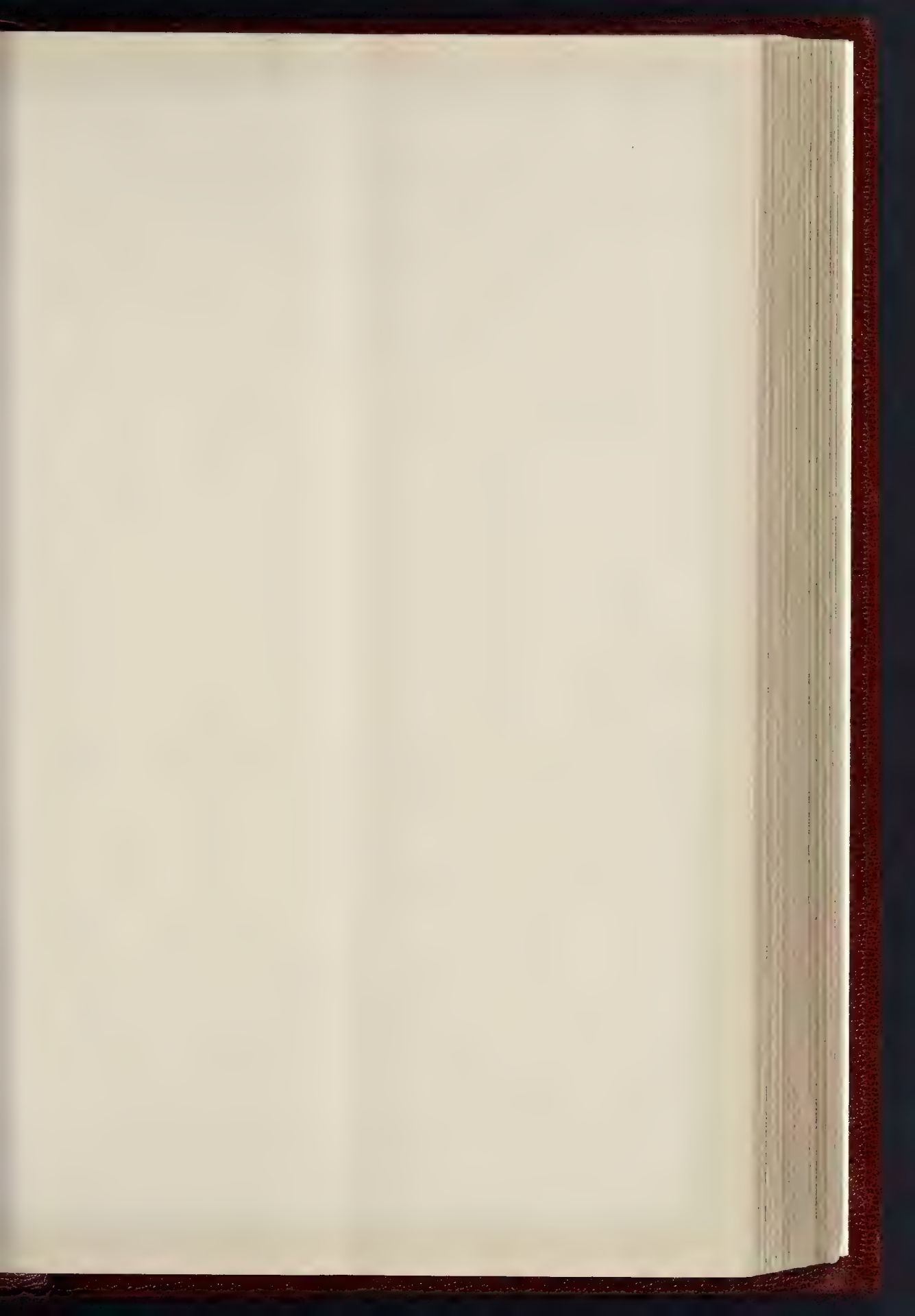
THE BUILDER, APRIL 8 1893.



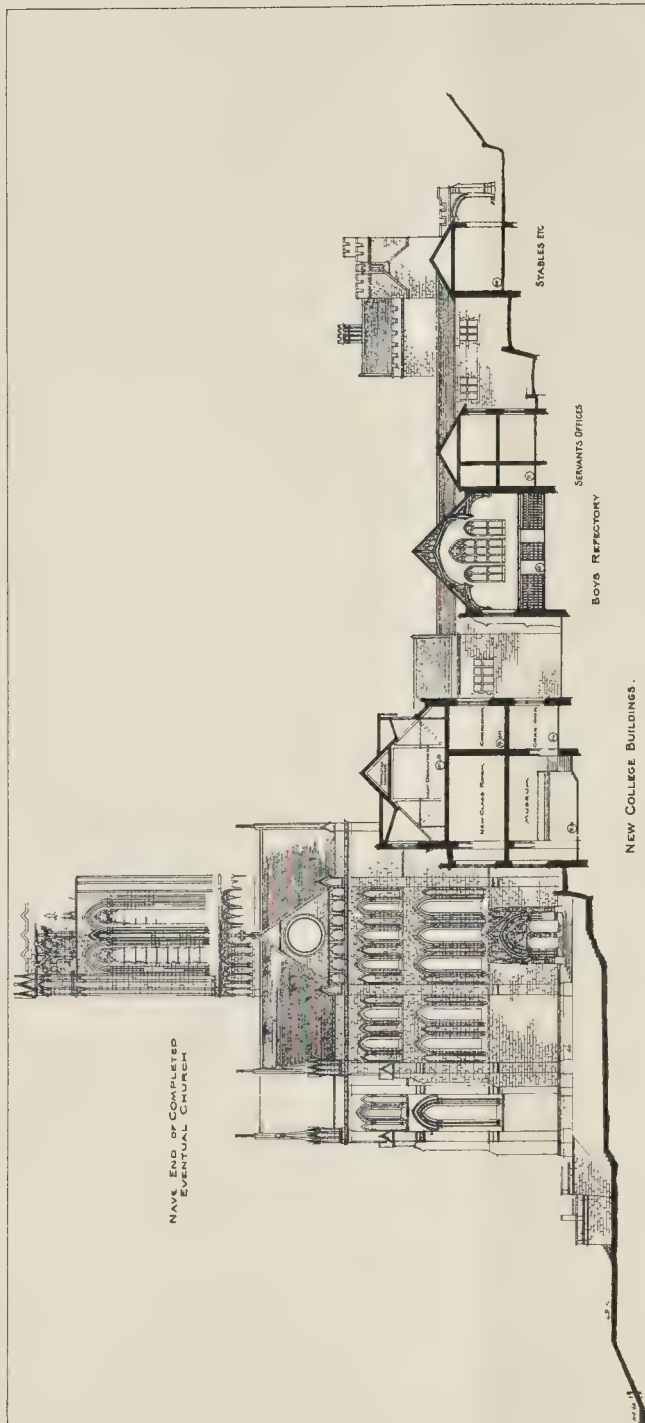


NO PHOTOGRAPHY & CO. 415 EAST HARDY STREET, NEW YORK

MONUMENT, PLACE DE LA RÉPUBLIQUE, AVIGNON — M. FELIX CHARPENTIER, SCULPTOR; M. GUIMINEL, ARCHITECT.



THE BUILDER, APRIL 8, 1893.



SECTION ON LINE A.B.

CROSS SECTION THIRD CHURCH (COMPLETED EVENTUAL CHURCH)



HOSPITIUM



ST. LAWRENCE'S, AMPLEFORTH, YORK. SELECTED DESIGN FOR NEW MONASTERY, CHURCH, AND OTHER BUILDINGS.
MR. BERNARD SMITH, F.R.I.B.A., ARCHITECT

parte; and it was there that the marriage of the Emperor with Marie Louise of Austria took place in 1810. In 1830 Charles X. signed there the famous "Ordonnances" which caused the Revolution of July and the fall of the monarchy. Louis Philippe, who was very fond of the place, altered its interior arrangements considerably, and decorated and re-furnished the principal rooms.

Under the Second Empire St. Cloud saw the revival of its old brilliant days. Napoleon III. passed nearly all his summers there, and carried out some new decorations, as well as placing in the principal vestibule Pradier's "Sappho," which had been so much admired in the Salon of 1852. The Emperor was at St. Cloud at the moment of the declaration of war. He left it on July 27, 1870, and in less than three months afterwards the place had been burned out.

It is only right that the blame of this act of vandalism should be put on the right shoulders. It has been generally attributed to the Prussian army. It appears now almost certain, although the town of St. Cloud was no doubt burned by the soldiers of the 9th division of German infantry under General Sandrart, that the château itself was accidentally set on fire by the shells from Mt. Valérien. It appears probable, however, that the works of art in the château, at all events, had been "looted" by the conquerors before the fire commenced.

The access to the château was by a long avenue which still exists, and which begins from the bridge over the Seine between Boulogne and St. Cloud. At the end of the avenue was a courtyard closed by a grille, in which there were two pavilions, one for the guards, the other (transformed now into an École Normale) for the governor of the château. The stables of the Emperor extended along the space between the terrace of the château and the infantry barracks.

At the rear of a second court rose the building, consisting of a centre flanked by two return wings. The buildings covered an area of about 1,850 square metres. The principal façade, designed by Girard, was adorned with four Corinthian columns surmounted by statues symbolising Strength, Riches, Prudence, and War. The two wings, from the plans of Lepaute, presented a combination of Doric and Tuscan orders. Statues placed in niches personified, on the right wing, Youth, Music, Eloquence, and Plenty; on the left wing, Comedy, Dance, Peace, and Riches. Each of the lateral pavilions had a large *fronton* sculptured with the Arms of France; that on the right was purchased by Princess Clementine d'Orléans, mother of Prince Ferdinand of Bulgaria.

The interior of the château was divided into seven "appartements d'honneur" and two "petits appartements." Among the first were the State Vestibule, giving access to the grand staircase; the "Salon de Diane," decorated by Mignard, and adorned with portraits of the Kings of France; the "Salon de Mars," also decorated by Mignard; the "Salon de Venus," the ceiling of which, painted by Le Moyné, represented "Juno taking the Form of Venus"; the "Salon de Verité," with a ceiling by Antoine Coyppel representing the "Triumph of Truth"; the "Salon d'Aurore," with a ceiling by Loir representing the "Dawn"; the "Salon de Mercure," and lastly the celebrated "Galerie d'Apollon," where Mignard had painted the birth of Apollo and Diana, Latona and Jupiter, Apollo in his chariot, Parnassus, and the Four Seasons. This *ensemble* was completed by other mythological subjects, and by medallions, some containing allegorical figures, others portraits of the princes of the house of Bourbon. In the same gallery was a remarkable collection of pictures by French masters of the eighteenth century—Coyppel, Restoux, de Troy, Boucher, Joseph Vernet, &c. The private apartments of the Emperor and Empress were most luxuriously furnished and filled with paintings by Rubens, Lesueur, Prud'hon, as well as the best modern painters.

The park was adorned by Marie Antoinette with statues, and divided out into parterres, shrubberies, and lawns. Beyond the private gardens, the park offered fine effects from its arrangement of trees, basins, and fountains artfully distributed. The shells in the siege damaged a great number of the statues; but the grand cascade was spared, and that remarkable work of Lepaute, in which architecture and sculpture were so picturesquely associated with the effects of water continues to be, for Parisians as well as strangers, a favourite object of a walk. The "Grands Eaux" of St. Cloud are, in fact, in no respect inferior to those of Versailles.

MONUMENT AT AVIGNON.

THIS monument, which is in commemoration of the reunion of the Venaisian territory with France, was inaugurated about a year ago, at Avignon. It is the design of M. Edix Charpentier, a young sculptor who obtained in the same year the order of the Legion of Honour and the "Grand Prix" at the Salon. M. Charpentier was assisted in his work by his pupil M. Férigoule. The architectural portion of the work was designed by M. Guiminel, chief architect to the Corporation of Avignon.

The monument, which rises to a height of 16 metres, stands in the Place de la République, not far from the celebrated Château of the Popes, in the place formerly occupied by a mediocre statue by Crillon, the removal of which, however, was the cause of violent protestations in the district.

The figures which M. Charpentier has grouped around the central figure of France, symbolise the family of Avignon taking oath of fidelity to their new country. At the back of the monument is a graceful seated figure representing the fountain of Vaucluse celebrated by Petrarch.

The steps at the foot of the monument are in blue Thomerac marble; the pedestal and the groups in white stone from Oppide; the statue of France, and the lion at the base, are in bronze. The work altogether has cost 150,000 francs.

NEW MONASTERY BUILDINGS, &c., ST. LAWRENCE, AMPLEFORTH.

We publish this week the design selected in the competition for the new Monastery, Church, and additional Collegiate buildings at St. Lawrence's, Ampleforth, York.

The problems in the planning were to keep the Monastery College, Hospitium (or Guest House), and servants' offices all quite distinct, and each with a separate entrance to the Church.

The very unlevel nature of the ground, there being a fall of over 40 ft. from north to south of building site, also added to the difficulties of the plan.

In the Monastery, cells are provided for more than forty monks, with calefactory, scriptorium, separate refectory, music-rooms, and workshops, and a large library 75 ft. x 30 ft. x 25 ft. high.

The additions to the College consist of six more class-rooms, chemical laboratory, additional libraries and play-rooms, and new dormitory for fifty boys; a large Academy Hall, with permanent stage for theatrical representations; workshops; infirmary; and a large refectory hall, to dine 200 people, with elaborate hammer-beam roof, and high wainscoting round the walls. This is intended to be the "show" room of the Monastery.

A large lavatory, with basin for each boy (150), and bath-rooms, are also provided.

The Hospitium, which serves as the principal and only entrance to the Monastery and College, is placed on the high ground at the back of the buildings near the main road, and its ground floor is 20 ft. above the ground floor of the Monastery and College.

The approach is along the Hospitium corridor (upper level), down the grand double staircase, with entrance to the Church opposite, and to the Monastery and College right and left.

The complete eventual church is shown on the elevations we publish, and the present church is retained for the present on the plan.

The estimated cost for the whole scheme is about 136,000l.

It is proposed to commence the work as soon as the necessary modifications, &c., are made in the plans.

The architect is Mr. Bernard Smith, F.R.I.B.A., of London.

PLANS OF ABBEY DORE.

THESE plans, with the small sketches accompanying them, are given in illustration of Mr. R. W. Paul's paper on "Abbey Dore," printed on another page.

SURVEYORSHIP'S.

SUTTON (SURREY).—Mr. Albert D. Greatorex, Assoc. MInst. C.E., Assistant Borough Surveyor of Southampton, has been appointed Engineer and Surveyor to the Sutton (Surrey) Local Board.

DIOCESAN SURVEYORSHIP.—Mr. Henry Ough, of the firm of Henry Ough & Son, of St. Paul's-churchyard, E.C., has been appointed one of the Diocesan Surveyors of St. Albans Diocese, under the Ecclesiastical Dilapidations Act, 1871.

Correspondence.

To the Editor of THE BUILDER.

THE INSTITUTE AND TERRA-COTTA.

SIR,—Mr. Leech's letter in your issue of 25th March is very interesting from his point of view, but he will pardon me if I still think the example of the Battersea Polytechnic does very decidedly prove something—viz., that in this building "where the features are plain and of diverse character, and the facings are in brick," that is to say, the ordinary case of such public buildings in London, the cost of terra-cotta was very much higher than Monk's Park Bath stone, and only a trifle under Portland. I maintain this may be taken as a "general principle," and, if so, the contention for terra-cotta on the score of economy falls to the ground.

As for the "artistic merits" of the question I hold that nobler designs are likely to result from working in a free and unrestricted material, such as stone, rather than in the cramped littleness of terra-cotta; that "much elaboration and ornament, coupled with repetition," which, it seems, alone can secure economy in the use of the latter, are not the essentials after which we should strive; on the contrary, they are the bane of much of our modern work, which the use of terra-cotta has materially emphasised, as I endeavoured, however feebly, to prove in the debate at the Institute.

I do not at all deprecate the proper function of the "laboratory of the chemist as an aid to the production of a building material"; all I contend for is that a material which depends so much on the laboratory and the burning kiln for its production, and which, from the necessity of the case, hampers the efforts of those who design in it, is entirely unnecessary, not to say detrimental, while we have abundance of stone at our command. Just what stone is best for different localities is quite a secondary question; in London it is Portland, in Birmingham it is Bath, and in the highest interests of architecture I prefer to work in the noblest materials available.—I am, yours faithfully,

J. M. BRYDON.

SIR,—On this subject I, and others also perhaps, should like an answer to one or two questions, and the questions themselves may suggest thoughts even to the wise in this matter.

America—meaning the United States thereof—is, we are often told, a great country. No one will, I think, say its architects suffer from either fear or restraint, whether in the use of new or old materials. The late Mr. H. H. Richardson was admittedly a giant among them and us. Oddly enough, too, in this connexion, the style he adopted and made so peculiarly his own was the Romanesque. But he never, I believe (from observation), used terra-cotta. Why?

It could not be obtained in the country, True possibly, but he could have imported it. What however, his *ad id* import was red Dumfries or Corshill stone, and this in quantities, until he found near Chicago and elsewhere both red and blue stone to suit his fancy.

Stone will not stand a smoky atmosphere, we are told. Do any of your readers know Pittsburg? Have they seen its buildings dating a few decades, blacker beyond compare than any part of Westminster, counting its centuries? Yet the court-house and prison there—among the finest of even Richardson's creations—he built of stone. Why?

The Institute has lately delighted to honour another transatlantic architect of eminence—Mr. Richard M. Hunt. And as one who has had the pleasure of meeting him and seeing much of his best work, I may say the Institute thereby has honoured itself as well as him. Now he, like Richardson, had a new and free country to work in, with almost unparalleled wealth at his back, and with the art, culture, and science of Europe before him—including the terra-cotta of so many centuries. A.C. It would be well to know if he uses, or has used, in any quantity this "new" material.

There have been many exhibitions, International and otherwise, and buildings put up for their service and mostly pulled down at their close. Iron and terra-cotta have been freely used in them—I had almost said exclusively used in them. But undoubtedly one of the chief merits of terra-cotta is its durability—in these cases quite wasted.

The potter's art is one of the noblest we are told. Granted. But when he leaves his art and starts building, how then?

Again, we are told terra-cotta is so convenient for covering up iron construction. No doubt. But, and I hope I may be forgiven, I have helped to cover I may almost say miles of such with marble, and much of this in our gallant but assertive friend's buildings. Who will compare marble and terra-cotta for this work—in doors, of course, I mean? And with all humility I will say that marble so used is the cheaper.

It is greatly to be wished that Mr. Edis would tell us what the terra-cotta of the Constitutional Club—as a typical job—really did cost. We have his contradiction of Mr. Stokes, but that does not assist our comparison. The effect is before us. What is the price per foot cube?

One sees so much terra-cotta that it is impossible not to admire—at least it is impossible to me—that it is well to hear its merits and demerits so freely and frankly discussed. And the Institute Committee deserve, I think, our warmest thanks for actually arranging for us to hear both sides.

C. H. BRODIE.

TERRA-COTTA *vs.* STONE.

SIR,—In your issue of 25th ult., we observe a letter from Mr. S. H. Leech dated from Lambeth Pottery.

Upon the general question we do not propose to occupy your space. But Mr. Leech devotes the concluding paragraph of his letter to the subject of Bath stone, and by the use of a mis-quotation, adroitly coupled with an erroneous statement, conveys to the reader the half truth which is proverbially misleading. He refers to Bath stone as a material "which needs to have sent out with it a chemical substance" (a manifestly incorrect statement), and proceeds to mis-quote our advertisement, which he apparently had before him, as "Fluate for hardening and preserving the stone." A glance at our advertisement will show that the correct quotation would have been "Fluate for hardening and preserving building-stones and marbles." It is perhaps unnecessary to further comment upon a letter which is so obviously unreliable, but we may say that we advise the use of "Fluate" of Magnesia upon all calcareous stones, and of other Fluates upon all sandstones which are sufficiently porous to drink in the solutions.

So far from the use of "Fluate" being confined to Bath stone, it has been used upon Chirkmark stone work in the south front of Westminster Abbey, and upon Ham Hill stonework in the porch of Lord Salisbury's mansion, Arlington-street, Piccadilly. At the present moment it is being used upon the Portland stone statues at the top of St. Paul's Cathedral, and upon the Portland stonework of St. Martin's Church, Trafalgar-square.

It may be worth remarking that a very large number of inquiries have from time to time reached us, the object of which was to ascertain whether "Fluate" would be beneficial upon brickwork and tiles, and we are glad to say that, by the use of special Fluates, we are able to render virtually waterproof and weatherproof these products of the kiln. If terra-cotta is sufficiently absorbent, certain of the Fluates will be effectual in preserving it, and it would certainly be well to test the process upon the terra-cotta in such buildings as the Flower Market, Covent Garden, which is a new building, but in which the terra-cotta is already disintegrating.

In regard to Bath stone, we need only point to the College of Physicians in Trafalgar Square; Apsley House, Hyde Park Corner; the Grosvenor Hotel, adjoining Victoria Station; and other old buildings in London to demonstrate that good Bath stone properly used is an excellent building material for the Metropolis, while within twenty miles of the quarries there are buildings, such as Edington Church, near Westbury (built in the fourteenth century), Lacock Abbey (built in the thirteenth century), Longleat (sixteenth century), whose perfectly sound condition to-day testify that Bath stone is also a thoroughly durable material for buildings in the country.

GEORGE HANCOCK,

Manager of the Bath Stone Firms, Limited.

KENSAL TOWN BATHS, &C., COMPETITION.

SIR,—We gather from your report on the design submitted in the above that in your opinion set No. 4 should have been placed, whilst set No. 15—awarded third position by the Commissioners—does not contain those points in the planning, &c., that would have induced you to award to it such a position. Both the sets Nos. 4 and 15 were submitted by us. We believe that the authorship of the premiated sets only is known, and, for reasons obvious, if you can find space to insert this in your next issue we shall be obliged.

LANSDALE & HARRISON.

THE EGYPTIAN CAVETTO.

SIR,—The instrument described by Mr. Inwards is simply a reproduction of one of the forms used by the Greeks for drawing curves by the revolution of a plane.

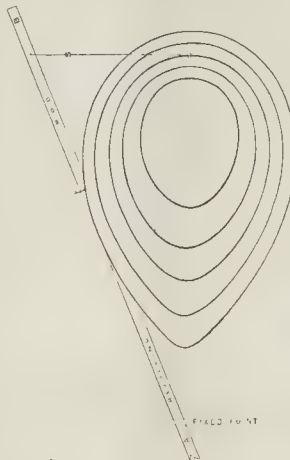
They had six separate movements or classes of movements, and the one he has drawn will produce the cissoid of Diocles, the conoid of Nicomedes, and other mathematical curves. It consists of a moving plane governed in its motion by a fixed point and a fixed straight line.

It may be true, as he says, that the Egyptians used only the cavetto and torus in their mouldings, but there are many other curves in their capitals and bases, and in the spaces of their columns and in their general compositions; curves which would require other instruments, such as Jopling's or the ovolo movement, for their production, and Mr. Inwards would confer a real benefit upon art if he would analyse some of these also.

The powers for controlling the revolving plane were:—

1. Two fixed points.
2. A fixed point and a fixed straight line.
3. Two fixed straight lines.
4. A fixed point and circular motion.
5. A fixed straight line and circular motion.
6. Circular motion and circular motion.

Of these, No. 1 includes the instrument for the cardioid; No. 2 is Mr. Inwards's movement; No. 3 includes the trammel; while No. 4, of which I enclose a diagram, gives the ovolo, and is a



very simple and useful movement. It can be made with a set square, with a few holes for the pencil point, a piece of string, and a pin. No. 5 is the Greek potter's instrument; No. 6 includes Jopling's instrument, and is a wonderful combination.

DANIEL WOOD.

PRICE-BOOKS.

SIR,—In your review of the new builders' price-books, you touch upon questions of great importance to the trade generally—i.e., "The necessity for the adaptation of prices to the varying rate of wages," and variation in cost of materials.

The increased cost of labour does not seem to me, so far as my experience goes, to have been sufficiently taken into account by the trades, and a corresponding necessary result of unremunerative business has in many cases followed.

Fifty years ago my father was in the habit of applying "constants" to ascertain the value of the various and numerous items required to be priced in surveying.

These "constants" were then applied to ascertain value of labour, the "factor" being the rate of wages per day, since then payment by the hour necessitating their application to the "hourly rate," and I have so used them to wages varying in different localities. In the edition of the first work you have in review, you refer to price named for painting in four oils, viz., 1rd. I notice that ten years ago 1s. is the price named in the same publication; surely the increase in cost of labour must be one more than equal to reduced cost of materials.

As to the item of paving in flat brick, to which you refer, my constant of $\frac{3}{20}$ multiplied by value of the bricklayer and labourer per hour, gives the result of sixpence per yard for labour only, agreeing with price-book, but the full price named of three shillings must surely include an indefinite factor of "levelled" and prepared bottom, which may be much or little, and should be separately valued, more especially as it is the frequent custom to pave on "concrete over area."

"Constants" for labour may be accurately applied to any and all of the various items in the different trades, and without being an erratic guide owing to the difference and increase of rates of labour.

THUDORE THORN.

SELENTIC LIME.

SIR,—Probably others, who, like myself use this lime extensively, find the same difficulty in getting the address of firms who manufacture it in various parts of the country. Builders seldom know anything about novelties, and one may often be importing the material from a great distance when it could be obtained close at hand. I shall be glad if manufacturers in various parts of the country will send me their names for formation of a list. To this (for my own information only) current prices may be added.

RALPH NEVILL, F.R.I.B.A.

Rolls Chambers, 85, Chancery-lane.

P.S.—I should like to say that for the last twenty

years I have used no other lime for ordinary building the slight extra cost being amply compensated at other ways. For ordinary concrete work this lime is quite as good as Portland cement. As, when first introduced great stress was laid upon its advantage for plastering work, I should like to say that I do not find it generally suitable; indeed, its very excellence for other purposes unfits it for this, as for ordinary plastering a soft non-dense material is required that will act as a sort of felting.—R. N.

BRICK CHIMNEYS.

SIR,—Will you kindly permit me to inquire through the medium of your valuable paper whether any of your readers can give me some information concerning actual examples of brick chimneys (or large iron ones) whose sectional area increases from the bottom upwards. The chief points of interest are the dimensions of the chimney, and whether there is any appreciable economy in building such a chimney over one of the ordinary form which narrows towards the top.

"DRAUGHT."

The Student's Column.

CHEMISTRY.—XIV.

LIMESTONES (continued).

4. Shelly Limestones.

HERE are two varieties of this class. They both consist almost entirely of small shells cemented together; but whilst one when fractured shows a crystalline structure, the other appears to be entirely without crystals. Purbeck stone is a shelly limestone of the latter variety, and Hopton Wood stone an example of the former.

5. Magnesian Limestone.

Magnesian limestones consist chiefly of carbonate of magnesia and carbonate of lime, but usually also contain small quantities of silica, iron, and alumina.

Although many limestones contain magnesia, they are not termed magnesian limestones unless at least 15 per cent. of carbonate of magnesia is present in the stone. The best magnesian limestones for building contain at least 40 per cent. carbonate of magnesia ($MgCO_3$) and 4 or 5 per cent. of silica.

Dolomites are magnesian limestones, but there appears to be some confusion as to what quantities of magnesian carbonate must be present in a stone for it to constitute a dolomite.

The following are analyses of dolomites given by Hull:—

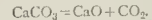
	From Bolsover Moor.	From Mansfield Woodhouse.
Carbonate of lime	51.70	51.65
Carbonate of magnesia	49.20	42.60
Oxide of iron and alumina	1.80	trace
Silica	3.60	3.70
Water and loss	3.30	2.50

Some magnesian limestones contain so much silica that they are often classed with the *Sandstones*. The following analyses by Phillips show the composition of two of these *silicious dolomites* from Mansfield, Derbyshire:—

	White.	Brown.
Silica (SiO_2)	51.40	49.40
Carbonate of Lime ($CaCO_3$)	26.50	26.50
Carbonate of Magnesia ($MgCO_3$)	17.98	16.10
Alumina and Oxide of Iron	1.32	3.20
Water and Loss	2.80	4.80

Calcium Oxide, CaO.

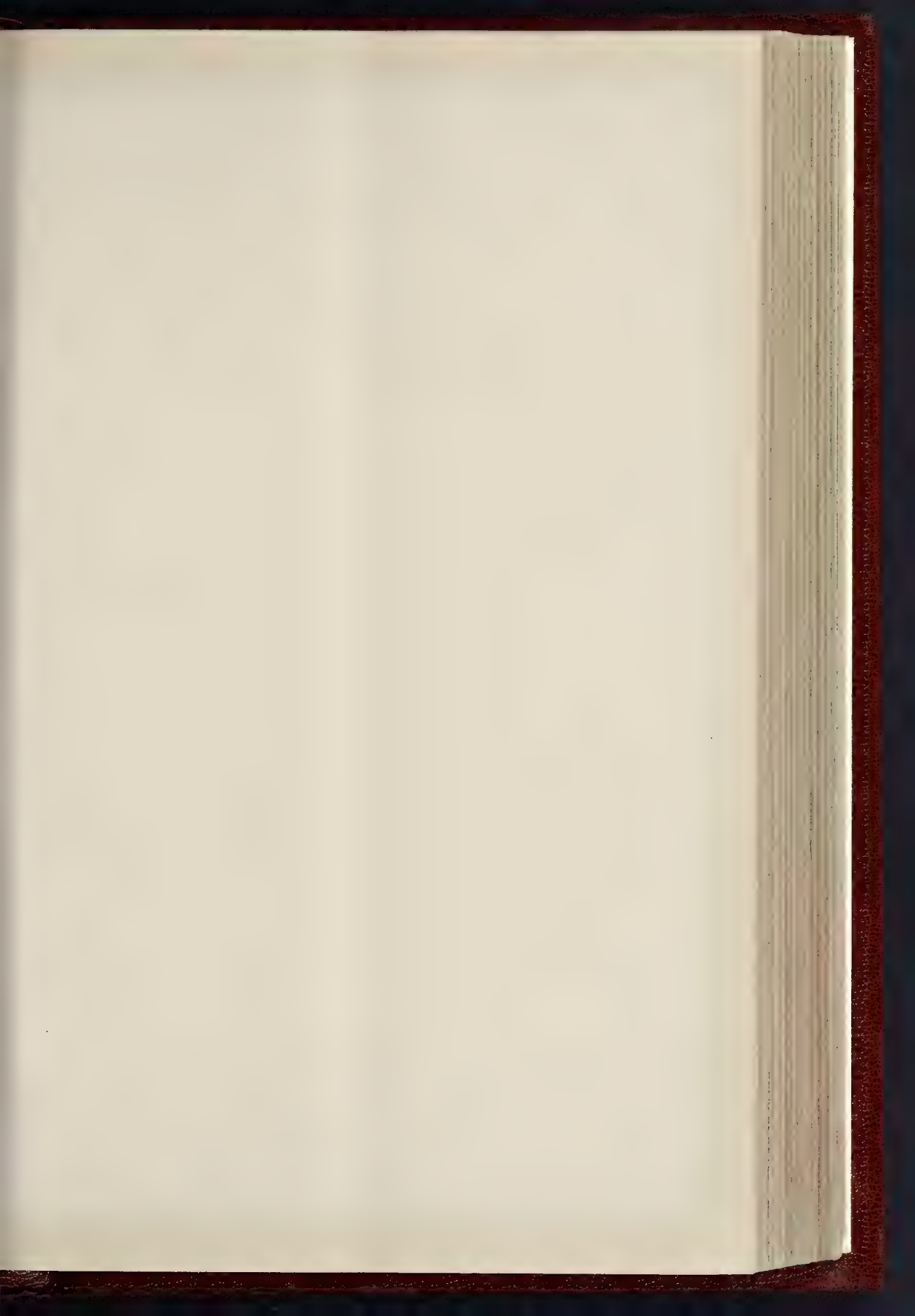
Calcium oxide, commonly termed *quicklime*, is obtained by heating, or calcining as it is called limestone. By this means the carbon dioxide expelled from the carbonate, and quicklime is formed thus,



$Ca = 40$; $C = 12$; $O_2 = 48$. $CaCO_3 = 100$, and $CaO = 40$. Therefore 100 parts by weight of pure carbonate of lime will yield theoretical 56 parts of quicklime.

Before being calcined, the limestone is usually mixed with coal or other combustible matter in order that the whole mass of stone should become thoroughly heated throughout, one bushel of coal usually being sufficient to make five or six bushels of lime. Sometimes limestone is burnt in *lams* consisting merely of heaps made with alternate layers of limestone and coal, having a fire-hole at the bottom, and covered with sods or clay to keep in the heat.

Limestone is, however, more generally burnt



ST. LAWRENCE'S, AMPLEFORTH, YORK.

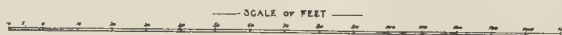
SELECTED DESIGN FOR NEW MONASTERY, CHURCH,
AND OTHER BUILDINGS.

MR. BERNARD SMITH, F R I B A , ARCHITECT



MONASTERY WING WEST.

ELEVATION





W. FRONT. —

COLLEGE WING EAST.

kilns. In *tunnel kilns* the fuel and lumps of stone are placed in alternate layers, as in the above instance, but in *flare kilns* the fuel is placed below in such a way that only the flame reaches the limestone, and yet maintains a heat sufficient to decompose the limestone. If worked by the *intermittent system* the kiln is heated (for thirty-six to forty-eight hours) until all the stone in it has decomposed. It is then allowed to cool down. The quicklime is now removed, and the kiln recharged.

By the *continuous system* the kiln is kept hot and the quicklime is removed in small portions at a time, fresh charges of limestone, or limestone and coal, being added at the top to fill the space caused by the removal of the quicklime. Both *tunnel kilns* and *flare kilns* may be worked either on the intermittent or on the continuous system, but, as a rule, tunnel kilns are employed for the continuous system. By this latter system a great saving of fuel is effected, but the lime produced is more likely to be unequally burnt.

Lime kilns vary greatly in shape and size. Fig. 12 shows in section a pair of flare kilns such as are commonly used for calcining grey chalk. The purest quicklime is obtained from certain marbles, such for instance as Carrara marble and the

Artificial Cements are made by mixing the ingredients in the proportions found in the best natural cements and calcining them at a comparatively low temperature.

Portland Cement is an artificial cement, and is by far the most valuable of all cements. The substances employed for its manufacture are sometimes chalk and clay mixed by a wet process, and sometimes limestone and clay or shale. In the latter case they are mixed by a dry process.

The following analyses extracted from "Spon's Dictionary of Engineering," show the composition of typical commercial clays and chalks, and of Portland cement.

Analyses of raw materials used by the Burham Cement Company.

	Gault Clay.	Grey Chalk.
Silica	46.61	7.00
Alumina	16.06	1.15
Oxide of iron	6.07	1.39
Carbonate of lime	25.06	87.50
Magnesia .....	.60	1.00
Potash .....	.60	—
Water and organic matter	5.00	3.05
	100.00	100.00

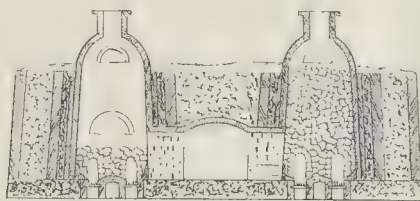


FIG 12

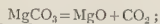
black, Derbyshire marble. Pure quicklime readily combines with water to form *slaked lime* or calcium hydroxide, $\text{Ca}(\text{OH})_2$, the heat produced by the combination being very considerable, as may be shown by igniting gunpowder by merely dropping it upon the slaked lime. This slaked lime is entirely soluble in water, although it requires a very large proportion of water to dissolve it. If slaked lime is moistened with water and exposed to the air, the surface of it will *set* on account of the absorption of carbon dioxide from the atmosphere, causing the formation of a crust of insoluble carbonate of lime.

Hydraulic limes are obtained from limestones containing from 70 to 92 or 93 per cent. of calcium carbonate and a considerable proportion of clay. Unlike pure lime they will set without the aid of atmospheric CO_2 ; they contain within themselves ingredients which combine with the lime and give them the property of setting, even under water. Their setting powers vary greatly. Most of them attain the maximum strength when kept under water.

Artificial hydraulic lime is made by calcining a fairly pure lime with the amount of clay usually found in good hydraulic limes, the two substances being previously intimately mixed.

The heat employed in calcining natural hydraulic lime, and also artificial hydraulic lime, must be moderate. If too great, the mass becomes partially fused, forms silicate and aluminate of calcium, and prevents the proper subsequent slaking of the lime.

Natural cements are calcareous substances, resembling in some respects the best hydraulic limes, but as a rule contain much more clay, and possess greater hydraulic properties. Natural cements are obtained in a similar manner as ordinary lime, by burning natural stone containing from 20 to 40 per cent. of clay, the other constituents of the stone being chiefly carbonate of lime and carbonate of magnesia, or carbonate of lime without magnesia. When heated, carbonate of magnesia is decomposed like carbonate of lime—



but the oxide of magnesia does not slake like quicklime; if powdered and mixed into a paste with water it expands and gradually sets into one solid mass.

Roman Cement is a natural cement obtained by carefully calcining, at a comparatively low temperature, nodules of argillaceous limestone, called "Septaria," which are found in the London clay. They contain from 30 to 45 per cent. of clay.

Cadderwood Cement is a dark-coloured Roman cement, obtained from somewhat similar nodules found in Scotland.

Analysis of Portland Cement manufactured by the Burham Cement Company.

Alumina	12.25
Oxide of iron	4.30
Magnesia .....	.30
Pure lime (CaO)	50.00
Sulphate of lime	2.00
Potash .....	.85
Soda .....	.75
Silicic acid	25.00
Clay sand	3.00
Moisture	1.00
Loss .....	.55
	100.00

Analyses of raw materials used by Hooper & Co.

	Wet clay.	Raw chalk.
Carbonate of lime	2.70	76.00
Silica	24.85	1.00
Alumina	5.12	.73
Oxide of iron	1.08	.36
Potash and Soda	1.39	—
Water	64.76	21.49
Carbonate of magnesia	—	.27
Loss	—	.27
	100.00	100.00

Analysis of Portland Cement manufactured by Hooper & Co.

Lime	61.36
Silica	26.42
Alumina	6.22
Oxide of iron	1.58
Potash and Soda	1.37
Magnesia .....	.05
	100.00

Classification of Limes and Cements.

Vicat's classification is still most generally adopted, and may be enumerated thus—

1. *Rich or fat limes* "are such as may have their volume doubled, or more, by slaking in the ordinary manner, and whose consistency after many years of immersion remains still the same, or nearly the same as on the first day, and which dissolve to the last grain in water frequently changed."

2. *Poor limes* augment very little in volume upon slaking, and are only partially soluble in water.

3. *Moderately hydraulic limes* set in fifteen to twenty days. At the end of a year they have attained their maximum hardness, which is about equivalent to that of hard soap.

4. *Hydraulic limes* set after six or eight days immersion, and continue to harden. Their expansion by slaking is always small, like the poor limes.

5. *Eminently hydraulic limes* set from the second to the fourth day after immersion. At the end of six months they are so hard that they splinter under a blow and present a slaty fracture. They do not increase much in bulk when slaked.

To this list is sometimes added—

6. *Hydraulic cements* containing 20 to 50 per cent. clay, which set in a few minutes, and became as hard as stone within a month.

Pozzuolanas.

Pozzuolanas, or pozzuolanas, are composed mainly of silica and alumina, but also contain lime, potash, soda, magnesia, and oxide of iron.

Berthier gives the following analyses of the Pozzuolana and of the Trass of Andernach:—

	Trass.	Pozzuolana.
Silica .....	.570	.445
Alumina .....	.120	.150
Lime .....	.026	.088
Magnesia .....	.010	.047
Oxide of iron .....	.050	.120
Potash .....	.070	.014
Soda .....	.010	.040
Water .....	.096	.092
	.952	.995

Mortar.

Ordinary mortar is a mixture of slaked lime and sand made into a paste with water.

Cement mortar is a mixture of cement and sand made into a paste with water.

Rich or fat line should never be used for mortar, because it remains wet for a long time, and when dry is very weak and friable, and sometimes becomes little better than dust. As a rule it only sets upon the surface exposed to the air. Hydraulic lime or cement should be used whenever possible.

The following are analyses of old mortars by Vicat:—

	From a Roman Tower near Boulogne.	From the Pagoda at Tripoli.	From a Dutch tomb at Maastricht.	Another specimen from the Dutch tomb at Maastricht.
Age (years) ...	1800	400	120	120
Specific gravity	—	1.5	1.67	—
CaO	29.1	17.40	26.60	25.33
CO_2 *	20.0	11.90	19.25	18.07
SiO_2	45.0	60.00	50.50	53.33
MgO	—	9.52	—	—
Water and loss	5.9	1.18	3.65	2.67
	100.0	100.00	100.00	100.00

OBITUARY.

MR. J. G. ELGOOD, F.R.I.B.A.—At the last meeting of the Royal Institute of British Architects, the death was announced of Mr. John Garrard Elgood, F.R.I.B.A., of the firm of Worthington & Elgood, Manchester. From an obituary notice contributed to the last number of the *K.I.B.A. Journal* by Mr. Thomas Worthington, we learn that Mr. Elgood, who died at his residence, Swiss Cottage, Bowdon, in his sixtieth year, was a native of Leicester. Early in his career he was a pupil of Messrs. Bowman & Crowther, of Manchester, to whom he was articled in 1847 for a period of seven years. During that time he was largely employed on their well-known work, "The Churches of the Middle Ages." In 1855 he became assistant to Mr. Thomas Worthington, and after twenty-five years of faithful service he became Mr. Worthington's partner. In the autumn of last year Mr. Elgood contracted a severe chill, which was followed by a serious illness necessitating an operation, and his illness having lately assumed a critical form, he died on the 8th ult. He was unmarried, and though of a singularly modest and retiring disposition, his professional knowledge and attainments were very considerable. He was a man of calm, sound judgment, had a rare appreciation of the details of Gothic architecture, and was an accurate and most conscientious draughtsman. He was well known among his professional brethren of the Manchester Society, and had taken a very warm interest in the amalgamation into one body of the senior and junior societies in Manchester. Elected an Associate of the Institute in 1874, he became a Fellow in 1890.

MR. GEORGE SNELL.—At the same meeting of the Royal Institute of British Architects, the decease was announced of Mr. George Snell, of Boston, Mass., an Honorary and Corresponding Member of the Institute for the past forty years, having been elected in 1853.

* The CO_2 would be present, partly as MgCO_3 and partly as CaCO_3 .

GENERAL BUILDING NEWS.

PROPOSED HOSPITAL FOR LANARKSHIRE.—The County Council of the Lower Ward of Lanarkshire has selected the plans of Messrs. Shells & Thomson, architects, Edinburgh, for the Infants' Diseases Hospital to be erected at Carnley, near Glasgow. The new hospital will consist of six pavilions, for sixty beds, and administrative offices. Accommodation is provided for private as well as ordinary patients, and there is provision for dealing with doubtful cases of fever, and also for convalescents.

PEOPLE'S PALACE, ST. HELENS, LANCAHIRE.—An additional place of amusement under the title of the People's Palace is being erected on land at the corner of Shaw-street and Sharp-street, St. Helens. The building, which consists of pit, orchestra stalls, balconies, and boxes, is 100 ft. long, by 65 ft. wide, and 50 ft. high. The fabric is of corrugated iron, lined internally with wood, and accommodation is provided for 2,000 persons. The total cost will be about 2,500. The work has been carried out by Messrs. Rowell & Co., of Westminster, and sub-contractors, under the superintendence of Mr. William Hesketh, architect, of Liverpool.

NEW WESLEYAN BUILDINGS, CHELSTON, TORQUAY.—On the 15th ult. a new Wesleyan schoolroom, to be used temporarily as a chapel, was opened at Chelston, Torquay. The scheme consists of a chapel capable of accommodating 500 persons, with vestries, schoolroom, and the usual offices, the building to be of red sandstone raised on the site, with white brick dressings. Up to the present, however, the schoolroom only has been proceeded with. The plans are by Messrs. J. W. Rowell & Son.

MINERS' HALL, BURSLEM, STAFFORDSHIRE.—On Monday last the North Staffordshire Miners' Hall was opened at Burslem by Mr. B. Pickard, M.P. The hall has been erected from plans by Mr. F. Bettany, Borough Surveyor of Burslem, and the building has been under the superintendence of Mr. Cooke, of Burslem. The accommodation on the ground floor consists of an office 16 ft. by 12 ft., and a committee-room, 22 ft. by 15 ft. Above this is situated an assembly-room, 32 ft. by 21 ft., which will accommodate 200 delegates. On the western side of the building is the residence, overlooking the park, of the miners' agent.

RE-OPENING OF PENDRIF WESLEYAN CHAPEL, HOLYWELL.—According to the *Liverpool Post*, and *Mersey Echo*, the Pendrif Wesleyan Chapel, Holywell, has just been re-opened. The building has been re-roofed, and a facade added, in which is placed a circular stone window. The ceiling is designed in square panels of wood and plaster, filled in with mouldings, red stars, and diagonal boarding. The pews in both the ground floors and galleries are of pitch-pine, with circular carved ends. The large west window has been filled with tinted muffled glass, with ruby stars at the corners. The communion rail is of polished mahogany, supported on iron standards (by Macfarlane, of Glasgow). The rostrum or pulpit is of selected figured pitch-pine. The whole has been carried out from plans by Mr. W. Lloyd Jones, architect, Upper Bangor. The contractor was Mr. Richard Jones, builder and contractor, Bagliff.

NEW THEATRE AT ASTON, BIRMINGHAM.—The *Birmingham Argus* gives some particulars of the new theatre now in course of erection at Aston. Mr. W. H. Ward is the architect. The new building will have a frontage upon Aston-road of 80 ft., will cover an area of 1,445 yards, and will rise 50 ft. from the foot-path. The main front will be in stone. The lower story is treated along its entire length with an arcaded arrangement, in which are set the swing doors which give admission to the vestibule. The model of the building is different from the traditional theatre of this country, on which all the other theatres are built, the American style being followed. One of the features of the building will be the vestibule referred to, which will extend across the entire width of the building, and from this vestibule every section of the auditorium will be reached. These sections will be differently arranged to our familiar method of tiers rising over a pit one above another round three sides of the house. An objection to this method is the poor view of the stage which those of the audience get who occupy the seats on the two sides. The American system places every seat directly fronting the stage, and that will be a notable feature in the new building. The usual succession of tiers will be absent, with the exception of one deep end gallery. The different divisions of the auditorium will be in regular lifts from the stage to the back of the hall, and every one of these divisions will have exits to the side corridors. Seating accommodation will be provided for about 2,000 people. The cost of the building will be from 4,000 l. to 5,000 l. The building contract has been entrusted to Mr. Bloore, of Aston.

PRIMITIVE METHODIST CHAPEL AT IRWELL VALE, NEAR BURY.—The memorial stones of the new Primitive Methodist Chapel at Irwell Vale were laid a few days since. The new chapel, the front of which will look down Milne-street, is Gothic in style. According to the plans, in front of the building there will be a large projecting vestibule with a traceried window of perpendicular character. The opposite end of the chapel will be half-octagon in shape. From each of the two sloping sides a wing will

project, connected with the chapel by a large open-pointed arch. In the wing to the preacher's right will be placed the organ, and to his left will be the minister's vestry, separated from the chapel by a pitch-pine glazed screen. The chapel will be built throughout of stone, faced with parpoinets. The fittings and all timber work are to be in pitch-pine, and the windows glazed with lead lights in variegated tints. The accommodation will be for about 250 persons. The entire work has been let to Messrs. Pilling & Halliwell, of Edenfield, for 1,080 l. The architect is Mr. J. D. Mould, of Manchester.

SANITARY AND ENGINEERING NEWS.

NEW RESERVOIR, INNELAN WATER SUPPLY, ARGYLLSHIRE.—The inauguration of the new reservoir at Innellan took place on the 30th ult. The work was commenced last May by Mr. Pearson, Kilmarnock, who secured the contract. The works, which have been constructed at a cost of about 1,800 l., are situated at Knochmillie, and their capacity is 2,550,000 gallons, which, added to that of the old reservoir, will give a capacity of nearly 6,500,000 gallons. The engineer was Mr. Wilson, Greenock.

BELLINGHAM MAIN SEWERAGE AND SEWAGE DISPOSAL.—The Bellingham Union Rural Sanitary Authority have instructed Mr. D. Balfour, M. Inst. C.E., Newcastle-on-Tyne, to carry out a scheme of main sewerage and sewage disposal for the towns of Bellingham and Wark, in Northumberland.

DRAINAGE, HEATLEY (SHEFFIELD).—We are informed that Mr. G. Herbert Bayley, A.M. Inst. C.E., has received instructions to carry out a scheme of main drainage for the Heatley Districts of the Lynton Local Board area. The Local Government Board will hold an inquiry shortly.

STAINED GLASS AND DECORATION.

WINDOW, EDENSOR CHURCH.—The east window of Edensor Church has been filled with stained glass in memory of Lord Edward Cavendish. The work was executed by Messrs. Burlison & Grylls, London.

WINDOW, ST. HILDA'S CHURCH, WHITBY.—There has just been unveiled a stained glass window at St. Hilda's Church, Whitby. The subjects represented are, "The Baptism of Christ" and "Christ changing the water into wine." The window is from the studio of Messrs. Atkinson Brothers, of Newcastle.

WINDOW, NEW WORTLEY CHURCH.—Stained glass has been inserted into the large east window of New Wortley Church, Leeds, illustrating the principal events in the life of the Saviour on earth. The work has been done by Messrs. Powell Brothers, of Park-square, Leeds, and is in the style of the fifteenth century.

FOREIGN AND COLONIAL.

FRANCE.—In connexion with the horse competition at the Palais des Champs Elysées, an exhibition of the work of horse painters and sculptors has been organised. The Commune of Conflans-Sainte-Honorine (Seine-et-Oise), has opened an architectural competition in that town for a Town Hall and a group of schools. Some fine buildings have just been completed at Saint Mandé, intended to serve as ateliers for the Braille Technical School belonging to the City of Paris. The Fine Arts Society of Berriers has organised an international exhibition of works of art from the southern districts to open on May 1. According to the work of the Marquise de Bloqueville, daughter of Marshal Davoust, Prince d'Eckmühl, the Minister of Public Works is to construct on the coast of Brittany a monumental lighthouse to be called the "Phare d'Eckmühl." A sum of 300,000 francs was left by the Marquise for the purpose. The Chamber of Deputies has authorised the State to cede gratuitously to the town of Toulouse the building of the ancient tobacco manufactory de la Dauphine, in order to instal there the local Fine Art School. M. Ulysse Gravigny, Architect and Inspector of Works of the City of Paris, has been appointed to design the monumental commemorative of Sedan, of which the sculptural portion (as mentioned in our last) is to be executed by M. Croisy. M. Paul Lenoir, a former inspector of "bâtiments civils," has died at Pecque, at the age of sixty-six. M. Léon Donnat, a distinguished engineer and former Municipal Councillor of Paris, has died suddenly at the age of sixty-two. At the London 1882 exhibition he was entrusted with the arrangement of the French machinery gallery there. Five years later, in 1867, he was placed at the head of the machinery department at the Paris Exhibition, and was president of a section at the two other exhibitions of 1878 and 1889. A congress on Christian Art is to be held in a few days at No. 46, Rue du Bac, at which consideration will be given to the formulating of an archeological course for the use of Catholic schools, and a manual of architecture with liturgical rules for the planning of churches. The number of works sent in to the old Salon is estimated at 5,600, of which only 1,800 pictures (by

the new rule) can be admitted. To the Champ de Mars Salon about 1,000 works have been sent in.

BERLIN.—The elaborate statistics of the building activity of Berlin in 1892 show that there is a marked decrease in the amount of work taken in hand last year. The number of large buildings commenced, with the sanction of the police, having alone seen a reduction of about 1,350. The only class of public buildings showing an increase are the Lutheran places of worship. This is due to the Emperor's endeavours to make church-going fashionable. We hear that Professor Begas, in accordance with the Emperor's commands, has been rapidly progressing with the large models for the proposed national monument on the "Schlossplatz." The sculptors, Barnewitz and Hidding, are acting as his senior assistants. The Emperor is a regular visitor at the Professor's atelier. The historical "Marienkirche" is undergoing repairs which will cost over 25,000 l. Several of the houses which at present spoil the view of the church are being pulled down. The arrangement of the Exhibition Halls at the "Landes Ausstellungs Park" for the coming picture exhibition has been put in the hands of Professor F. Wolff. Some 6,000 l. are to be spent on certain new mural decorations of the Berlin Town Hall, Westminister, S.W., and the new library of the "Architekten Verein" now include twelve thousand volumes. About 600 l. was spent last year by the society for newspapers and journals.

The well known archeologist, Professor Ernst Curtius, will have to resign his position as honorary secretary to the Prussian Royal Institute, on account of his failing eyesight. The Dresden society of Architects, a paper was read on the strength of various kinds of bricks which had to be subjected to such temperatures as occur in factory fires. The paper contained a résumé of some interesting experiments.

INFORMATION FOR EMIGRANTS.—The April Circles of the Emigrants' Information Office, 31, Broadway, Westminister, S.W., and the new editions of the penny and other handbooks, with maps, issued on Saturday last, show the present prospects of emigration. Emigrants to Canada should prepare to start at once, so as to arrive when winter is over and the busy season begins. The Canadian Government is offering bonuses of five to ten dollars a head to those who take up land in the North-West or British Columbia. The Dominion Immigration Agencies are now abolished, except at the ports of landing: in Manitoba and the North-West the Dominion Land Agents now act as Immigration Agents also, and new arrivals should apply to these. Young men who are going to Canada with a view to learn farming are strongly advised to pay no fees as farm-pupils, but to apply for information to the High Commissioner for Canada, 17, Victoria-street, London, S.W., or to the Chief Clerk at the Emigrants' Information Office. New South Wales, Victoria, Queensland, and Tasmania continue to suffer from commercial depression, and great damage has been done in Queensland by the recent floods. In none of these Colonies is there any demand for labour except for female domestic servants, and in some country districts of New South Wales for farm hands. In South Australia there is an abundant supply of labour already on the spot. In Western Australia there are openings for a limited number of farm hands, miners, navvies, and men in the building trades. In New Zealand the main feature during the last few months of 1892 was the influx of new comers, the arrivals during 1892 having, for the first time since 1884, largely exceeded the departures. Persons in possession of small capital are now eligible for reduced passages to New Zealand on application to the Agent-General. In some districts of Cape Colony there is a limited demand for mechanics and female servants. The Natal Immigration Commission, which has lately reported, recommends the establishment of additional agricultural settlements in the colony, consisting of small farmers from Europe, as well as the continuance of the existing system of assisted passages to artisans, female servants, and others. Queensland and Western Australia are the only Colonies now giving free passages, the privilege being limited to selected female servants. The warnings against emigration to Brazil still hold good. There are branches of the Emigrants' Information Office at Bradford (Yorks), Cardiff, Hereford, Reading, Wolverhampton, Leeds, Manchester, Newcastle-upon-Tyne, Glasgow, Liverpool, and Devises.

MISCELLANEOUS.

ELECTION OF ASSOCIATES OF THE ROYAL SCOTTISH ACADEMY.—A general assembly of the Royal Scottish Academy was held on the 29th ult. Sir George Reid presiding—when the following ten gentlemen were elected to the rank of Associates: Messrs. Alex. Marshall Mackenzie, architect, Aberdeen; R. B. Nisbet, painter, Edinburgh; W. Birnie Rhind, sculptor, Edinburgh; John James Burnet, architect, Glasgow; G. H. Kinross, architect, Edinburgh; Alexander Roche, painter, Glasgow; Henry W. Kerr, painter, Edinburgh; John Kinross, architect, Edinburgh; David Robertson, architect, Edinburgh; and J. Coutts Michie, painter, Aberdeen. The *Scotsman* of the 30th ult. gave

CUNLIFFE V. THE HAMPTON WICK LOCAL BOARD.

THIS was a case which came up in the Queen's Bench Division last week, before Lord Chief Justice Coleridge and Lord Justice Lopes. From the report of it which appeared in the *Times* for March 29, we learn that it was an action brought by a contractor against the Hampton Wick Local Board, to recover an alleged balance on a contract to construct new sewers for the district, they counter-claiming for gool, for the cost of reconstruction of a part of the sewers; and the official referee having found in favour of the Board on that counter-claim, the contractor now appealed against the referee's

THE "SHOULD BRICKLAYERS TILE?"—The discussion of this question, to which is referred in the *Builder* for March 25, p. 239, still goes on in the columns of the *Star*. In answer to "A Slater and Tiler," "A Member of the Operative Bricklayers' Society" replies to the question in the affirmative. "Tiling," he says, "is now and always has been a part of our trade, and would it be fair, to our country members especially, who are always called upon to do the work, because we are not often called upon to do the work, to allow ourselves to be robbed of our trade rights?" Whereupon "Live and Let Live" writes:—"I have spent between twenty and thirty years of my life as a slater and tiler, ten years of it as a tiler alone. I am growing grey in the trade, and feel bitterly the unscrupulous and dastardly attempts on the part of the bricklayers to rob us of what has become the greater part of our trade. I am sure that in the dispute the bricklayers should try their case before a jury and abide by the result. This is what the bricklayers will not do. They prefer barbaric fighting. The only approach at a conference which has been held was one from which members of the threatened trade were excluded. Masons, plasterers, bricklayers were present, but not slaters. It was this precious meeting, which ultimately resolved itself into one delegate, that carved out from one branch the right to do the work which was given to the bricklayers. Do the bricklayers aim at extinguishing us entirely? They roam all over a building from the cellar to the highest point, devouring everything and anything that they choose, no matter what other trade it may belong to—slating, roof tiling, wall tiling, floor tiling, paving, setting stones, landings, sills, heads and steps, plastering, knobbing, whitewashing, &c. Yet they are not happy. They feel of federation. They are not necessary to the building, and the trades together are going to resist the encroachments of this omnivorous gang." In the meantime we perceive that the question in dispute has led to a strike amongst the workmen employed on the new buildings on the Leigham Court estate, Streatham. Mr. Stephen Matkin, of the Slaters' and Tilers' Union, has published the correspondence which passed between Mr. Farrant, Managing Director of the Artisans' and Labourers' Dwellings Company, and the Bricklayers' Society, Streatham Hill, at Leigham Court Estate, Streatham-hill, where it is stated that 400 men have been thrown out of employment by the action of the bricklayers. The first letter was ad-

5,929.—**WALLS, Etc.; *W. S. Morten*.**—This invention consists in substituting for ordinary lath and plaster work as applied to walls, partitions, and ceilings an improved method of walling composed of panels or slabs made of a special material, and arranged in a novel manner. The use of these improved arrangements, it is claimed that, the interior of buildings can be speedily completed in a dry state, and without the necessity of painting and decorating can be proceeded with without delay.

18,093.—**WINDOWS: *C. Reinhardt*.**—This invention relates to the arrangement of apparatus for opening, closing, and securing window sashes. It consists of a curved and toothed rod, connected to the window sash, constructed in several parts, and operated by a pin-wheel mechanism, which, when the sash is closed, forms a continuous rod, but when the sash is closed, they are automatically deposited side by side in a recess, or in a groove, and a provision for protecting the rod and side openings of swinging sashes, and for forming the rotary sliding plates being connected to the sash-frame and to the toothed operating rod, which open and close with the sash, and are deposited in a recess or in a groove in a recess, or receptacle. An arrangement is also provided to protect the frame of the lifting window from bending, and the sash from being warped, and the rod is secured into the wood, or screwed on to the sash.

Shreehan.....	179 0	1. Desmond.....	145 0
[Engineer's estimate.....		*Accepted.	
		£170]	

MERTHYR TYDFIL.—For the erection of forty-five houses, Pen-y-darren, for the building of Mr. J. Williams, architect, and 4 Edward-street, Morgantown, Merthyr Tydfil.
 Ivan Jones £1,000
 The Williams 1,000
 David Davies 845
 W. L. Lissman, Junr. 832
 Merthyr (accepted) 7,005

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 Mitchell & Band 1,000
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 James MacLellan 1,000
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 Wm. Scott Junr 410 0
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 D. W. Barker 383
 Andrews & Son 343
 Turner & Co., Limited £301
 H. P. Bulled & Co., Croydon (accepted) 279

POOLE.—For the formation, metalling, and drainage of roads on the Heolpark Estate, Longfleet, Mr. H. F. J. Barnes, architect, Poole.
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 Heathley Bros. 2,421
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 Cosford 2,200
 Hall, Hewat, Jones & Lismar, &c. (accepted) 2,100

RUGBY.—For erecting a house, 100, Chapel-street, Rugby, for Mr. George Linton. Mr. Alfred G. Greenhill, surveyor, Rugby.
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 Linnell & Son 972
 Hollowell 990
 Foster & Co., Rugby* 973
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RUGBY.—For levelling, installing, paving, kerbing, &c., Bridge-street, for the Local Board. Mr. J. H. Brinkley, surveyor, Rugby.
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 J. Broadhurst £475
 Thomas Roe 475 10 0
 Station-road, Stockport (accepted) £450 10

WITTINGTON (Lancs.).—For laying a pipe sewer (150 yards) in Albert-road, for the Local Board. Mr. A. H. Mountain, Surveyor, Town Hall, Wittington.
 M. Taylor & Co. £354 15 6
 Warrington & Co. 300 0 0
 Barker & Harris 299 4 6
 Geo. Clarke 258 3 0
 W. B. J. 140 7 0
 Jas. Farrell 930 0 0
 Amos Goddard 106 0 0
 Wittington* 106 0 0
 Accepted.

CLIFTON SPA AND PUMP-ROOM.—Messrs. Marks, Monro, & Son, architect, Bristol, write to us with reference to the list of tenders received for the Clifton Spa and Pump-Room, which list appeared in the *Builder* for March 18. We are asked to say that the tenders as published by us were not fully considered, and that on a revision of the plans being made, the tender of Mr. Beaven was accepted at 4,720s, this being the lowest.

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The Builder.

VOL. LXIV. No. 2519.

APRIL 15, 1893.

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New Imperial Law Courts, Tokio, Japan : Design as at First Proposed by Messrs. Ende & Boeckmann.....	Double-Page Ink-Photo.
Imperial Law Courts, Tokio : Design Finally Accepted : Messrs. Ende & Boeckmann, Architects	Double-Page Ink-Photo.
Parish Room and School, All Saints', Plymouth.—Mr. Edmund Sedding, Architect	Single-Page Ink-Photo.
St. Marylebone General Dispensary.—Mr. Beresford Pite, Architect	Single-Page Ink-Photo.

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The Local Government Bill.



THE importance of the Local Government Bill to the inhabitants of rural England can scarcely be overrated: it may affect the health and the well-being of many thousands of persons in this

country probably more than any other measure of recent times. It is sometimes regarded as the complement of the Local Government Act of 1888, by which County Councils were established. But whilst that measure introduced a new administrative body, the Bill really restores in a sense the original administrative unit outside cities and boroughs. The vestry—in other words the inhabitants of the parish gathered in an assembly which selected certain of its members to perform various functions—was the administrative unit. This Bill proposes to establish Parish Councils elected by the inhabitants of the parish, and they will perform the function to a large extent of parish officers. Hence this measure is at once conservative and reforming, for it revives, in a new form, the administrative action of the parish which, through Acts of Parliament and local inaction, has gradually lost its former vitality. Nor can there be much doubt that, for many reasons, the measure which has been introduced this session should have preceded the Act by which County Councils were constituted, since, in the first place, it was desirable to establish in full working order the administrative unit. But the present Bill might, with advantage, have been divided into two measures, since it establishes not only Parish Councils, but District Councils, which latter are not confined to rural places.

Assuming for a moment, however, that this Bill becomes law, there will then exist, in every parish in England which contains over three hundred inhabitants, an assembly elected by the people of the place whose business it will be to manage the local affairs of the parish. When a parish contains less than the above number of inhabitants, it will be grouped with another or other parishes. Whether such grouping is desirable is a matter of doubt: a Parish Council elected by less than three hundred persons would be a

modest kind of body; but, after all, it would be animated by more local spirit than a body representing a group of parishes—in other words, a district with different aims and objects. That small parishes might with advantage combine for certain purposes is, no doubt, true; but it would be better to give parishes the power to do this rather than oblige small parishes to lose their particular existence. For example, among the duties of the Parish Council will be (sec. 6, sub-sec. iii.) "the holding of parish property or village greens or allotments for recreation grounds, or for gardens, or otherwise for the benefit of the poor." It is easy to imagine unbounded rivalry and animosity in reference to the proper maintenance of two village greens. On the other hand, if of two small adjacent villages one only has a green, there might well be a combination to maintain the one as a recreation ground for two villages.

Speaking broadly, the Parish Council will have authority to manage all the secular business of the parish: its powers will be practically unlimited. Certain statutory powers are transferred to it, which it can adopt if it sees fit, such as those under the Lighting and Watching Act, 1833, the Baths and Wash-houses Acts, 1846 to 1882, the Burials Acts, 1852 to 1885, the Public Improvement Act, 1860, and the Public Libraries Act, 1892. But wider additional powers are conferred by the eighth section—namely, power "to provide or acquire buildings for public offices for meetings and other public purposes." The last words are so comprehensive that they appear to include almost any kind of building, such as village halls, cottage hospitals, and almshouses. Further, the Parish Council may acquire land for the above purposes, for recreation grounds and for public walks. They may "utilise any supply of water within their parish." Practically, therefore, a Parish Council may obtain a proper water supply for a village, a power which, if carefully and sagaciously used, would be of unbounded benefit to the community. But having regard to the apathy in reference to sanitary matters which prevails in pretty nearly every village, from Northumberland to Sussex, it is to be feared that however valuable this power may appear on paper, it will not have much real effect except under the gentle pressure of the Local Government Board. But a possibility of local activity is given by this Bill: a village, whether it possesses a Hampden to take the lead or

not, will, when this measure becomes law, be able to improve the minds and the bodies of its inhabitants. It may have its public library, its village hall, its recreation ground, its wholesome water. It will not be dependent on private benevolence or individual kindness; the collective action of the community, if it is willing to bear the necessary pecuniary burdens, may turn a deserted village into an Arcadia.

So much for the Parish Council—a body elected by ballot by the people of the parish. The District Council is a different body; it is not a purely rural assembly, "Urban Sanitary Authorities shall be called Urban District Councils," and "for every rural sanitary district there shall be a District Council." To each Rural District Council shall be transferred "all the powers, duties, and liabilities of the Rural Sanitary Authority in the district, and of any highway authority in the district." In addition to these clearly-defined powers, District Councils have conferred on them certain rights in regard to public rights of way, of a somewhat hazy character. The weak part of the Bill appears to be the creation both of Village and District Councils. Such dual existence will weaken both bodies. Nor does the duplication of authorities seem necessary. The parish has now, where highway boards do not exist, the management of the highways other than main roads, which latter are under the control of the County Councils. There is no adequate reason why the Parish Councils should not possess the same power as the present vestries. The tendency of the County Councils is to gain the control of a larger area of highways by declaring what may be called parochial roads to be main roads, hence parishes and highway boards are gradually having fewer roads to manage. The Parish Councils will be more capable than the existing vestries of looking after highways, and they certainly ought to retain the control of them. Rural and Urban Sanitary Authorities might then remain in their present state and retain their present name.

A larger area than the parish may well be necessary at present for the administration of the Public Health Acts, though there can be no doubt that if the Parish Council is fit to be trusted with the water supply—or, indeed, is worth calling into existence—it will eventually have to become in rural districts the Sanitary Authority.

Oddly enough, too, under this Bill, the

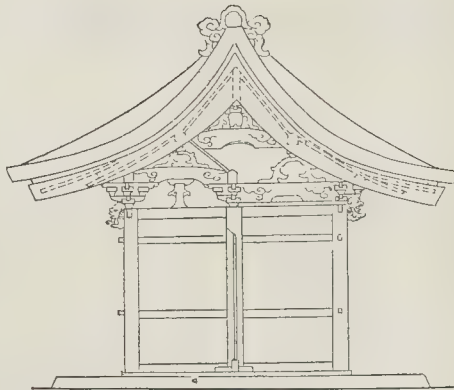


Fig. 8, Side View of Entrance to Shinto Temple.

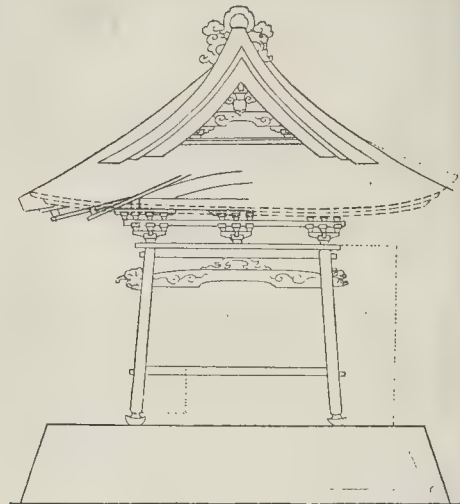


Fig. 9, Shinto Bell-tower.



Fig. 10, Tower Gateway to Buddhist Temple.

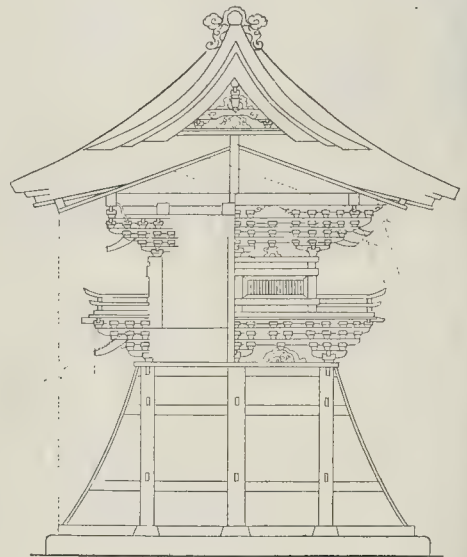


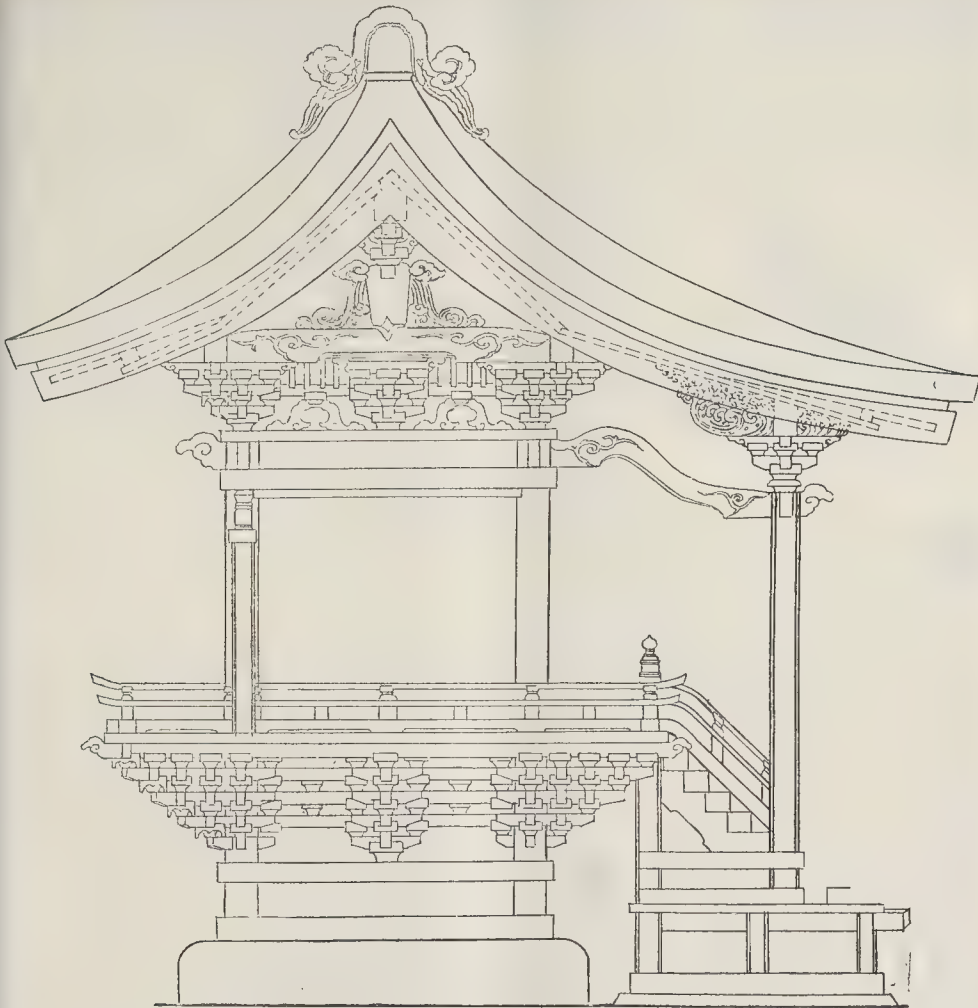
Fig. 11, Bell-tower to Buddhist Temple.

Parish Council may, in regard to sanitary matters, act as a kind of censor of the District Council, for it is enacted by the fifteenth section that "where a Parish Council consider that a District Council ought to have provided the parish with sufficient sewers, or to have maintained existing sewers, or to have provided the parish with a supply of water in accordance with the Public Health Acts, or to have enforced with regard to the parish any provision of the Public Health Acts, and have failed so to do, the Parish Council may complain to the County Council, and the County Council, if satisfied, after due inquiry, that the District Council have so failed as respects the subject matter of the complaint, may resolve that the duties and powers of the District Council for the purpose of the matter shall be transferred to the County Council, and they shall be transferred accordingly." It seems clear, therefore, that the Government do not place any great reliance on the sanitary activity of the District Councils; on the other hand, it is rather a large assumption to suppose that

a Parish Council will show more intelligence in such matters than a District Council. But if there is this distrust of the District Councils in regard to sanitary matters, there can be no strong reason for calling them into existence to take the place of the Rural Sanitary Authorities, which might, as we have said, well remain the bodies responsible at present for the administration of the Public Health Act, just as in certain parishes the School Board, where there are no voluntary schools, only exist to manage the elementary education of the parish, though it is possible that, in the future, the Parish Council may absorb the School Board.

To the District Council are also transferred, various powers not known to the public generally—such as appeals from police as to certificates for pedlars, and the licensing of dealers in game. Some of these functions might well be handed over to the County Councils, and others to the Parish Councils, which should be the administrative units of the county of which the County Council is the general assembly.

It will be obvious from this short sketch of the main and cardinal principles of this measure that we used no exaggerated language when at the outset we stated that it may affect the health and well-being of thousands. The Municipal Corporations Act, by quickening the collective life of the towns years ago, made the inhabitants of the cities of England the masters of their own affairs, and in spite of many shortcomings the urban inhabitants of the country in every sense have become more prosperous and more healthy than those of any other country in the world. If when this measure becomes law—which it is certain to do, if not this session, then in the next, being one which is supported in principle by both the great political parties—it can hardly fail to have an equally beneficial effect in the rural districts. Doubtless, instances of mismanagement and extravagance, as well as of foolish parsimony, will be found from time to time, but undoubtedly it gives opportunities for great improvement in the material condition of the country people of

*Side View of Shinto Temple.*

SOME NOTES

ON JAPANESE ARCHITECTURE.*

BY F. T. PIGGOTT.

IN the temple roofs, which are perhaps the most remarkable feature of Japanese architecture, the straight line of the house roof becomes a beautifully proportioned curve. The accompanying architectural drawings reproduce the lines with great fidelity. The main curve is, I think, a natural curve. The impression created on the mind is of the "sag" of a tightly-stretched tent, and this would give a catenary with one of its extremities much lower than the other. But the architects do not limit themselves to one curve. If the elevations are examined, two such curves will be seen. The upper line is, of course, the curve proper of the roof; the lower one is that of the gabled end. In the case of the entrance gate to a Shinto

temple, Fig. 8, it will be seen that the extremities of these two curves are coincident; in the case of the Bell Tower, Fig. 9, the gable-curve does not extend to the full length of the roof curve. And yet another curious feature. The sweep of the front of the roof is nearly always longer than that of the back, so that it may cover the steps up to the temple door, as will be seen in the large drawing of the side view of a Shinto temple. And, as one would expect with natural curves, those of the front and of the back are not identical.

The description of these curves is exceedingly difficult, for the gable curve (the lower line in the elevation) is much deeper than the curves of the roof. The timbers of the gable project from the end of the roof about 18 in., and the lead with which it is covered droops from one curve to the other; it forms a short veil, and corresponds to a loose overhanging end of canvas. It is from 18 in. to 2 ft. in width, and being joined, not only at both ends, but also at one side along its whole length, has a peculiar graduated "sag" of its own. Let us imagine the side of a canvas tent 44 ft. long, the extreme peg-ropes from the uprights 40 ft. apart; only so that there is a loose flap of canvas at either end, 2 ft.

broad; and imagine further these two loose flaps to be caught up at both extremities by the ropes which support the tent in the direction of its length, then the outer edges of these two flaps will obviously sag to a deeper curve than that of the tent itself. There are minor modulations of the curves at the corners, or where curve meets curve at the joining of the smaller dormer gables with the roof. This seems to be the origin of the sweep of the temple roof, which in miniature is full of graces, and in its larger sizes is full of grandeur; or, if doubts as to whether tents were ever used in Japan throw doubts as to the suggested derivation of the curves, we must content ourselves with saying that a tent put up in the manner suggested would reproduce the curves of the roof with great fidelity.

But the purely mechanical construction of the roof sinks into insignificance when compared with the intricate joinery of the nests of brackets with which the overhanging eaves of the roof are supported. They appear in the small illustrations under the roofs in figs. 10 and 11, under the balcony of the upper story, and often also under the balcony which runs round the base of the building, as shown in the large drawing of the temple. This lower balcony is one of

* Concluded from p. 263.

the great features of the temples; it is, in Buddhist temples, usually finely lacquered in either black or crimson.

The illustrations from temples given with this article show, in Fig. 7, two forms of the covered entrance to a Shinto Temple; in Fig. 8, the side view of such an entrance; in Fig. 9, a Shinto Bell Tower; in Fig. 10, the Tower Gateway to a Buddhist Temple; in Fig. 11, the Buddhist Bell Tower; and finally the side view of a Shinto Temple.



NOTES.

THE Hull Dock strike has rapidly developed into one of those bitter struggles in which the origin of the dispute is soon lost sight of in the excitement of subsequent events; and as the success of the appeal to public sympathy in the case of the London dockers will doubtless prompt a similar appeal in the present dispute, it is as well to note that the two cases are not analogous. The circumstances under which the London dock-workers contended for their "tanner" differ from those of the Hull dispute, inasmuch as no specific wage-rate enters into the latter, although apprehensions of forthcoming reductions doubtless prompt the Hull dockers' action—which may fairly be described as an unblushing attempt at coercion. The "tyranny" about which so much is generally heard in connexion with strikes is certainly not on the side of the shipowners, who simply claim a right to employ whom they please. The reverend gentlemen who waited upon them on Saturday with conciliatory intent were informed that the situations left by the men were still open for them, on the condition that they made no distinction between Unionist workmen and other workmen. But this does not accord with the Unionist idea of freedom, and the labourer who is sufficiently independent to keep aloof from their organisation is assailed with every reproachful epithet—as well as the employer who is rash enough to offer him work. Of course, it is not disputed that free labour generally means cheap labour, and the antipathy of the Unionists—who have obtained considerable advances in wages since their formation—is not unintelligible. But, on the other hand, it cannot be denied that organised labour is rapidly becoming too dictatorial for the extension of commercial enterprise. Messrs. Wilson have once withdrawn from the Shipping Federation, under the impression that they could deal better with their men direct, and even took an active part in the formation of the local Dockers' Union. But, according to the *Times*, they have been so harassed by the Union, that they again joined the Federation, and commenced to engage men irrespective of their being Unionists or not—this being the sole cause of the block upon their vessels. For the Unionists to work side by side with men engaged through the Shipping Federation would be, we are told by a labour organ, "to throw over the whole principle of trade unionism, and in their own interest the men on strike would be wiser to starve than resume work on such conditions." This in the face of a statement in the same journal, that the "Labour candidate" for Central Hull advised the dockers not to

refuse to work with free labourers, and that their energetic champion, Mr. Ben Tillett, was also entirely opposed to the strike of the federated societies.

THE two opposite ends of Eastbourne offer a curious example of diversity of taste in building at the interval of a few years. The central portion of what in modern parlance is called the "sea front" consists largely of hotels, and where it does not, the houses are in the regulation hotel style always adopted from a quarter to half a century ago for the more showy and expensive class of seaside lodging-houses. At its eastern end, however, Eastbourne has pushed out further extensions not many years ago, in the shape of rows of less sumptuous lodging-houses which have all the formality and dullness of the older ones in the centre, without their pretension to semi-palatial dignity; and more depressing rows of buildings than those eastern continuations of the "Front" could not well be imagined. But at the present moment Eastbourne is extending her bounds westward, where a whole new "residential quarter" of terraces and semi-detached houses (mostly the latter) is springing up. Here, as if by a natural recoil from the architectural ugliness and uniformity of the east end, we find on the contrary a kind of restless striving after picturesqueness and variety which forbids any two houses, or at all events any two blocks, to be alike, and which seems to drive the builders into all kinds of eccentric efforts to arrange their windows and roofs and fashions in some unexpected and individual manner. The intention is creditable; it is better than the monotony of the eastern terraces; but it has been overdone, and (though a few of the houses are really pretty) there is a sensation of fussiness and want of repose about the domestic architecture of this new neighbourhood which is a little irritating to the eye and mind. We may observe that between the centre and the new eastern portions (a little beyond the Queen's Hotel) there are left a few of the old Eastbourne "front" houses, of probably the early part of the century—some of the old houses with large circular bays running up to the eaves—which, in their real picturesqueness combined with simplicity and dignity of character, might have formed a good model for some of the modern houses; but we see nothing like an imitation of their style anywhere. While on the subject of Eastbourne, we may call the attention of the Sanitary Authority there to the state of the brick shelters which are built at intervals along the lower level of the promenade. The interior corners of these, which are never swept by the wind, are also apparently never swept by anything else, and become pockets for the accumulation of rubbish, old papers, orange-peel, and other "matter in the wrong place." To send a man round them with a besom in the morning would not cost the Corporation very much, and would remove a pretty frequent cause of complaint among visitors.

CLAPHAM has been largely rebuilt in recent years, but it yet retains a good deal of "slum" property which gives trouble to the local authorities. A very large proportion of this objectionable property is on land in which the Ecclesiastical Commissioners have an interest, and it is to the credit of the Church that a large area of insanitary dwellings is about to be cleared. Just ninety-nine years ago the then Rector of Clapham, the Rev. Henry Venn, was, by a special Act of Parliament, permitted to let the glebe land for building. The inevitable result, unreleasing, followed, and a lot of wretched wooden houses were "run up" under the very shadow of the fine mansions in which the Thorntons, the Macaulays, and other celebrities have dwelt. Over and over again Clapham vestrymen have declared the houses in "Bromell's-passage," "Waterloo

Retreat," and other places shut in by "The Pavement," "Grafton-square," and "High-street" to be dark, insanitary and "the resort of bad characters," but little, apparently, could be done until the leases expired. The leases are now running out, and the Rector, the Rev. C. P. Greene, intends to vastly improve the property. Five beershops and one public-house will be done away with, and three new roads—one to be named after Henry Venn—will be formed. Certainly the most picturesque houses, if they deserve the title, in old Clapham will be demolished. No one walking along the High-street towards the Common would dream of the close proximity of so many wooden houses, vine-covered here and there, with red-tiled roofs and quaint gable ends altogether unlike what one sees in modern dwellings. "The Rectory Estate," Clapham, was well known to a few artists, who often made studies of the old houses and picturesque gardens now degenerated into "barn-yards." Kenny Meadows, the well known artist, lived over a sweetstuff shop close to the glebe land, and many a picturesque bit of old Clapham was introduced into his "Illustrated Shakspeare." Clapham vestrymen have hailed with delight the removal of the old "rookeries," and we understand that they are taking care that the 700 persons or so who will have to be rehoused shall suffer as little inconvenience as possible. The Rector intends to build, in one of the new roads, a recreation hall for the use of the parish.

THE new number of the *American Journal of Archaeology* (Jan.-March, 1893) is unusually strong in original papers, a fact which we are glad to note, as at one time the *Journal* seemed likely to lapse into little more than a *résumé* of the work done by others. The first paper on "The Temple on the Acropolis burnt by the Persians," by Mr. Harold N. Fowler, contends (1) that Pausanias does not mention the temple excavated in 1886, and (2) that the existence of that temple during the latter part of the fifth and fourth centuries is not proved. Mr. Tarbell follows with a useful tabular view of the subjects of the principal sculptural decorations of all known Greek temples. The sculptured decorations included are pediment figures, metopes and frieze, acroteria and sculptured drums are omitted. The object is of course to provide material for establishing the relation between the sculptured decorations and the dedication of the temples. Mr. Brownson, of the American School, has a good paper, prompted by suggestions in a peripatetic lecture by Dr. Waldstein on the relation of the archaic pediment reliefs from the Acropolis to vase-painting—the relation, it is contended, is very close and immediate. The tympanum was at first either painted or filled in with a group in terra-cotta—the pediment was no exception to the general rule that the whole architectural adornment of the oldest temple was of pottery. In a paper on the frieze of the Lycian Monument, Mr. de Cou points out that the arrangement of the slabs is incorrect in the earliest publications, and the inaccuracy is repeated in subsequent standard publications—e.g., in Overbeck's "Plastik." The correct arrangement is seen in the cast in the British Museum. Finally, Mr. John Pickard has a paper on the "Conjectural Site of the Shrine of Dionysos, ἐν Αἰπυρίᾳ, at Athens."

OUR German contemporary, the *Deutsche Bauzeitung*, publishes some interesting notes on the rapid increase of places of worship in Berlin since the commencement of the present Emperor's reign. Whilst during the thirty years preceding his accession to the throne only four churches were built in the Prussian capital, no less than twenty-six have been taken in hand during the last four years, and there is every prospect of another forty having seen their completion by the end of the present decade.

Of the twenty-six churches started during the Emperor's reign seven have already been consecrated, whilst the rest (with the exception of a memorial church to the late Emperor William) have to be finished by the end of 1895. The memorial church alluded to will cost about 200,000*l.* and will hold a congregation of 2,000. The architect of this building, Herr Schwechten, intends having a spire about 117 metres high, and using a good free stone for his façades. Herr Schwechten has also two other churches in hand, Herr Spitta has five of the twenty-six, Herr Orth has four, and Messrs. Moeckel, Adler, and Otzen two or three each. The total cost of the churches in course of erection, their fittings and sites they stand on exceeds 750,000*l.* 13,000*l.* is the usual cost of the more dignified churches with a thousand seats, a spire and vaulted naves and aisles, but this sum does not include the church furniture and fittings. Churches of a simpler kind for congregations of 850 and wooden roofs are generally estimated at 1,000*l.* With the exception of three cases the parishes do not have to pay for their sites themselves, as the Government, the Municipality, or even private individuals have been the donors in due accordance with views expressed by the Emperor and the example set by his Court.

It is understood that the Queen has accepted the patronage of the so-called "International Fire Congress," to be held in June, and which we hope may prove itself deserving of this distinction. In those continental countries where fire protection ranks as a science, a congress of firemen really means a meeting of experts in fire-fighting, architects, engineers, and public servants, to discuss questions relating to the general protection of communities or separate risks. In some cases on such occasions we find a brigade showing some new special drill, or a maker some novel apparatus, but in no case are these exhibitions the main object of the gathering. The proposed Agricultural Hall "Congress," however, appears to be a very different affair—i.e., a kind of Military Tournament without the substantial *raison d'être* of collecting funds for deserving charities. Drill competitions, races, and showy parades are the main events, then comes a trade exhibition, and we understand rightly, we shall also see some fine relics, hear a few papers read, and have some 3,000*l.* spent in entertaining distinguished visitors. Competition drills and parades may further the efficiency of individual firemen or brigade-units, but fire brigades, like military bodies, cannot be judged solely by the abilities of their most agile and specially coached members. The intelligence and athletic power of the raw material from which our brigades are recruited may probably rank first in the world, and an exhibition of the smartness which can be drilled into such material will always be interesting. Unfortunately, however, the advantages of the brigades having good material are mostly counterbalanced by the irrational organisation of these forces and the unscientific training of the officers in command, whilst it should also be remembered that in reality even the best organised and most efficient brigades play but a minor rôle in modern schemes of fire protection. Preventive measures rank far higher than the actual defensive ones, and the energy expended by the "Fire Brigades Union" Committee might be more usefully employed in furthering legislation for preventive purposes than in arranging the proposed displays of the "Congress."

It is certainly high time that a National Society for checking the abuse of public advertising should be formed, and the society for that purpose, whose programme has just been made public, may do very good service. Little can be effected in these days by individual effort; but collective work and

adequate funds may do a great deal. The society in question will busy itself mainly with the question of large public advertisements such as skyscrapers, those on hoardings, buildings, and so forth. We hope also that they will take in hand the abuse of advertising in railway stations, where great inconvenience is caused by the name of the station being practically lost in the surrounding advertisements. The list of members who have already joined the Society includes the well-known names of Mr. W. E. H. Lecky, Mr. A. Waterhouse, and Mr. Alfred Austin, not to speak of others. A duty on advertisements, which is one of the points now under their consideration, would probably be a useful aid to local taxation, and if it were placed heavily on the larger kinds, would effectually check those which are most to be censured.

THE commemoration last week of the deaths of Barrowe, Greenwood, and Penry, known as the "Congregational Martyrs," recalls some events in the history of Southwark and its now nearly vanished prisons. The former two were taken to the Clink, and suffered at Tyburn on April 6, 1593; Penry, on May 29 following, at the Elms, close to St. Thomas à Watering, by the southern point of St. George, Southwark, parish. Comparing old and modern maps we find that the galleys, and the brook, flowing from the slopes of Nunhead and Peckham-rye, were situated by the present junction of Albany and Old Kent-roads.* Penry, a resident of Long-lane, Southwark, had been confined in the Borough Prison, that is to say, the old Marshalsea, on the eastern side of Borough High-street, between Mermaid-court and Newcomen, formerly King, street—the Axe and Bottle-yard of Roque's map, 1746. The old Marshalsea extended eastwards to a once open sewer in the Bowling-green, where they used to set up booths for Southwark Fair. A short distance southwards, on the same side of the way, stood the old King's Bench and Queen's Bench, its site now marked by Layton's-buildings and Layton's-grove, *præter* King's Bench-alley. Between the old Bench and St. George's Church—depicted, in the distance, in Hogarth's "Southwark Fair"—was the White Lion, originally an inn, converted into a gaol circa 1558, whence John Rigby, *temp.* Elizabeth, was taken to the Elms. When the White Lion fell into disrepair a new Bridewell was built, circa 1770, on Hangman's Acre, at the junction of Higler's-lane (now Friar-street) and Great Suffolk-street, and north of the site of the later King's Bench, which latter was pulled down in the winter of 1881-2. In 1811 the White Lion site was acquired for the new Marshalsea, built at a cost of 8,000*l.*, and used until fifty years ago for debtors, pirates, and smugglers. This is the Marshalsea wherein the late Charles Dickens, lodging in Lant-street, used to visit his father, and which he describes in "Little Dorrit." Ten years ago we went over the debtors' side, chapel, and Admiralty prison, the last-named then serving for a cheap lodging-house. A firm of iron and hardware merchants have lately taken, and made changes in, the premises, so that the public can no longer enter the prison yard from Angel-place.† But in the ground-floor of No. 211, High-street, which occupies the site of the prison fore-court, turnkey's "lock," and keeper's house, one may still see the four posts and cross-beams with their brackets of the two prison-gates; in the rear is the four-storied block of eight houses, built in two rows back to back, containing fifty-six rooms and surrounded by a narrow courtyard, which formed the debtors' prison. Horse-monger-lane Gaol, designed by Gwilt, was

closed on August 31, 1878, and the prison, within the walls, was pulled down two years afterwards. On May 5, 1884, Mrs. Gladstone opened part of the ground as a public garden.

THE exhibition of the New English Art Club, now open at the Dudley Gallery, shows the usual proportion of the grain of wheat to the bushel of chaff. Mr. Walter Sickert affords evidence, in his life-size portrait of the late Mr. Bradlaugh at the Bar of the House of Commons (8), that he can paint a really fine portrait, both in regard to execution and expression, when he chooses; why, being able to do so, he should choose to exhibit such a daub as the "Portrait of Mr. Roussel" (99), or "Miss Geraldine Blunt" (52), it is impossible to understand, any more than one can understand why Mr. Fred Brown should choose to exhibit "A Portrait" (59) of a woman with a texture of skin which gives the idea that she had suffered from a virulent attack of smallpox; or why Mr. Wilson Steer should paint the face of a young girl (85) as if it were made of parchment, both as to colour and modelling. In regard to these and many other of the exhibits, it would appear that art in the New English Art Club is not the search after beauty, but the search after ugliness; or absurdity, if we judge by such travesties as Mr. Wilson Steer's "Yacht Race" (54), which it is fortunate for him that few yachting men are likely to see. Mr. Wylie sends some charming little sea and coast pictures, and Mr. Mark Fisher is seen at his best in "Winter Fodder" (86), and "An Inappreciative Audience" (92), but neither of these are painters especially known in connexion with the New English Art Club. Mr. Furse's large hunting portrait is very well drawn and full of character in man, horse, and dogs but most unaccountably dingy in tone. Among smaller works Mr. Brabazon's "Fishing-Boat Sails at Chiggia" (4) and "On the Riva dei Schavoni" (12) are brilliant bits of colour study; Mr. Holloway shows fine qualities of composition in "Lambeth" (41) and "The Breakwater" (96), the swing of the water in the latter is well conveyed, but in both it is odd to observe a painter in this "progressive" exhibition practically going back to the colouring of Callcott. Next to the portrait of Bradlaugh, the most noticeable work in the exhibition is Mr. Christie's "Pied Piper of Hamelin" (102) which is a remarkable realisation of the legend, both in the weird figure of the Piper and the crowd of delighted children's faces which are seen in perspective behind him: the treatment of the rather hackneyed subject is quite new and original.

THE special point in the exhibition at the French Gallery, which opened on Monday, is the presence of a number of works by the clever Spanish painter, Professor Pradilla, who is talked of as a successor of Fortuny, but some of whose smaller works might dispose one to regard him as (*longo intervallo*) the Spanish Meissonier. Professor Pradilla does not, in fact, appear to have any very fixed style or aim in painting; his two large works in the exhibition, both from the history of the conquest of Granada, are not more than well-executed "historical paintings" of the regulation style; but there is considerable originality as well as brilliancy of execution in some of the smaller ones. Among these are "Happy Childhood" (33) and "A Summer's Morning" (48), for minute study and expression in small scale figures; "The Stations of the Cross in Holy Week" (38), a scene in a convent enclosure in Spain, fine both in colour and composition; and one or two sea studies (30 and 60, for instance). The studies of horses for the larger paintings are very good. Among the other works are various little bits by old favourites, Cazin, Van Marcke, Heilbuth, &c., some large paintings

* And forth we riden a litel more than pas,
Unto the watering of saint Thomas,
And there our host began his hors arrest.

CHAUCEER.

† Formerly Bridewell-alley; named after the Angel Inn, and the abode of Doggett, the comedian, *æd.* 1721. Shaw's court, next to the church, has been renamed New-alley, but is known as Coroner's-court.

by Heffner, in which the effects are more conventional and the water more metallic than ever; and a small painting by Kühn, "In the Studio" (25), an eighteenth-century scene with little point or meaning in the subject, but remarkable for its splendid qualities of texture and colour.

MR. MORTIMER MENPES'S collection of small oil studies in Spain have about the same kind of merit as his former collection from Japan; they show an eye for effects of colour and for seizing the picturesque elements of a group or a situation, but there is a good deal of sameness about them, and they give the impression of being rather easily produced. Moreover, we disapprove altogether of the indicating the roughness of wall-surfaces, &c., by roughness in relief in laying on the pigment—a most false practice in painting. Mr. Menpes appears to have made a hit with this kind of painting of impressions on a small scale, and has become to a certain extent a fashion; but this kind of thing will not go very far, and if the artist can (as we imagine) do something more serious than this, it will be well for him to aim at it without delay.

AN International "Exposition" of Medicine and Hygiene is announced to be held at Rome in September and October of this year, which is not however, we presume, to be confounded with the "Hygienic Congress" of which the last meeting took place in London. Among the subjects to be considered are apparatus and plans of buildings for technical research; service and apparatus for "assistance et sauvetage;" plans and models for the sanitation of towns; plans, models, and materials of hygienic construction, and plans and models for artisans' dwellings, &c. Those who require further information should apply to the office of the President, Professor Pagliani, Ministère de l'Intérieur, Rome.

THE *Northern Echo* of Monday last states that the Darlington Town Council have decided to erect new Municipal Buildings (including a Town Hall "measuring at least 100 ft. by 85 ft.") The designs are, it is stated, to be sent in to the Council by December 31, and the Municipal Buildings Committee will have the assistance of an architect of repute in deciding on their merits. The author of the selected best design will receive 150*l.*, which, however, "will be merged in his 5 per cent. commission on the total cost of the building should he be entrusted with the carrying out of the undertaking." The second and third best designs will be awarded premiums of 100*l.* and 50*l.* respectively. The local journal speaks of this "latest development of municipal enterprise" somewhat dubiously on the score of its want of expeditiousness, but consoles the ratepayers by telling them that they are not committed by it "to the payment for even a single brick, because after getting the designs and deciding on their merits the Council may postpone the work indefinitely." (The italics are ours.) We fear that the terms of the competition will not be very alluring to architects of repute.

THE PIER FOUNDATIONS OF THE TOWER BRIDGE.

A PAPER by Mr. E. W. Cruttwell on the Pier Foundations of the Tower Bridge was read a few days ago before the Institution of Civil Engineers. The paper only deals with the foundations of the bridge, and does not describe the superstructure which is still under construction. It will be remembered that besides the two abutments on each shore, there are two very massive piers in the river, and as these are similar in all respects, a description of one of them will be sufficient to convey a general idea of the work. The total load on the foundation of each pier is estimated at 68,700 tons, and as it was thought expedient to limit the pressure on the London clay, upon which

the piers rest, to 4 tons per square foot, the required area of each foundation is given by making the pier 204½ ft. long, by 100 ft. wide, thus forming, we believe, the largest pier of its kind in the world, and one which in area is equal to the four large circular piers of the Forth Bridge taken together.

It was essential to adopt caissons of some kind for laying the foundation, because timber cofferdams were specially prohibited by the Act of Parliament. Instead of sinking large caissons, extending right across the pier, a system of smaller ones around its circumference was adopted, each of which was 28 ft. square. The caissons at each end of the pier were, however, triangular in shape, forming the cutwaters.

As the Thames Conservancy insisted on a clear waterway of a width of 160 ft. always being maintained, it was impossible to build both of the foundations at the same time, as the clear space between them is only 170 ft., and a certain width of staging was required all round each pier for the cranes and other plant used in their construction. By adopting the small caisson system it was possible while building one pier, to be also laying the foundation for the shore side of the other, and still conform to the demands of the river authorities.

The caissons were in two portions, the lower part, or permanent caisson, being 19 ft. high, and the upper part, or temporary caisson, being 38 ft. high.

Each portion consisted of a single skin of wrought-iron plates, ¼ in. thick, at the bottom of the permanent caisson, and diminishing to ½ in. thick at the top of the temporary caisson. The sides of the caissons were stiffened by angles and timbers. The caissons were not sunk quite close to each other, but a space of 2½ ft. was allowed between each, and timber piles were afterwards driven between them, making this space watertight. The material excavated was London clay, covered in places by about a foot of ballast, and so compact that it was found the caissons could be pumped dry after they had been sunk some 5 ft. into it.

The excavation inside the caissons was done by Priestman's grabs, but divers were employed to remove the material from the sides, and shovel it to near the centre, where it could be lifted out by the grabs. The caissons were sunk to some 28 ft. below the bed of the river, and when they were only 6 ft. below, it was considered safe to pump them dry. Pumping was commenced a little before the time of half-ebb, and took about two hours, by which time the tide had fallen to within 3 ft. of low water. Navies were then sent down and worked for three hours filling skips, until the rise of the tide made it necessary to stop work. As the depth of sinking increased, the pumping was commenced earlier, so that more time for working at the excavation was obtained. The rate of sinking was 8 in. a day from the time it was commenced until the pumps were at work, but when the caissons could be pumped dry, and the material could be excavated by the navies, the daily rate increased to nearly 4 ft. The sides of the caissons forming the circumference of the pier were undercut 5 ft. beyond the cutting edge, and 7 ft. beneath it, to increase the area of the foundations, and after this was done the caissons were filled with concrete consisting of six of Thames ballast to one of Portland cement, which was lowered into place by skips, an interval of a day being generally allowed for each layer to set before proceeding further.

Over these permanent caissons the pier was faced with rough picked Cornish granite, in courses of 2 ft., and 2½ ft. in height, with a lining of brickwork, all the work being set in Portland cement mortar.

The erection of the first caisson was commenced in September, 1886, but it was not until January, 1890, that both piers were completed up to the limits of the contract, namely, 4 ft. above T. H. W. This long time was due chiefly to the fact above-mentioned, that the two piers could not be built simultaneously, and also to the many other hindrances caused by the limited size of the staging, and the restrictions imposed by the Thames Conservancy. The total cost of the two piers, including all temporary works, amounted to 111,122*l.*, equal to an average cost of 2*l.* 3*s.* 7*d.* per cubic yard. The engineer for the bridge is Mr. J. Wolfe Barry, and the work was carried out by Mr. John Jackson, contractor.

In our opinion the most important question in connexion with this work is whether four tons per square foot is not too small a load to allow on the London clay. There is no doubt that considering the complicated nature of the machinery placed on each pier to work the opening portions of the

bridge, it was necessary to provide against any subsidence, yet the load per square foot cannot but be regarded as very small, especially when it is remembered that no allowance has been made for the water and material displaced by the piers. In the Charing Cross bridge the pressure on the foundations is double the above amount, but even if the pressure allowed in the Tower Bridge piers was increased by only 25 per cent., the saving in the cost of the work would have been very considerable. Taking only the cost per cubic yard, it will occur to those who have had experience in this kind of work, that its cheapness is due to the immense size of the piers themselves, and must not be taken as indicating the cost of similar work on a smaller scale, where the plant used and general expenditure could not be spread over so large a cubic contents.

The work was, however, done cheaply, especially when it is considered the long time it took, and the many delays met with in the execution of the contract.

THE MAUSOLEUM AND ITS SCULPTURES.

DR. A. S. MURRAY, Keeper of the Greek and Roman Antiquities in the British Museum, recently delivered three lectures, on "The Sculptures of the Mausoleum," to the students of the Royal Academy. He commenced the first lecture by incidentally pointing out that in mediæval history a conspicuous part was played in the south-west corner of Asia Minor. It was there in particular that the Knights of St. John, after their expulsion from Jerusalem, erected a series of fortresses of immense strength. Establishing themselves first in the adjacent island of Rhodes, they subsequently, in 1402, obtained the permission of the Sultan to build a new castle on the site of the ancient Halicarnassus, then and now called Budrum. That was the Castle of St. Peter, a place of great strength, still jealously guarded and maintained by the Turks. Its erection was carried out by a German knight, Schlegelholz, and he no doubt availed himself freely of the masonry which lay abundantly to his hand in the town of Halicarnassus, and particularly in the ruins of the famous Mausoleum. At all events we knew that when, about a century later, repairs and additions were in progress at the castle, it was to the ruins of the Mausoleum that the Knights turned for material. A sixteenth century French writer, named Guichard, quoted by Sir Charles Newton, gave an interesting description of the way in which the steps and other portions of the Mausoleum were despoiled for the repair of the castle. The writer referred to spoke of the discovery and exploration of the interior of the Mausoleum by those who were thus in quest of building stone, who found themselves in a "fine large square apartment, ornamented all round with columns of marble, with their bases, capitals, architraves, frieze, and cornices, engraved and sculptured in half-relief."

"The space between the columns was lined with slabs and bands of marble of different colours, ornamented with mouldings and sculptures in harmony with the rest of the work, and inserted in the white ground of the wall, where battle scenes were represented sculptured in relief. Having at first admired these works, and entertained their fancy with the singularity of the sculpture, they pulled it to pieces and broke up the whole of it, applying it to the same purpose as the rest. Besides this apartment, they found afterwards a very low door, which led into another apartment serving as an ante-chamber, where was a sepulchre with its vase and helmet of white marble, very beautiful and of marvellous lustre. This sepulchre, for want of time, they did not open, the retreat having already sounded. The day after, when they returned, they found the tomb opened and the earth all round strewn with fragments of cloth of gold, and spangles of the same material, which made them suppose that the pirates who hovered along this coast, having some inkling of what had been discovered, had visited the place during the night and had removed the lid of the sepulchre. It is supposed that they discovered in it much treasure. It was thus that this magnificent tomb, which ranked among the seven wonders of the world, after having escaped the fury of the barbarians, was discovered and destroyed to repair the Castle of St. Peter, by the knights of Rhodes, who immediately after, this were driven completely out of Asia by the Turks."

It was believed that the slabs mentioned in that account as having been sculptured with battle-scenes in relief were the thirteen slabs of the frieze which were afterwards found let into the walls of the castle in a decorative manner, and if that were so it spoke so far for the good taste of the knights that they not only rescued these sculptures, but placed them where they would command attention. As time went on, an occasional traveller made his way into the Castle of Budrum, and mentioned the existence of these reliefs. At last, Dalton made drawings of them, and published the same in his book of "Views of Greece and Egypt" between 1751-1781. The reliefs were

thus brought before the learned world, and their importance recognised in a general way. In 1846 Lord Stratford de Redcliffe, who was then Ambassador at Constantinople, and a man of great influence, persuaded the Sultan to allow him to remove the thirteen slabs and present them to the British Museum. On the arrival of the slabs, Mr., now Sir Charles Newton, set himself to see whether the general belief that the slabs belonged to the Mausoleum could be proved, or at least reasonably confirmed. He published a memoir on the subject, accompanied by a plate showing a conjectural restoration of the Mausoleum by Professor Cockerell. The effect of renewed study and speculation on the subject was to create a desire, on the part of Sir Charles Newton, to explore what he believed to be the site of the Mausoleum. Having obtained the aid of the Government of the day, he set out in 1856. For a time his excavations were fruitless, so much so that he had fixed a particular day on which he would abandon the task should he not in the meantime strike on the right track. The morning of that day arrived, there remained only a few yards of a trench to be cut, and fortunately the cutting of it led to the enclosure wall of the Mausoleum. Thenceforward the work of clearing the site went on apace. The destruction was found to be very thorough. It had been begun apparently by an earthquake, which had brought down the building with a crash. The Knights of St. John had helped themselves to its finely-worked marble blocks. The ships of the Venetians and Genoese were constantly in those waters, and probably they had carried away much more than the single slab of frieze which we obtained from Genoa in 1866. Nevertheless, there still remained a rich harvest of sculpture and architectural members for Sir Charles Newton to rescue and bring to London. Having thus given a brief outline of the modern history of the Mausoleum, the lecturer turned to ancient times, and referred to Mausolus, Prince of Caria, after whom the Mausoleum was named—the Mausoleum being so splendid that the Romans, when they erected great and costly tombs to their Emperors, designated them "Mausolea." Thus, in Rome, the building, now converted into a fortress, known as the Castle of St. Angelo, was originally called the Mausoleum of Hadrian. When Mausolus transferred his seat of government from the inland town of Mylasa to Halicarnassus, he marked his advent by building a new palace, of which we were told the interesting fact that while the decorative parts of the building were executed in Proconnesian marble, the walls themselves were made of brick, over which was a coating of plaster polished till it had the appearance of glass; the writer who recorded that circumstance added that the use of brick was not due to the poverty of the king, for he had become rich from the numerous taxes imposed by him on his people. By all accounts Mausolus was an unscrupulous in the burdens he placed on his subjects. We read of his having alarmed the people of Mylasa, his old capital, by announcing the probability of a war, and asking for money for a new wall of defence. They subscribed the money and sent it to him, but he never built the wall. That, and some other incidents which had been handed down of a more or less mean character, suggested that Mausolus had a good deal of the old Carian blood in his veins. His long hair and short beard reminded us of the ancient type of the Gauls, who, in their seats in Asia Minor were almost neighbours of the Carians. At the same time, his face seemed to the lecturer to have become strongly Hellenised, and in a measure incongruous with the manner of wearing the hair and beard which was probably in strict accordance with a national custom among the Carians as among the Gauls. A comparison of the fine head of a barbarian chief, in the British Museum, with the head of Mausolus, would show the difference which had been brought about by contact with the Greeks. When Mausolus died in 353 B.C. it was certain that any monument erected over his tomb would find in so rich and populous a city as Halicarnassus an abundance of spectators well skilled to judge in matters of art and architecture. Without beating these circumstances in mind, it might be thought strange that Greek sculptors of the foremost rank like Scopas should have left the more natural scene of their labours in Greece itself, at the invitation of a semi-barbarous queen, to decorate her husband's tomb. The result of their labours became, as we knew, a household word in Greece and throughout the Roman Empire, the Mausoleum being counted as one of the seven wonders of the ancient world. It was a curious idea that of the seven wonders;

it was not an idea that dated from good Greek times; it was a later and more or less degenerate conception, such as suited writers like Philo of Byzantium. From one writer to another the seven wonders varied a good deal, but generally they were:—(1) the hanging gardens of Babylon, (2) the walls which Semiramis constructed round Babylon, (3) the pyramids of Memphis, (4) the Colossus of Rhodes, (5) the tomb of Mausolus, (6) the Temple of Diana at Ephesus, and (7) the gold and ivory statue of Zeus at Olympia. Though the references to the Mausoleum in late Greek and Latin writers were frequent, there was practically only one of them that gave a useful description, and even that was very defective. Pliny, in speaking of the works of the sculptor Scopas, said:—

"In the same period Scopas had as rivals Bryaxis, Timotheos, and Leochares, whom I would mention together, as they were associated in the work of decorating the Mausoleum with sculpture. On the south and north the Mausoleum extends 63 ft., being shorter in the fronts. Its entire circumference is 411 ft. It is raised in height 25 cubits (equal to 37 ft. 6 in.). Round it are thirty-six columns; the part surrounding the tomb was called the *pteron*. The sculpture on the east side was by Scopas, on the north by Bryaxis, on the south by Timotheos, on the west by Leochares. Before these artists had terminated their labours Queen Artemisia died, but they did not cease from their work till it was completely finished, regarding it as a monument of their own fame and art. To this day it is a matter of dispute which of these masterpieces is the finest. With these sculptors a fifth artist was associated. For above the *pteron* a pyramid equalled the lower part in height, connecting by twenty-four steps a pedestal like that of a *meta* (or goal in the circus race). On the summit is a marble chariot with four horses, the work of Pythios. The addition of this made the height of the entire work 140 ft."

So far Pliny, as translated by Sir Charles Newton. Now there would be nothing extraordinary in a height of 140 ft. from a modern point of view, in a building with a high pyramidal roof, but there were many critics who objected that the chariot group could not have been visible at such a height; that the sculptures of the chariot group were finished with much detail; that all that detail would have been lost; that the statues of Mausolus and Artemisia (who were supposed to have stood in the chariot) would have been invisible; and so on. But why not dispute the measurement of 140 ft. which Pliny gave for the entire height, especially when another ancient writer gave the height at about half that figure? The difficulty was that if we once began to alter one of a set of calculations in an ancient writer, we had to make sure that it was the only one which required emendation, and that the context itself pointed the way to the necessary change. So far as he (the lecturer) knew, that principle had only been applied once in a satisfactory manner to that passage of Pliny, and that was a year or two ago by a German archaeologist, whose view of the question was as follows:—Pliny stated first the height of the order (or *pteron*, as he called it) to be 25 cubits. He then went on to speak of the sculptures who had been employed in decorating that part of the building, after which he returned to the question of height, and said that the roof was in the form of a pyramid equal in height to the lower portion of the building. He must therefore have mentally calculated that the height of the building, so far, was 50 cubits (75 ft.). But subsequently, when he came to speak of the chariot on the top of the pyramid, he gave the entire height as 140 ft., thus leaving 65 ft. to be made up somehow without any indication on his part as to what it consisted of. It was argued that Pliny, having previously doubled in his mind the height of the order, had again, by a mistake, redoubled it. Had he meant us to understand, as most modern critics had understood him, that there was also a lofty podium or basement of about 65 ft. on which the whole structure was raised, he would have said, or ought to have said, if he wished to be grammatical, that the pyramid was equal in height, not to the lower part of the building, but to the middle part. That was a view which commended itself the more because, as already mentioned, another ancient statement put the height of the Mausoleum at 80 ft., which was sufficiently close for reasonable purposes. Of course it might be replied that a lofty basement, if it were undecorated, need not have been taken into account by the second writer, or even by Pliny, when he was giving the dimensions of the order of the pyramid, while, at the same time, Pliny might have taken it into account when summing-up the entire height of the monument. That was all possible enough as speculation; but it was to be remembered that in excavating the site no evidence was found of that immense basement, which surely would have stood after all else had fallen in ruins. The lecturer said it was not for him to go into architectural questions,

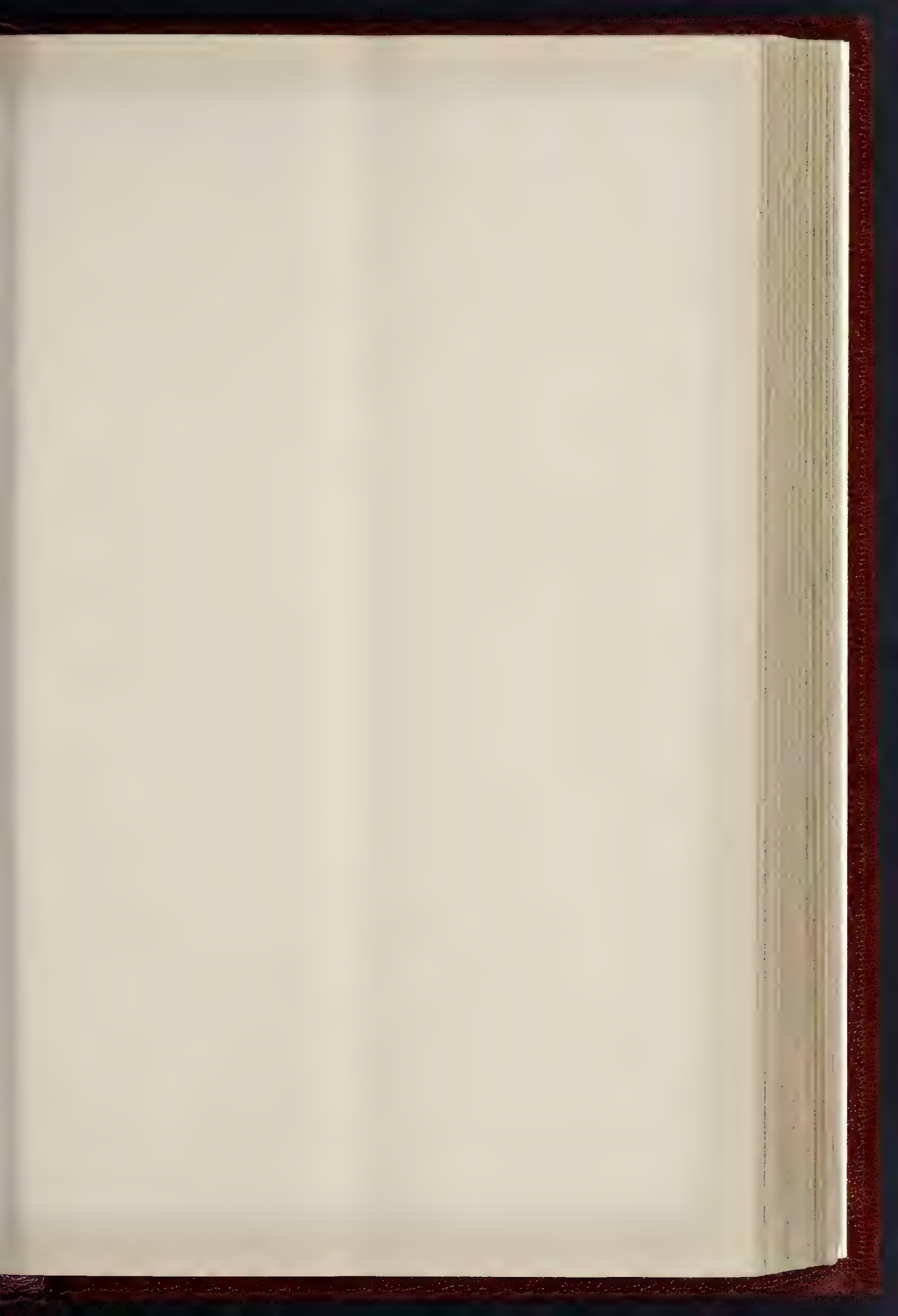
but he thought that surely a basement of the enormous height of 65 ft. must be wrong. Those famous Greek sculptors, who completed their work at their own expense, would hardly have been willing to do so if the fruits of their labours—such, for instance, as those friezes in comparatively low relief—were placed high up on a building which itself stood on an inaccessible podium of 65 ft. The lecturer would not say that there might not have been a fairly high podium: that seemed to have been a characteristic feature of the architecture of the locality; and, of course, there would be less difficulty if we could suppose that on the podium itself were placed the work of the four famous sculptors, much in the manner of the reliefs on the high basement of the Nereid monument from the same quarter of the world. It had, indeed, been suggested that the surviving friezes of the Mausoleum might have been thus placed on the podium. But against that it was quite plain that the Amazon frieze at least could have been nothing but the frieze of the order; the mouldings along the top and bottom of it were conclusive on that point, and even if it were not so, the suggestion would be in flat contradiction to the statement of Pliny that the four sculptors were employed on the *pteron* or colonnade, not to mention his total ignoring of any basement. In the opinion of the lecturer, the probability was great that the modern idea of a podium 65 ft. high was not a reasonable explanation in the circumstances, but that conclusion had not been arrived at solely in deference to the German view, which diminished the entire height of the building by one-half, and thus brought down the sculptures,—especially the chariot group,—to nearly the ordinary range of vision. So far as the chariot-group was concerned, the lecturer saw no absolute impossibility in the height of 140 ft., if that was necessary. The Greeks did not expect everything they did to be seen and criticised, as was plainly shown by the Parthenon sculptures, and many another piece of first-rate work. In conclusion, the lecturer discussed the question why Queen Artemisia chose a high pyramidal roof for the tomb of her husband. He thought that the idea of the tomb was that of a pyre, derived from the funeral pyres of Babylon and Persia. Diodorus Siculus (xvii., 141) described the monumental pyre erected by Alexander the Great to one of his greatest generals, Hephæstion; and what appeared to be a similar monument, that of Sardanapalus was represented on a coin of Tarsus struck in the time of Demetrius II., B.C. 130–125. Both these structures appeared to have had pyramidal roofs. It was probable that Artemisia and the architects whom she employed for the Mausoleum recognised a Persian custom in giving a high pyramidal roof to the monument of a man who, though a prince in his own right, was also a Persian governor. The high pyramidal roof was an idea utterly foreign to the Greek mind. We could imagine that the Greek architects employed on the Mausoleum had found in the roof which had thus been prescribed for them a problem not at all to their liking. How far they had succeeded in obtaining an artistic proportion between it and the lower part of the building we could not yet say; but we knew that they took great pains in seeing that the masonry of the roof was as perfect as it could be made. Each block of marble was carefully fitted into the other so that the whole mass would hold well together, and yet be as light as possible. Every precaution was taken to protect the joints of the stones from the effects of rain and weather. We had many of these blocks in the British Museum. They afforded testimony to the skill of Greek workmen, although the roof altogether was an example of what the Greeks do not seem to have admired.

In his second lecture, Dr. Murray first of all proceeded to discuss the question of the causes which led to the selection of the chariot-group to surmount the pyramidal roof of the Mausoleum. There was, he said, a Roman coin on which was figured the funeral pyre of the Empress Julia Domna. On the summit was a flaming fire. That was a representation of an actual fact which could not be expected to satisfy, except for once in a way, a people of artistic taste. Even the late Romans, who might not have been models of artistic taste, usually required a symbol instead of a flaming fire. As an example, there was in the British Museum an ivory diptych, which represents the apotheosis of Romulus, son of the Emperor Maxentius, who died A.D. 308 when Consul. In the uppermost field were the gods of Olympus, amid clouds, and partly enclosed by the zodiac, waiting the arrival of Romulus, who was being carried aloft to them by two winged

genii. In the middle there was a small genius driving upwards a minute chariot of four horses and accompanied by two eagles. Immediately below them was a funeral pyre, from which the eagles had been let loose. In the lowermost field we saw Romulus himself seated in a car, which was in the form of a temple drawn by elephants. Now it sometimes happened that rude works of art such as the diptych in question exhibited a curious combination of actual present-day fact and of artistic symbols which had been prevalent many centuries before. The latter element was conspicuous in the pair of genii who bore up Romulus and the gods. They corresponded admirably with the pair of winged figures whom we frequently saw on Greek vases of the best period carrying away the body of Sarpedon. Both genii had small wings springing from their heads like our famous bronze head of Sleep. We might therefore identify them as Sleep and Death, and recognise in the ivory diptych an instance of how a piece of Greek symbolism which had been common in the fifth century B.C. recurred again in the fourth century A.D. Side by side with the artistic symbolising of the transport of an Emperor to the gods, we had, on the ivory, a practical record of how the body of a deceased prince was conveyed in a stately car to be burned on the pyre, and how his genius was supposed to escape in a chariot up to the gods. The ordinary usage of the Romans was to surmount the pyre of an Emperor with a representation of himself in his chariot, and the question was whether the chariot so placed was understood to be the chariot in which he was to rise to the gods, or the chariot in which his body was conveyed to the pyre. There was another Roman coin showing the funeral pyre of Antoninus Pius. On the top of the pyre the Emperor was represented standing in a quadriga and holding a palm-branch, like a victor in the chariot-race. Again, there was a coin showing the pyre of the Empress Faustina, this pyre being surmounted by a *biga*, or chariot of two horses. The usual explanation was that these chariots represented the apotheosis or translation of an emperor to the gods; but in the light of the ivory diptych that explanation was at least questionable, because there we saw Romulus, still in bodily form and substance, borne along in a chariot, while in mid-air the genius was seen driving up to the gods, and lastly the gods received the emperor. Whether or not it was intended that the minute chariot in the middle scene of the diptych should represent the vanishing pomp of the emperor, it was certain that in other instances of apotheosis it was usual to see the emperor ascending on the back of an eagle, a winged horse, or a winged genius, but never in a chariot. It might, therefore, be not unfairly concluded that on the coins in question the chariot surmounting the pyre was intended to represent the chariot in which the body of the emperor had been conducted in pomp to the funeral. Among the Romans the idea of placing a chariot on a height had long been familiar. We saw it on their triumphal arches and their city gates. The famous chariot which was placed on the apex of the Temple of Jupiter Capitolinus, in the early part of the sixth century B.C., was a case in point. In Greece, on the other hand, there were no instances of the erection of chariots on pyres, arches, gates, or temples, with possibly one exception. Pausanias spoke of having seen, at a little place called Celee, in the district of Corinth, a building which was known as the Anactoron. He gave no explanation of the name or of the character of the building, but he said of it that "towards the roof was placed a chariot, which they say was the chariot of Pelops." What could he have meant by "towards the roof?" The lecturer was of opinion that the chariot mentioned by Pausanias must have been outside the roof and on the top of it. Proceeding to speak of the Mausoleum chariot itself, the lecturer observed that if an archaeologist without previous knowledge or prejudice were asked to explain it, he would unhesitatingly say that it was a marriage-chariot. He would argue that the only analogy for such a group in Greek art was what we saw so frequently on the archaic painted vases, where the gods were represented as about to start in a wedding procession—either a wedding amongst themselves or between some of their favourites. Artemisia could not have failed to be familiar with an idea which had been long current in Greek art; and it must be allowed that it was at least singular that the chariot group which she caused to be sculptured for the top of her husband's tomb should have no analogy among the remains of Greek art

except a wedding chariot. When her husband died Artemisia was plunged into inconsolable grief, and apparently one of her first cares was to erect over his tomb the splendid monument of which we now had the remains. She invited the foremost artists of Greece, and exhausted her resources in what must have been an enormous expenditure. In these circumstances no artistic symbol could have better expressed her feelings than the chariot, which recalled at every moment the happiness of her married life. At the same time, we must not, so to speak, put that particular idea into her head without some sanction. At Greek funerals in the heroic age, as also on great occasions in historical times, there were races of chariots and athletic games which to our minds seemed more appropriate to marriage ceremonies. Numerous Athenian tombstones presented us with sculptured scenes which looked more like a reunion in Elysium than a parting on earth. No wonder that they had often been supposed to represent a meeting, in the after-world, of spouses who had been parted on earth. The lecturer said he readily allowed that these things did not prove so satisfactorily as could be wished that the idea of Artemisia, in making the roof of her husband's monument in the shape of a pyre and placing on it a chariot containing figures of Mausolus and herself, was to recall her actual marriage and to symbolise her belief in a reunion in Elysium; yet, taking all the facts into consideration, that seemed the best interpretation. The lecturer next proceeded to explain the view that had been current hitherto, viz., that the chariot represented the apotheosis of Mausolus. He said we happened to know what an apotheosis was thought to be like by the Greeks contemporary with Artemisia. As an example, there was a vase on which we saw Herakles being driven upwards in a chariot while his body was being consumed in the fire below. In that and similar instances the chariot was in the act of ascending rapidly, but that was certainly not the case on the Mausoleum; there, the horses were not in motion, as was clearly shown by the remains of the horses, and by the fact that there was no movement in the drapery of the statues of Mausolus and Artemisia. On the assumption that the chariot was in motion it had been argued that the figures could not have belonged to the chariot. In support of that view it had also been contended that the figures could not have belonged to the chariot because they were much smaller in scale than the horses. Certainly the horses were very large. But if we were to judge of the scale of the statues in reference to that of the horses, we must not make vague and useless comparisons with the Parthenon frieze, where the proportions of men accompanying horses were out of all scale. There one might see a youth on horseback, and beside him apparently his twin brother on foot; yet the latter, if looked at more closely, and not only in passing as he would be found to be quite a giant in his form and proportions. It was one of the delights of the Parthenon frieze to watch those changes of scale in the human proportions, and to see how they were forced upon the sculptor in order to avoid the realistic effect which would have resulted had he made the youth on foot of the same proportions as his brother on horseback. There was, in fact, only one certain test of scale which the lecturer could see for the Mausoleum group, and that was to measure the head of Mausolus against the head of the horse. The head of Mausolus was 15 in. in height, that of the horse 41 in. The head of the Theseus, in the Parthenon, was 12 in. high, the head of the horse 31½ in. high. The head of an average man measured about 9 in., and the head of the average horse about 24 in. The result was that while the head of the Theseus was a little too large for the horse—as would be expected from his being nearer the centre of the pediment, the head of Mausolus was nearly, to the same extent, too small; but it must be remembered that the horses in Asia Minor were of a larger breed than those of Greece proper. It should also be remembered that the two statues of Mausolus and Artemisia were found in a separate heap of ruins along with the horses and a large number of the steps of the pyramid piled one on another. That particular heap of ruins, says Sir Charles Newton, "had evidently never been disturbed since they first fell from the building;" he adds, "it is evident that an earthquake or equivalent force must have rent asunder the pyramid, hurling a portion of the chariot group, and of the steps on which it rested, over the marble walls." The statue of Mausolus had been put together from

more than sixty fragments found in that heap. Now that the remains of the chariot group had been placed together in what appeared to be their original positions the two statues seemed to have gained by being ranged side by side: in attitude one responded to the other in a manner which suggested that they had been composed with that intention. An examination of the detailed treatment of the drapery, &c., showed so close a similarity between the two statues that one was led to conclude that they were carried out by one were the conception of one artist. It had been suggested that the folds of these draperies were too minute and detailed for statues that were to stand at a great height; but surely those were matters on which an artist might be left free to decide for himself. It was all very well to say that minute details of drapery would be lost up at a great height, even in the clear atmosphere of Greece or Asia Minor. If it were asked what could be put in the place of the details, it was easy to reply "a broad and simple treatment;" but would not "a broad and simple treatment" equally suffer from being placed at a great height? The sculptures of the Temple of Zeus, at Olympia, were broad and simple enough, in all conscience, not to say negligent; while those of the Parthenon were exactly in the opposite case. Who, then, should decide when the Greeks themselves did not agree? Then it was argued that in the horses there was a breadth and simplicity which was out of harmony with the statues behind them. But even if that were strictly accurate, it could be defended on good grounds. As a matter of fact, minuteness of detail was not altogether abandoned in the horses. A bronze bridle was found on the head of one of the horses, and the bridle was extremely slight. Being of bronze it might, perhaps, have been visible at some distance when its gliter was new, but that would not last long. It was clearly one of those minor details which the sculptor thought due to his art, whether it could be seen or not. That sculptor, as we knew, was Pythios, one of the architects of the building. Dr. Murray, in his third and concluding lecture, endeavoured to identify the other sculptures which had survived with the other artists whose names had been associated with the Mausoleum from antiquity to the present day. The four sculptors who were employed, each on a separate side of the Mausoleum, were Scopas, Bryaxis, Leochares, and Timotheos. Of these, the name that had come down to us with the most reputation was that of Scopas. The three others survived him a considerable period, and in the natural order of things, we might conclude that they had joined him at Halicarnassus as comparatively young men, possibly his pupils. It was a little surprising to find Pliny describing them as rivals of Scopas. Each of them worked on a different side of the building, and it was of interest to try and discover whether the undoubted differences of style which were to be seen among the remains of the Mausoleum answered to what was ascertainable about the several artists. The lecturer confined his attention for the most part to the sculptured friezes, because they alone presented a continuity of subject which could be supposed to stretch round the four sides of the building. There were reasons for supposing that the Amazon frieze, which Sir Charles Newton, at the time of its discovery, was inclined to attribute to Scopas, was not wholly his work, or if it was all his, he was not seen at his best in it. The chariot frieze, which had been interpreted as representing the races which are supposed to have been held at the funeral of Mausolus, was very probably by Scopas. With regard to Bryaxis, ancient writers told us of a number of his works, but these did not include a monument in Athens, which had lately been discovered there in the course of excavations necessary for a public improvement. The monument in question consisted of a square pedestal on which stood a pillar, surmounted probably by a tripod. On the front of the pedestal was an inscription stating that the sculptor of the monument had been Bryaxis. On each of the three other sides there was, in relief, a mounted horseman with a tripod beside him to indicate a prize which he had obtained for having discharged the functions of a *phylarch*, as the inscription also testified. These three horsemen were a father and two sons, who in their day had taught the Athenian youth to ride well and gracefully in public processions, as at the Panathenaic festival. They were thus the successors of the men who had trained those youths whom we saw riding in the Parthenon frieze. Up to now we have no means of judging of these newly-discovered Bryaxis reliefs, and whether they would enable us to

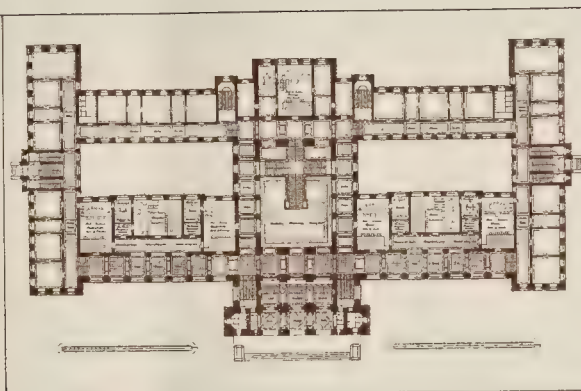


THE NEW IMPERIAL LAW COURTS FOR TOKIO.

DESIGN AS FINALLY ACCEPTED.

MESSRS ENDE & BOECKMANN, ARCHITECTS.





NO. PHOTOGRAPH BY A. & C. H. HARRIS & SONS, LONDON, AND F. C.

sign to him any definite part of the existing Mausoleum sculptures; but it was stated that the person who had been obtained of late years as the sculptor of the Mausoleum frieze. There was reason for thinking that he was probably a pupil of Scopas, and that on the Mausoleum he had followed his master's manner so closely that it would be difficult to distinguish between them, even if we had secured specimens from the hands of both before they died. Of Leochares so little was known that it was impossible to gather any definite idea of his style. There remained only Timotheos, concerning whom certain facts had been obtained of late years as to his part in the sculpture of a temple at Epidauros. If something of his style could be traced from the ruins of that temple, we were bound to consider whether that same style could be traced on the Mausoleum. In an inscription found at Epidauros he was mentioned as the sculptor of the acroteria of one of the pediments, and of certain reliefs appertaining to the Temple of Asklepios there. Amongst the sculptures found in the ruins of the temple were three Victories, a mounted Amazon, and a Nereid (as it would seem) sitting sideways on a horse. The three Victories, it had been ascertained, belonged to the acroteria of the pediments, and we might therefore claim one at least of them as the work of Timotheos. With regard to the Nereid, there was a probability that it was also by him, seeing that it had originally stood on one of the lower angles of the west pediment. The mounted Amazon was in a different case, because, if the current opinion was right, that figure was part of a large composition within the west pediment, and because another artist than Timotheos was assigned in the inscription to that composition. Nevertheless it seemed hardly possible to distinguish, in point of style, between the Amazon, the Nereid, and the Victory. That being so, and one of them assuredly the work of Timotheos, we might not unfairly choose for comparison with the Mausoleum frieze whichever suited us best, and that was the Amazon, on account of the striking similarity of subject. The drapery, with its thin material broken up into slight folds with flat surfaces and sharp edges, presented the same effect as the work in the Mausoleum, and there were other resemblances, though there was a marked difference in the way of sitting the horse between the Amazon of Epidauros and the Scopas labls of the Mausoleum. In conclusion, the sculptor touched upon a number of other interesting points incidentally arising out of his subject.

COMPETITIONS.

NENAGH CHURCH.—Competition designs were invited for this church from four architects, of whom two responded, sending in designs both of which received high commendation from Mr. Phos. Drew, the assessor, who eventually selected the one which was found to be by Mr. Walter Joolin, of Dublin, who will carry out the work. A premium of fifty guineas was given to Mr. J. C. Ashlin, R.H.A., the author of the other design. 20,000*l.* is to be expended on the building.

COUNTY COUNCIL OFFICES, WAKEFIELD.—The Council of the Corporation for County Council Offices for the West Riding of Yorkshire has just been made known as follows:—First place, Messrs. Gibson & Russell, London; second, Messrs. Cooksey & Cox, London; third, Messrs. Simpson & Richardson, Wakefield.

THE LONDON GEOLOGICAL FIELD CLASS will commence their Saturday afternoon summer excursions on the 20th inst. They are conducted by Professor H. G. Seeley, F.R.S.

THE INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.—The fifteenth voluntary pass examination of candidates for the offices of Municipal Engineer and Local Board Surveyor, carried out under the auspices of this association, was held at the Institution of Civil Engineers, Great George-street, Westminster, on Friday and Saturday, April 7 and 8. The whole of the first day was occupied in the written portion of the examination, while the *viva voce* took up the greater part of the second day. Nineteen candidates entered for the examination. The examiners were:—1. Municipal Engineering, H. P. Boulnois, M.Inst.C.E. (Past President); 2. Building Construction, J. Lobley, M.Inst.C.E. (Past President); 3. Sanitary Science, A. M. Fowle, M.Inst.C.E.; 4. Public Health and Rivers Pollution Acts, C. Jones, M.Inst.C.E. (Past President). The next examination will be held at Liverpool in October next.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—On Saturday, April 8, the Edinburgh Architectural Association visited Whitekirk, Prestonkirk, and Tynninghame, in East Lothian, under the leadership of Mr. Hippolyte J. Blanc, A.R.S.A. Favoured by excellent weather, this, the fourth visit of the current session, was well attended. East Lothian is proverbial for its fertility and finely-timbered stretches of fair scenery, in the midst of which are some of the most interesting architectural remains in Scotland. Prestonkirk, first visited, dates its ecclesiastical history from the time of the Culdees, its site being one of a series of missionary stations planted in the East of Scotland. The most interesting part of the existing church is the chancel, an excellent example of Early English work. The three well-proportioned double-played lancet windows of the east end are all of equal height, separated from each other by chamfered buttresses. The angles are flanked by double buttresses; a played base-course, of unusual projection, receives the buttresses, which are bold and good, but now overgrown by dense ivy. Lancet windows light the chancel both to north and south; to the north, however, they are partially blocked up, the chancel being divided into a tomb for the Smeaton family below, and a room, approached by an outside stair, above. A door of Perpendicular detail now forms an entrance to the tomb. The interior of this interesting portion of the church, unfortunately, could not be examined; the nave is devoid of interest, having most unhappily been "rebuilt" by the local mason early in the present century, a "rebuilt" which, to judge from a fine groining boss and other rich fragments now lying in the "manse" garden adjacent must have entailed havoc and destruction much to be deplored. The tower at the west end is of much later date than the church, and more civic than ecclesiastical in feeling, with round-headed windows and ogival roof; it is a good specimen of a type common in the East of Scotland. Whitekirk, next visited, lies about eight miles due north-east of Prestonkirk; it also owes its origin to Culdee influence, its foundation being ascribed to a holy well (now disappeared) of miraculous healing properties. So famous was the spot that in 1413 some 15,000 pilgrims are said to have visited it. A tithe-barn still stands to the north of the church as evidence of former wealth. The church is cruciform in plan; the eastern portion belongs to the year 1439, the prosperous period of the church. Though without the grace of Prestonkirk, it is exceedingly interesting, and in one respect unique. The east-end rises to the eaves-level an unbroken mass of masonry, without buttress or window; at the eaves-level it is weathered back, with crow-stepped gable-sides, and in the triangle thus formed is inserted a circular window with quatrefoil tracery, probably inserted later. On the north and south, massive buttresses of unusual breadth sustain the roof, which is a pointed barrel vault without ribs of any kind. Over the crossing is a tower, not quite square in plan, with a projecting parapet carried on corbels, but rounded off above the square angles of the tower itself; the roof is a straight-sided pyramid, slated. The belfry stage, now used as a pigeon-loft, is lit by pointed double lights rather crudely treated, below which are square openings into the originally much steeper roof. The north transept is old, and contains the Haddington pew; the south transept is modern, by Dr. R. Rowand Anderson, and affords accommodation for organ and choir, which, in Presbyterian ritual, do not occupy the chancel. The nave, which was built after the eastern portion, does not offer any special interest architecturally; but a very good fourteenth-century porch, with angle buttresses, has been thrown forward to the south, not structurally connected with the main building, in front of the square-headed south door. This porch, which is sadly decayed, is again a pointed barrel vault, but has ribs applied to it, as may be seen in St. Giles's Cathedral, Edinburgh, and elsewhere in Scotland; the practice would seem to indicate a certain want of skill or frankness in treating Gothic roofing. Two points of considerable antiquarian interest are to be noted in Whitekirk Church. On the south-west pier of the crossing arches, facing eastward, is a singular recess, about 18 in. square, and rebated on the face, as for a door. This, it has been suggested, was a "leper-window," an explanation, however, that suggests a difficulty, in that it would have been better placed in the transept wall adjoining than in the pier. Further, immediately above the south door, are two small

lozenge-shaped openings, now built up; and two similar apertures, some 12 in. square (also built up), can be made out on either side of a niche long since defaced, above the entrance to the porch. These are commonly supposed to have contained lamps, as the niche would doubtless contain a statue of the Virgin, the church being dedicated to St. Mary. An explanation, however, perhaps more satisfactory is that the pier recess contained some relic or treasure of the church, which was exhibited to the pilgrims at festival times on a sort of scaffold or wooden structure over the entrance doorway; the small built-up holes referred to would thus be sockets for the wooden scaffold, the inner ones being built up when the porch was added. Tynninghame House, the seat of the Earl of Haddington, was subsequently visited, the Association being most kindly received and conducted over it by the noble owner. The building, which was extensively added to about 1824 in the pseudo-Elizabethan style, is chiefly interesting for its wonderful situation in the famous Tynninghame Woods, commanding very lovely views of the Tyne, and even of the sea. It contains a rare collection of art treasures in portraiture, including examples of Vandyck, Reynolds, Jamesone, and Raeburn. Of great interest to the ecclesiologist are the two sets of pewter communion-flagons from Whitekirk and Prestonkirk, one dated 1708; a pair of old collection plates; and a handbell of 1665, formerly used in the parish for funerals. Within the grounds are the ruins of Tynninghame Priory, a Norman building of great richness, closely resembling the churches of Leuchars and Dalmeny. Two wall shafts remaining *in situ* show that the choir was apsidal; two very rich Norman arches also remain, occupying a similar position to those still existing at Dalmeny. The south shaft of the eastern arch are deeply scored, owing to an ancient practice of men of arms on the eve of battle thus invoking a blessing on their weapons. Considerable remains of the old Norman work, including many interesting fragments, are still to be traced, built into the Tynninghame stables.

GLASGOW INSTITUTE OF ARCHITECTS.—At the last quarterly general meeting of the Glasgow Institute of Architects, the President, Mr. W. Forrest Salmon, brought up the following recommendation from the Council of the Institute regarding the proposed by-laws under the Building Regulations Act, 1892, viz., that the Institute withdraw its opposition to the by-laws on the understanding that by-law No. 73 would be struck out, and that it was the intention of the Town Council to prepare in a year or two a Building Act for Glasgow more thorough in character than the existing Acts, and to consult with the Institute when framing the clauses. On the motion of the President, the Institute adopted the recommendation.

GLASGOW ARCHITECTURAL ASSOCIATION.—The usual monthly meeting of this Association was held in the Rooms, 114, West Campbell-street, on the 4th inst., Mr. A. N. Paterson, vice-President, in the chair. Mr. A. McGibbon, President, read a paper entitled "Some Minor Practical Building Details." Reference was made to many different points of construction in connexion with masonry, carpentry and joinery, iron work, &c. The paper was illustrated by diagrams, and at the close a hearty vote of thanks was awarded the lecturer.

THE MEMBERS' SOIRÉE, ARCHITECTURAL ASSOCIATION, has, we learn from *A. A. Notes*, been unavoidably postponed from April 14 to Wednesday, May 17.

INSTITUTION OF MECHANICAL ENGINEERS.—An ordinary general meeting of this institution will be held on Thursday evening next, April 20, and Friday evening, April 21, at 25, Great George-street, Westminster, by kind permission of the Council of the Institution of Civil Engineers. The chair will be taken at 7.30 p.m. on each evening, by the President, Dr. William Anderson, F.R.S. Among the papers to be read and discussed will be one "On the Second Report to the Alloys Research Committee," by Professor W. C. Roberts-Austen, C.B., F.R.S. In connexion with this subject, Mr. William Dean, Locomotive Superintendent of the Great Western Railway, will read a paper on "Tensile Tests and Chemical Analyses of Copper Plates from Fire-boxes of Locomotives on the Great Western Railway."

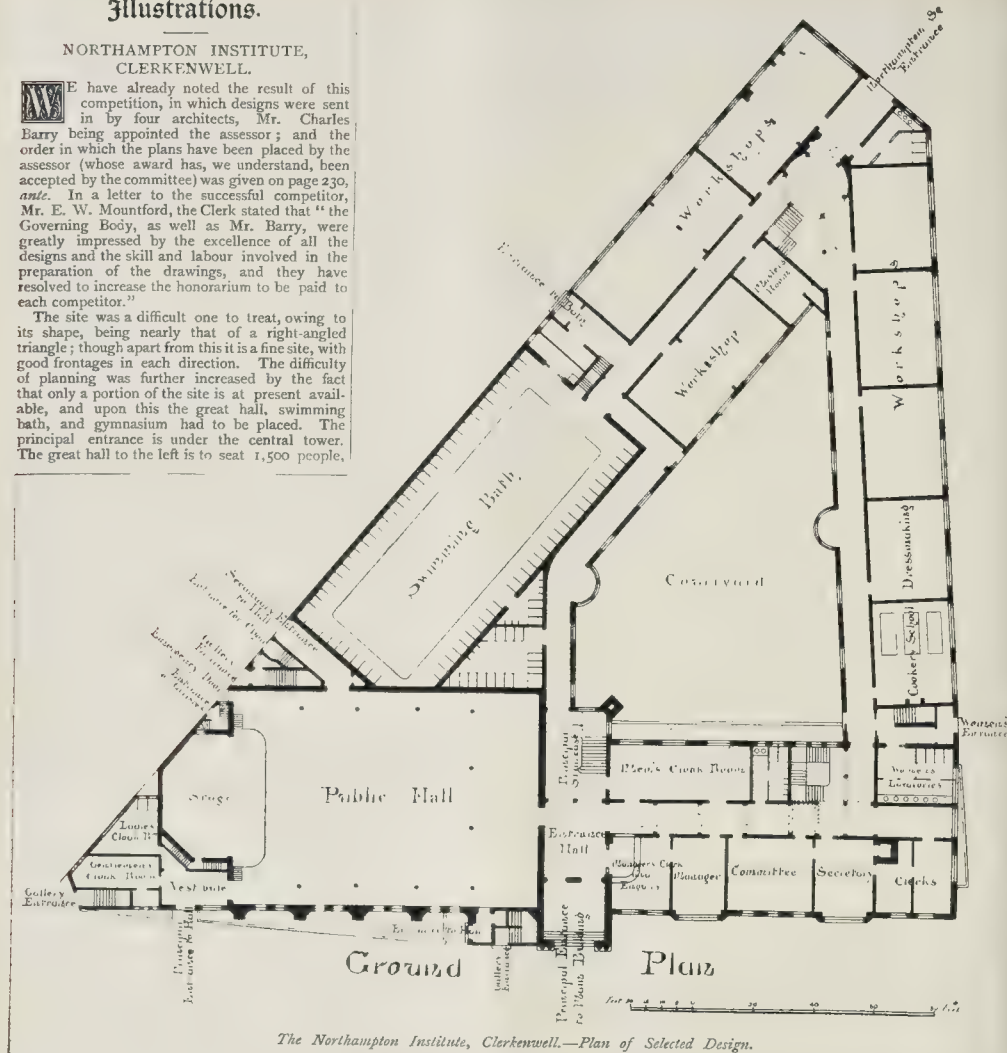
THE ENGLISH IRON TRADE.—Little alteration has taken place in the English iron market during the week. In crude iron matters generally remain quiet, and manufactured iron is still depressed. Tinplates, however, are fairly active. In steel little is doing, and in the North-west makers have reduced heavy rails 5*s.* per ton. Shipbuilders and engineers continue indifferently employed. The coal trade is quiet.—*Iron.*

Illustrations.

NORTHAMPTON INSTITUTE,
CLERKENWELL.

WE have already noted the result of this competition, in which designs were sent in by four architects, Mr. Charles Barry being appointed the assessor; and the order in which the plans have been placed by the assessor (whose award has, we understand, been accepted by the committee) was given on page 230, ante. In a letter to the successful competitor, Mr. E. W. Mountford, the Clerk stated that "the Governing Body, as well as Mr. Barry, were greatly impressed by the excellence of all the designs and the skill and labour involved in the preparation of the drawings, and they have resolved to increase the honorarium to be paid to each competitor."

The site was a difficult one to treat, owing to its shape, being nearly that of a right-angled triangle; though apart from this it is a fine site, with good frontages in each direction. The difficulty of planning was further increased by the fact that only a portion of the site is at present available, and upon this the great hall, swimming bath, and gymnasium had to be placed. The principal entrance is under the central tower. The great hall to the left is to seat 1,500 people.



The Northampton Institute, Clerkenwell.—Plan of Selected Design.

in addition to an orchestra of 200 performers, with all necessary retiring-rooms, &c. There are three entrances to the ground floor of the hall, and three separate staircases leading to the gallery, besides the entrances for choir and artists. The swimming bath has a separate entrance, and measures some 120 ft. by 60 ft., the gymnasium being about the same size.

Social-rooms, refreshment-rooms, cloak-rooms, and lavatories, are provided for each sex, while there is a large reading-room, library, and museum &c., common to both. Workshops, laboratories and class-rooms are also provided. The administrative-rooms are arranged on the ground floor adjoining the principle entrance.

The committee have limited the cost to 50,000l., with a margin of 10 per cent.

The site has been given by the Marquis of Northampton, and the buildings are intended to serve as the Central or City Polytechnic, the site being not very far north of the City boundary.

THE IMPERIAL LAW COURTS, TOKIO.

As is well known, Japan has of late years shown a great tendency to Europeanise all her institutions, and although this Europeanising tendency fluctuates very much according to the changes in political parties, it is on the whole progressive. As the new constitution of Japan has been organised on European models, it is not

unnatural that European assistance should have been sought for in designing the new public buildings. That the Japanese should have gone to Germany instead of to France or England for their architects is probably due to some previous relations between the Governments of the two countries.

Messrs. Ende & Boeckmann, the architects selected, have had no very easy task, having been driven this way and that way in turns, according as the patriotic or progressive party in Japan were predominant, towards a Japanese, a semi-Japanese, or a European style of building. Of the two designs shown here, one is an example of an attempt to combine a certain amount of Japanese character with some of the features of European Renaissance, and as the experiment is of some interest and cleverly carried out we have thought it worth while to give an illustration of it. This design had been approved and actually commenced, when a European fit took the Japanese again and the work was countermanded in favour of a more distinctly European design. This is here shown, nearly as it is now being carried out.

This is only one of five great buildings designed by Messrs. Ende & Boeckmann for the Japanese Government, the others being the Houses of Parliament, the Admiralty, the Ministry of Justice, and the Police Headquarters. These are all in process of execution, but the Law Courts, the one which we illustrate, is the most

advanced. It will contain the courts of each of the three degrees of judicial appeal recognised in the legal system of Japan. There is a fine central *Salle de pas perdus*, with a large main staircase leading to the Superior Courts on the first floor. A library and reading-room form a portion of the plan. The small plan given in the corner of the Renaissance design (we regret that the architects have not furnished us with a larger and more detailed one) applies to both of the designs, the alterations referring only to the external architectural treatment.

Herr Hartung, the senior assistant to Messrs. Ende & Boeckmann, is mainly responsible for the design of this building, which has been carried out under the superintendence of Herr Seel, the senior clerk of works in Japan. Both the senior partners of the firm, however, have in turn taken up residence at Tokio for a time to look after the work, for which they have had to train the workmen specially, as well as superintend the preparation of materials by opening quarries and founding brick-kilns.

PARISH ROOM AND SCHOOL, ALL
SAINTS, PLYMOUTH.

We had not received any description of this building up to the time of going to press. The drawing was exhibited in the last Royal Academy Exhibition. As we said of it at that time, the architect,



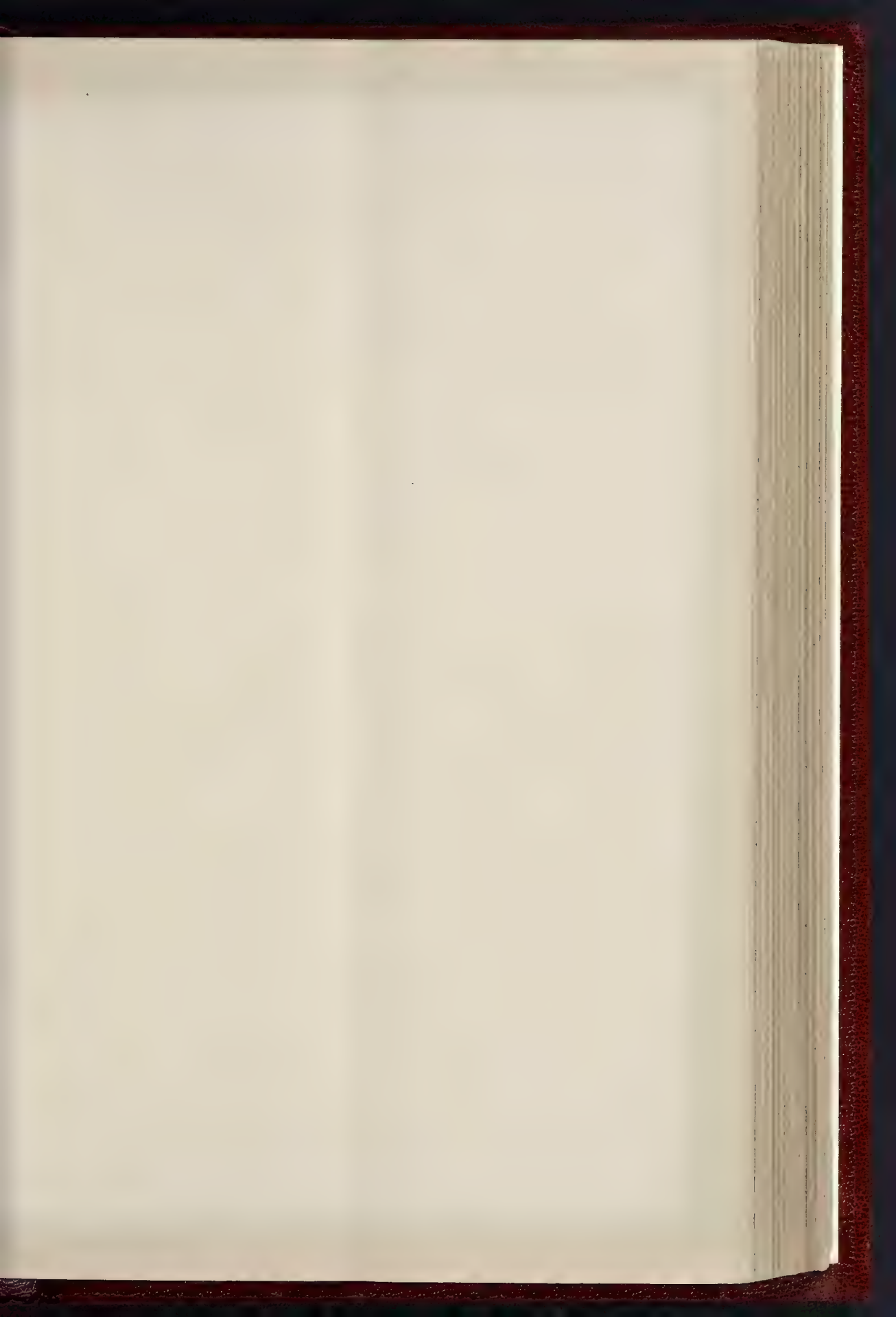


SELECTED DESIGN FOR THE NORTHAMPTON INS'

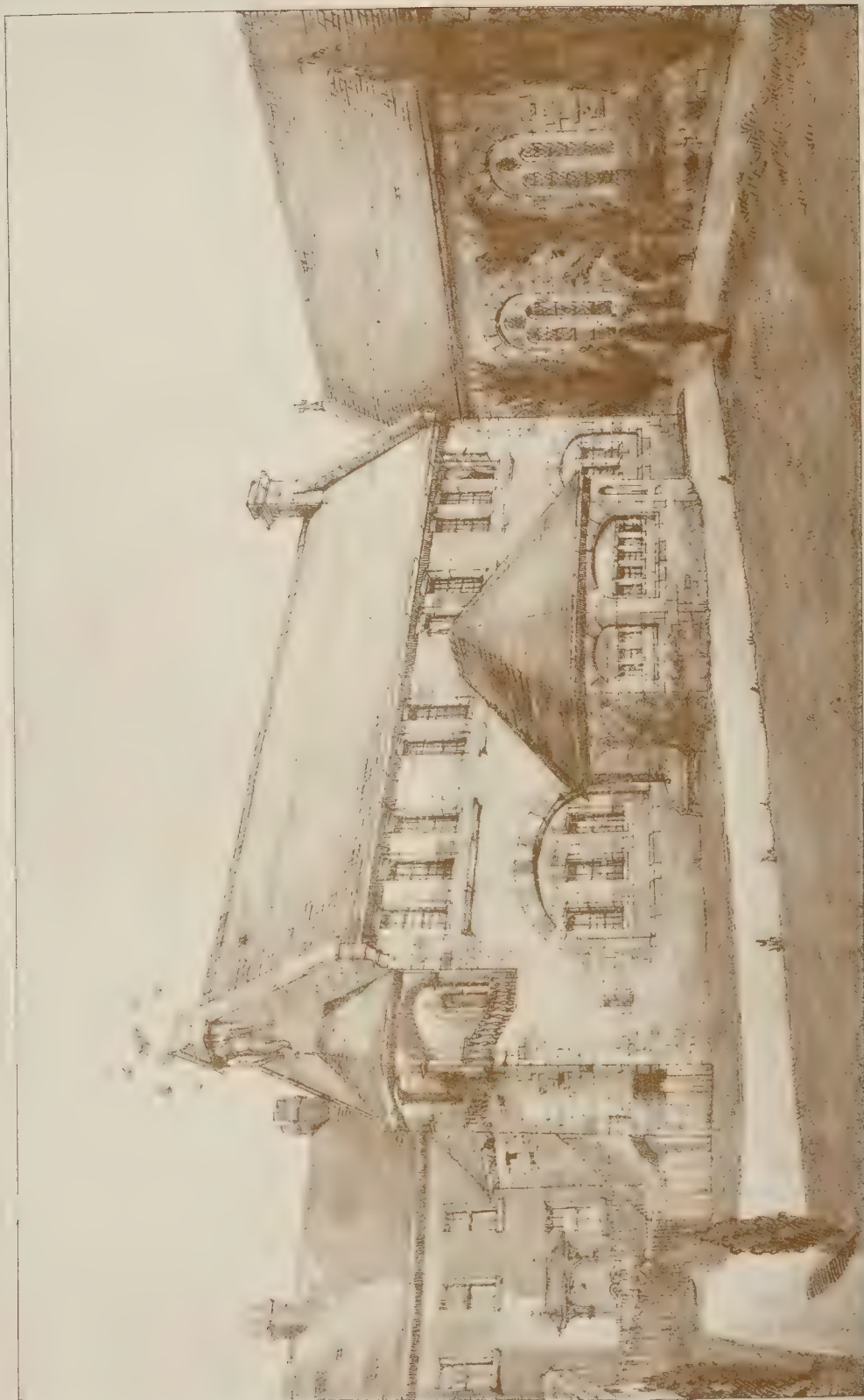


PHOTO BY THE SPRAGUE & CO. A. EAST HAGDORE STREET, PRESTON. JANE E. L.

KENWELL.—Mr. E. W. MOUNTFORD, F.R.I.B.A., ARCHITECT



THE BUILDING, APRIL 15, 1893.





PHOTOGRAPH BY J. A. C. EAST, HARNETT STREET, LONDON, E.C.

ST. MARYLEBONE GENERAL DISPENSARY. MR. PERSEFORD POLE, ARCHITECT.

U. L. 1892





GENERAL ELEVATION.



DETAILED

THE NEW IMPERIAL LAW COURTS FOR TOKIO.

DESIGN AS AT FIRST PROPOSED.

MESSRS ENDE & BOECKMANN, ARCHITECTS.

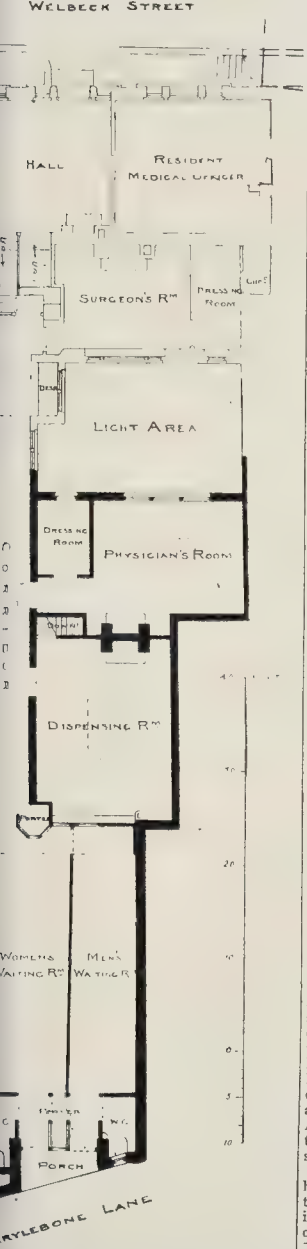


ON.

r. Edmund Sedding, seems to have caught something of the feeling of his late talented father in the treatment of the staircase which adds to the upper floor, with porch over the top landing (shown in the view).

ST. MARYLEBONE GENERAL DISPENSARY.

The drawing represents the Marylebone-land out of this building, which extends from Marylebone-lane to Welbeck-street. The patients' waiting rooms, the dispensing room, with laboratory under, and the physician's consulting-room, with dressing room attached, are in this portion of the building, and the corridor is continued into



Welbeck-street block, where the surgeon's consulting room, with its dressing room, is added. The portion of the building illustrated

was erected in 1891 by Mr. John Hooper, builder, Herne-hill, the contract being about 1,200l. The Welbeck-street block, containing the board room and resident medical officer's rooms, has been subsequently added. Mr. Beresford Pite is the architect.

THE ROYAL COMMISSION ON METROPOLITAN WATER SUPPLY.*

We have held over our summaries of some of the evidence taken at the last sittings of the Commission, having, however, indicated that analyses carried on down to the latest moment had materially changed the views of experts as to the efficacy of storage and filtration in removing objections to the continued use of the river waters. The results of these later experiments and the confident opinions based upon them appear likely to exercise an important influence on the results of the inquiry.

The East Kent Chalk Supplies.

In his examination, Mr. William Whitaker estimated that there was an area to be dealt with of 390 square miles east of the Darent. An inch of rain yielding 15,000,000 gallons, the Commission had to multiply that by any figure they might select between 4 and 15. How much of the rainfall could be secured by the suggested works could be answered only by experiment, but he should say undoubtedly it would be 50 or 60 million gallons a day.

Mr. William Topley thought that on this estimate the amount of percolation was underestimated. He took the area of percolation in the valleys of the Medway, the Swale, and the Stour and St. Margaret's Bay at 467 square miles; he estimated the total percolation at 111½ gallons; and he believed it would be possible to get more than 50 or 60 millions of this. In order to get all the water there would have to be great work done in driving tunnels and headings miles and miles.

Mr. W. Easton, in a long and exhaustive examination upon the statement we have already summarised, explained a large number of sections designed to illustrate the flow of water through the chalk in the Thames valley. He was with Mr. Topley and Mr. Whitaker between Gravesend and Northfleet, at low water during a neap tide. Walking along the bare chalk they saw reaches of fresh water running out through the fissures in the chalk, just as they are to be seen in the tunnels at Brighton and elsewhere. Then how is it, asked the Chairman, that the Northfleet people have a difficulty in getting water? It is simply that there, as in almost every case in the chalk, the water is running in well-defined channels or fissures, and these fissures generally have no lateral communication whatever. Certain wells at Northfleet are drawing from a certain line of fissures. As a general rule he does not believe in a "cone of depression" in the chalk, certainly not where the water is running in fissures. In many instances water is at varying levels in adjacent fissures. There is a vast amount of water that falls upon the chalk, and is passing away by underground channels—a small amount through the main body of the chalk, and most of it through fissures. In driving tunnels there are met with long spaces of dry chalk—200 to 250 ft. with scarcely a drop of water. At another point, Mr. Easton said that besides the water we get in the regular slope of the chalk, there is another underground stream in all probability derived from that uncovered chalk without streams in the upper part of all these chalk areas, which never feeds the upper springs at all, but which always runs down underneath the ground and gets out somewhere. It is not improbable that it goes straight under London; but that is a very difficult question indeed. He does not think the chalk under London has ever been properly tapped. It has not been tapped, as at Brighton and Ramsgate, with tunnels—there has been no opportunity of doing that. It probably runs away underneath to some outlet at sea-level. According to the estimates of absorbed rainfall there must be an enormous quantity running out somewhere every year.

Mr. Bryan, of the East London Company, having heard Mr. Easton's evidence, and being the next witness, volunteered to give roughly an idea of the slope of the water in the chalk at the company's Lea Bridge well, where they have

7,000 ft. of tunnel. He said they had gone to all the points of the compass without meeting with a big fissure. The water seemed to come in almost equally for every 100 or 200 ft., and none of the bore-holes yielded anything. But at Waltham Abbey, where two fissures had been cut, the yield of the bore-holes was enormous.

Proposed Thames Tidal Reservoir.

Mr. C. Moore, the Engineer to the Conservators, said that if it were thought necessary to take 100,000,000 gallons a day more at Hampton, and if the proposed storage reservoirs in the Upper Thames were deemed impracticable or undesirable, compensation water for the reaches below Richmond might be obtained by turning the Deer Park into a tidal reservoir to hold 50,000,000 gallons, to be filled with the rising tide and discharged at low water. The top water level would be about 2 ft. below Trinity, about 10' 50" ordnance datum, and the bottom would be 10 ft. below Trinity, or 2' 50" ordnance datum. Sections were exhibited showing how different quantities of water would affect the depth in the river, and the extent of foreshore exposed. The risk of deposit would be reduced by what the County Council are doing to take solid matter out of the sewage. Indeed, the commencement of the rise of the tide is the damming back of the river water. The late spring tides bring the dirty water. They run up two or three feet above Trinity, and the last part of these tides might be kept out of the reservoirs altogether. Little of the lower sewage water need ever be admitted into the reservoir, and there would never be any salt water there.

Mr. Binnie objected to impounding tidal water, and substituting that for the purer flow of the river. He referred to the state to which the Lea is reduced in its lower reaches by the abstraction of upland waters. If more water is taken from the Thames, a proper amount of compensation water ought to flow down the long reach of the river between Staines and Teddington, a distance of eighteen to twenty miles, and afterwards into the tidal portion of the river below Teddington Weir. In this respect, the proposed upper reservoirs were satisfactory. We wished to have the Thames pure as well as navigable, and tidal water would be detrimental to health. Then a large amount of impurity passes into the river, and it is desirable to have it carried to the sea as rapidly as possible. The downward flow of the whole mass is determined by the volume which comes over Teddington Weir. It was explained to Mr. Binnie that this compensation reservoir had nothing to do with other reservoirs, but it was suggested because Mr. Hawksley, Mr. Martin, and Mr. Moore had agreed that 100 millions more gallons might be taken out of the Thames and leave it as full as before, but with the effect of diminishing its velocity by one-half, and that this tidal reservoir was to supply the 100 millions. This did not remove Mr. Binnie's objection to taking another 100 millions in the height of the summer out of the Thames at Hampton. It would make a "real, perceptible, appreciable difference." Mr. Binnie adhered to his view, although pressed very hard, particularly as to the small proportion borne by the river water to the tidal water.

Proposed Reservoirs in the Lea Valley.

Mr. W. B. Bryan, on behalf of the East London Company, submitted a scheme for enabling the company to take more water from the Lea by increasing the storage from 740,000,000 to 2,000,000,000 gallons, so as to allow a daily abstraction of 40,000,000 gallons in such a period of drought as that from June, 1887, to March, 1888. The filling of the reservoir would take for a time all the water passing over Field's Weir; but there would be two compensation reservoirs filled with flood water to supply the navigation. The new reservoirs would be from 20 ft. to 30 ft. deep, and the compensation reservoirs 17 ft. deep. It was all marsh land, and there was not a house upon the areas, the greater part of which was subject to floods. These new reservoirs were to be filled by a new cut to take the water from the Lea down to Waltham Abbey, close to the company's station Waltham Abbey well. The whole area of the proposed reservoirs is upon the London clay, the depth of which, from the surface-level, is from 10 ft. to 18 ft. Puddle trenches would be constructed, and the reservoirs embanked to the top of the water-level. The river Lea would be left as a flood channel in flood times, the flow of the river being sometimes 1,000 million gallons a day. From February to November the average flow was 82,000,000 gallons, and it would be quite right to take three-fourths of the whole flow,

* For previous reports of the evidence given before this Commission, see the last two volumes of the *Builder*, as per references given in footnote on page 318 of the number for December 31, 1892; see also current volume, pp. 93, 131, 151, ante.

because the appearance of the stream would not be affected, and the navigation was canalised. There had been no complaint of the condition of the river since the Tottenham sewage was taken out of it.

Mr. Binnie objected that the proposed reservoirs would be expensive, and, situated in the water-bearing gravel, would be difficult of construction. They would be shallow, and the depth of 20 ft. would be practically less in hot weather. This would not be conducive to purity, especially with flood water from a populated and cultivated area. If more water can be had from the Lea, how is it the East London Company have resorted to the Thames? Their late Engineer said as much had been done as was possible in the way of storage in the Lea Valley. It is already on record that the two companies, the New River and the East London, take all the flow of the Lea in dry weather. To pump 44,000,000 gallons from the chalk in the valley would dry up the chalk springs which feed the Lea.

Conflicting Analyses.

Mr. Richard Bodmer, Public Analyst for St. Saviour's, Southwark, and Bermondsey, produced the results of analyses of samples of water taken from cab-rank stand-pipes in Southwark-street and Blackfriars-road, the analyses being unfavourable to the Southwark and Vauxhall in one case and the Lambeth in the other. The tests were—the albuminoid ammonia, Wanklyn's standard, and oxygen required to oxidise organic matter, Tidy's standard; and he concluded that the waters were not fit for a public supply. Examined by Professor Dewar, he said he had not determined the organic carbon, or the organic nitrogen; and he admitted that the results of Dr. Frankland of the same date were totally opposed to his own; but the difference depended not only upon the standards taken, but also upon the samples. Dr. Frankland and others used the organic carbon, and the organic nitrogen methods, and therefore their results were not directly comparable with his; and unless the samples were identical, it was unfair to compare analyses. The Chairman wanted to know whether a cab-rank stand-pipe was at the dead-end of a pipe, or on the centre of a main, but the witness did not know; only water is being continually drawn from a stand-pipe, and therefore it is considered to be the fairest spot for taking a sample from. When the companies have known that samples were going to be taken, they have drawn off water by the firecocks so as to renew the water at the stand-pipe from the main; but it would take some hours to renew the water in the mains from a filtered supply in a reservoir.

Conclusions of the County Council's Chemist.

Mr. W. J. Dibdin, who had in July handed in a series of analyses of the water of the Thames and the Lea taken at the companies' intakes, and also of the filtered waters supplied to the Metropolitan, said that these analyses had been continued so as to cover fourteen months. The results were embodied in tables and plotted on diagrams. They showed that, although the waters at the intakes had returned to a condition similar to that during the storm period of October and November, 1891, the filtered water supplied by the companies had in no case been as impure as it was at that time. In October and November, 1891, the weekly rainfall rose to 1.3 and 1.5 inches, while in the corresponding months in 1892 it rose to 1.5 and 1.8 inches. During the former period the organic elements in the filtered supplies ranged from 0.2 to 0.64 parts per 100,000, while during the latter period they were 0.06 to 0.15 parts per 100,000. The albuminoid ammonia in like manner fell from about 0.012 to about 0.006; and the oxygen absorbed from permanganate in four hours fell from about 0.13 grains to 0.08 grains per gallon, while the colour of the water fell from 3.5 to 1.2. The continued examination of the waters of the rivers had shown that these large reductions are not due to any specified improvement in the unfiltered supplies, which is evidence that the companies have found themselves better able than formerly to deal with flood-waters—a result presumably brought about by the attention called to the matter, which strongly points to the advantage to be derived from a systematic examination of the water.

In examination on this statement, Mr. Dibdin said that, taking the various analytical factors—the organic elements, the albuminoid ammonia, the oxygen absorbed by the organic matter in the water, and the colour of the water—they confirm one another. During the last storm period the water at the intakes had been worse than before, while the water delivered had been of a better

quality. The discharge of the Emms Ditch into the Windrush had been roughly from three to sixteen times the strength of ordinary London sewage; and all that was washed into the Thames. While the unfiltered water had been actually worse than it was in October and November, 1891, the filtered water had been much better. Something wrong had been pointed out in an impartial manner, and the companies had done their best to put it right. He saw no reason why the standard that had been reached should not be maintained, and indeed he saw reason why it should be improved upon. The improvement in organic elements had been effected with a worse natural water and the filtered water had been 33 per cent. better. In the case of the albuminoid ammonia the improvement was as much as 50 per cent. With the flood water impounded and treated as it now is, it was not objectionable on the score of health, but there was a strong sentimental objection to drinking the sewage of the population in the Valley of the Thames, coming down in many cases as untreated sewage. There was no evidence that the water as it had been supplied during the last six months could be suspected of producing diseases. For anything shown to the contrary, the waters were perfectly pure and wholesome. The companies that had improved were the West Middlesex, the Chelsea, the East London, the Southwark and Vauxhall, and the Lambeth, and, after some delay, the New River. If there were regular inspection in the water-shed of the Thames and a large increase of storage the improvement effected might be permanently maintained. The question of pollution must be carefully considered in connection with storage. In the Emms ditch, which discharges into the Windrush near Witney, there is abundant evidence of pollution with strong sewage. If water is to be collected from the drainage areas suggested, the most stringent measures must be adopted to prevent pollution. It was also important that the method of conveying the water from reservoirs to the Thames should have careful consideration. If the reservoirs emptied themselves into streams flowing to the main river, they would merely act as carriers of the pollution of the towns on their route. The consequence of this would be even more objectionable than the present system, because the fresh sewage would be carried direct to the river, thus allowing less time for oxidation, &c. As a further precaution, before the water is admitted into the storage reservoirs, it should receive a rough filtration through gravel beds in order to prevent the admission of particles of polluting matter. The whole district supplying a reservoir should be under the most strict observation. It was not desirable that a question affecting the health of the inhabitants of London should be entrusted to a supervision which had been found wanting. Apart from all biological considerations, the admission of crude sewage into drinking water must be objectionable, and it should be prevented by means of proper restrictions imposed by an authority having power to enforce its regulations. He had, in previous evidence, shown that there was gross pollution of tributaries by sewage. He submitted that there was not the slightest reason why it should be continued, and, if it were proposed to have storage reservoirs, it was imperative that the utmost precautions should be taken to prevent that sewage pollution. In reply to Professor Dewar, Mr. Dibdin said there was not, and there was not likely to be any large concentration of manufacturing industries in the valley of the Thames. It was substantially an agricultural area, and therefore favourable for the collection of water. Even with gross sewerage pollution, analyses showed that the water as delivered was wholesome and pure. The longer flood waters were impounded in suitable reservoirs, the safer they would become. While there were localised areas that were exceedingly bad, like the valley of the Windrush, the flood water of the whole watershed was not in such a state of impurity that we need be frightened at its being used.

Bacteria and Filtration.

Dr. Klein carried on an examination into the character of the microbes, notably the bacteria, occurring in the intakes of the companies and in the water distributed by them. Ten samples were supplied to him once a week for six weeks. In a good many instances the colonies or their sub-cultures were tested on animals in order to ascertain whether they possess pathogenic action. In no case did he come across any of the known pathogenic bacterial species, or any of the species that produce on the animals experimented upon—

guinea-pigs, mice, and rabbits—definite pathogenic action. Of course, searching for an individual bacterium was no less difficult than looking for a needle in a bundle of hay. So the examinations do not prove that the bacteria sought for were not present, or that, although then absent, they might not be present in any of the other forty-six weeks of the year. Some spore-bearing bacilli, as well as non-spore-bearing and micrococci, present in the intake water, are not removed by the filters. The mesentericus and fluorescens were present in the intake waters of both the Thames and the Lea. While on one occasion the filters of one company or another were capable of intercepting them, at another time they did not, and one or both appeared in the filtered water. It may be owing to the varying conditions of the filters. It may be that the bacilli, under suitable conditions, form spores which are oval and much shorter than the bacilli themselves, and therefore more easily pass the filters. Some of the spores measure in diameter or length the following fractions of an inch: $\frac{1}{1000}$ to $\frac{1}{2000}$, $\frac{1}{3000}$ to $\frac{1}{4000}$, and $\frac{1}{5000}$. Some of the water supplied contained species which were not in the intakes at the time. Possibly these species had been retained by the filters from the intake water at a preceding period.

Bacteria and Storage.

Dr. Percy Frankland, in an elaborate statement, said that as the public is often surprised to learn that a drinking water contains any micro-organisms at all, he had instituted comparisons between London river waters and moorland waters—Lintrahen and Loch Katrine. The average numbers found in a cubic centimetre were as follows:—New River, 38; Grand Junction, 47; Dundee (Lintrahen), 161; and Glasgow (Loch Katrine), 74. Thus the river waters supplied in London are markedly poorer in bacterial life than those from the Scotch mountain lakes. To test the influence of storage on the bacteria in river waters, he had samples taken from the river at the Grand Junction intake, and from three reservoirs. The results bring out most strikingly the diminution effected by storage. It is inferred that, by employing suitable storage, much of the flood-water, which is at present wasted, might be turned to useful account. A succession of tables show that while the unfiltered water of the Thames yielded from 7,000 to 1,000 colonies, the same water filtered yielded only hundreds, tens, and units. In almost every case the number of micro-organisms in the filtered water appeared to be independent of the age of the filter-bed. On two occasions when filter-beds were tested the day after cleaning there was evidence that the water issuing from them was not as free from micro-organisms as that coming from older beds at the same works. Normal efficiency is attained within two or three days; and there was no evidence of the efficiency of beds being reduced by prolonged use. Of the small number of micro-organisms found in these filtered waters it appears that only a very insignificant part can be derived from the unfiltered water, for the numbers in the filtered water bear no relationship to those in the unfiltered water; the majority of the bacteria in the filtered water are, therefore, attributable to past filtration sources. The filtering materials are not sterile themselves, nor are the channels, culverts, wells, &c., into which the filtered water passes.

The Satisfactory Results of Filtration.

Dr. Edward Frankland was further examined on his second statement, which brought down his experiments to the end of January this year leaving only three months to complete the year. He began those experiments with an open mind. Before May of last year all the samples he had subjected to chemical examination were drawn from stand-pipes, and these samples usually contained a much greater number of microbes than were afterwards found in samples taken from the filter wells before the water is pumped into the mains. There can be no doubt, he says, that there is a considerable multiplication of microbes either in the service reservoirs or in the mains. Judging from samples taken from filter-beds there can be no doubt that efficient filtration of Thames water produces a beverage which is practically very slightly inferior to deep-well water. This may be said of the Chelsea Company's water, but cannot be said of all the supplies, because all the filtration plant is not equally efficient. Double filtration in certain cases would be very desirable; it would have enabled the Southwark Company to avoid instances of great microbial impurity. They knew

they were using their filters in a way they ought to be used, but they could not avoid it; they had to send out a certain quantity of water, and they had not sufficient filtering area whilst one was being repaired. Occasional double filtration is desirable, and that it is not impracticable is shown by the fact that the Grand Junction Company is carrying it out upon a considerable scale. The lower the temperature of the water the more microbes or spores it contains. The seldomer filters are cleaned the better, if only water will go through. The companies that with equal storage capacity employ the thickest stratum of sand put into their filters water containing the smallest number of microbes. You may have chemical purity with actual impurity; and greater bacterial purity could result from storage before filtration. Storage capacity is an important factor and slow filtration another. There ought to be sufficient storage to prevent the use of food water, which is the probable cause of every bad report. One of the chief agents in efficient filtration is "a coating of something or other on the surface of the filter, which arrests microbes from getting into the sand at all." With a perfectly purified sand there would be efficient chemical purification, and probably no bacterial purification. When filters are working efficiently a single filtration is sufficient, and it is always sufficient for gravel filters as distinguished from raw river water. For the first day or two after the sand has been cleaned the water should be passed through a second filter. It is the cleaning of the sand which is dangerous, and the longer a filter is in the more efficient it seems to become. Stopping up is due to the deposit of mineral and dead matter as well as the growth of the skin. The recent immunity of Altona from cholera during prevalence in Hamburg was a very severe test of the practical efficiency of the filtration of water; if efficient filtration is carried out in London, shall have no epidemic of cholera. If filtered water remain in the mains 12 or 14 hours at a temperature of from 45 to 65, the microbes could multiply perhaps a hundredfold. But by reducing the number to a minimum you reduce the chance of any of them being pathogenic. If they are only non-pathogenic it does not matter much they multiply. Experiments seem to show that pathogenic organisms will not increase at equal ratio; and if they were one to nine the pathogenic would not have much chance of continuing life. A pathogenic organism naturally develops in the body of an animal and not in water. Some will develop in water; typhoid organisms, for instance, will develop in water which has been artificially freed from other microbes; but if other microbes are present they will be eaten up by them and to disappear. The survival of the fittest in water is the survival of the fittest which are not objectionable. There is the Thames basin an excellent supply of water for the next hundred years at least. To increase the supply adds ought to be driven into the chalk and oolite formations, so as to deplete their water in wet seasons and leave room for storage of fresh rainfall.

Mr. Binnie reiterated his objection to taking a supply in perpetuity from the open rivers, on account of the polluted nature of the flood-waters, which would get worse with increase of population. He added that looking to the cholera outbreak at Valencia, in Spain, where the water was ordered, to the case of Stockton and Middlesbrough, reported upon by Dr. Barry, and to his experience in India, he did not believe that detection was to be obtained by mere sand filtration. As to Spain, the County Council had endeavored to adduce the evidence of the late Mr. Higgins, but his death prevented that. As to Stockton and Middlesbrough, the chairman told Mr. Binnie they could not consider the case until they had the completed as well as the interim report. At Nagpore, Mr. Binnie said he had himself seen impure water filtered through considerable thickness of sand drank by the people and causing cholera. It was ascertained, and it was as clear to the eyes as London water. It was not a public waterworks with regular filtration; but there was a tank, the people passed water in it through sand digging holes in the adjoining sand. The sand itself was not cleaned out. Cholera was got off by bringing a new supply from the hills distributing it without filtration. The old creek was half a mile long, a quarter of a mile deep, and 20 ft. deep. The Chairman and Mr. Ogilvie both intimated that the official report on Nagpore case did not say anything about sand filtration, that no inference could be drawn from

the case supporting Mr. Binnie's statement, and that the prevalence of cholera and the state of the water were wholly different from any conditions that could exist in the Thames valley. Mr. Binnie did not say that sand filtration was of no use; but it did no more than clear water from visible impurities. The Commission had been told that no chemical analysis would detect in water those dangerous properties which communicate disease. Asked "Do you know anything better than sand filtration?" he replied, "I do," and added, it was to obtain a water free from objection, as Manchester, Liverpool, &c., had done.

Mr. Binnie's Last Words.

We have given under other headings Mr. Binnie's criticisms of the proposals mentioned. He further said the estimate of the cost of the proposed reservoirs at Staines was very low, and a large filtering area would be required for the additional supply of 200,000,000 gallons a day. The estimate of 5,391,435¹/₂ contained no item for filter-beds, or the distribution of the water when filtered. It is proposed to reduce the flow of the Thames to a minimum below which it has fallen only on thirty-one days during the last nine years. What occurred in those dry years is matter of notoriety. The river above London was so dry that people could walk across it, and its condition in the neighbourhood of London was most unpleasant. The assumption that 135,000,000 gallons a day can be obtained from the Lea Valley and the Chalk Wells of Kent ought not to be assented to, because it is clear that the dry weather flow of the Thames and the Lea is entirely dependant upon the chalk springs. Citing returns of the monthly flow of the Thames at Teddington in 1884-5-6-7-9, 1890-1, and the fact that on 236 days of 1891 the river waters were abnormally coloured and turbid, Mr. Binnie contends that the companies must either take the flood water or abstract the clear dry weather flow of the river, or provide even more than sixty days' storage.

Evidence of the Water Examiner.

The last witness was Major-General Scott, the Water Examiner under the Metropolitan Water Act, 1871, who described his duties and his manner of carrying them out. Speaking of sewage farms, he said it was objectionable that they were leased to private individuals, who sought to make profit, whilst there were many times when all questions of profit must be disregarded. They required to be managed with more scientific knowledge than was often possessed by the persons left in charge of them. In the upper part of the Thames there ought not to be any difficulty in finding sites for sewage farms. He had compiled from the monthly returns the following table, showing the works possessed by each company for the purification of the raw river water:—

	Subsidence Reservoirs.		Filters.	
	Million Gallons.	Days' Supply.	Per Mill. Area, Acres.	Per Mill. Acres.
Chelsea	140	14.2	68	0.68
East London	615	13.7	201	0.07
Grand Junction	649	3.5	173	0.96
Lambeth	126	0.5	0	0.48
New River	161	5.1	102	0.50
Southwark and Vauxhall ..	66	1.8	245	0.55
West Middlesex	117 ¹ / ₂	7.0	24	0.88

* This includes six acres of filters constructed of sand in its natural condition and used for preliminary filtration, which is succeeded by filtration through washed sand and gravel.

	Thickness of sand in Filters.		Monthly averages of Filtration per sq. ft. per hour.	
	Max. ft. in.	Min. ft. in.	Mean gals.	Max. gals.
Chelsea	4	6	1.75	1.75
East London	2	1	1.33	1.13
Grand Junction	2	0	1	0.9
Lambeth	3	0	2.16	2.50
New River	2	1	2.14	2.13
Southwark and Vauxhall ..	3	0	1.6	1.5
West Middlesex	3	2	1.27	1.12

The East London derive a supply from the gravel. They possess one well in the chalk completed, and three in the course of construction in the Lea Valley. The Grand Junction have works for flooding and collecting underground water from twenty-five acres of ballast beds. The New River Company have thirteen wells in the chalk; the water from them is mixed with that from the Lea and filtered. The Southwark and Vauxhall have works like those of the Grand Junction, occupying thirty-five acres, and have sunk a well at Streatham. The Lambeth Company collect water from the gravel subsoil at West Molesey. In all cases water from the gravel is filtered before distribution.

Changes in the rivers occasioned by rain and flood, General Scott said, are immediately perceptible in the water that is delivered. He attri-

buted the general excellence of the Chelsea water and the power the company had of dealing with flood water to the combination it had of large storage, great thickness of sand, and considerable area of filters all combined. The value of each factor would have to be determined separately. The doubt the companies had been in as to the fate in store for them had militated against the desirable extension of their works. If we are to continue to use the Thames and the Lea, there ought to be no stint in providing to the fullest extent the necessary works for purification; and a considerable extent is required. There ought to be a minimum storage of from fifteen to twenty days' supply, and an extension of filtration. It would be important to ascertain by experiment the value of each factor, and meanwhile to level the companies up to the highest standard any one of them has adopted.

We have now completed our special report of the evidence given before the Commission. We have devoted a great many pages to the subject since the Commission held its first sittings, nearly a year ago, but we think that the very great importance of the inquiry, fraught as it is with issues of the utmost moment to the health and general well-being of London and its vicinity in the near future, has justified us in inflicting upon our readers some rather "dry" reading. Not that the evidence given before the Commission has been altogether devoid of humour. One of the most diverting incidents of the inquiry was contained in some of the evidence given on behalf of the Thames Conservators, who are apparently in favour of the continued abstraction of an enormous quantity of water from the river because they get 20,000¹/₂ a year from the water companies. As we pointed out at the time, the "conservation" of the river conducted on these lines might afford a capital hint for the librettist of a comic opera.

THE LONDON COUNTY COUNCIL.

THE first meeting of this Council since the Easter recess was held on Tuesday afternoon last at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

Election of an Alderman.—Mr. J. Fletcher Moulton, Q.C., was elected an Alderman in the room of Lord Lingen, resigned.

Finance.—This was "Budget Day" at the Council, and Mr. Evan Spicer, Chairman of the Finance Committee of the Council, introduced the estimates for the year ending March 31, 1894. He remarked that, next to the finances of the nation dealt with in the annual Budget of the Chancellor of the Exchequer, the finances of the London County Council were the most important in the kingdom. The effect of the estimates now introduced was that the rate which was required for the County, outside the City, was 13d. in the pound, and in the City 10.7d. He hoped that the next Chairman of the Finance Committee would not have to announce two separate rates for the different sections of the County. They wished every success to the Commission now sitting to bring before Parliament a scheme that would meet the wishes of all who desired to see the unification of London. The proposed rate of 13d. was an increase of 3d. in the £ over the rate of last year, and it was accounted for as follows:—The estimated balance brought into account was less than in 1892-93 by about 26,000¹/₂; increased provision was made for technical education in that year's estimate to the extent of 27,000¹/₂; and the estimated expenditure was on the whole greater by about 32,000¹/₂; making, with the slight decrease in the estimated receipts of 2,000¹/₂, the total increase in the amount to be raised, 87,000¹/₂, which was equal, after deducting the gain for improved rateable value (which was 15,238) to a rate of 3d. in the £. The rateable value at present was 33,555,848¹/₂, and last year it was 33,354,946¹/₂. The total gross expense of the debt amounted to 1,543,070¹/₂, which was made up as follows: redemption of debt, 507,946¹/₂; dividend and interest, 1,018,799¹/₂; management of stock, &c., 13,985¹/₂; rent, drawbacks, &c., 2,340¹/₂. But against that must be set the interest received on loans advanced, rents, and other receipts applicable to debt, which brought the net charge for debt to the sum he had stated. The gross debt outstanding at the present time was 30,635,169¹/₂, redeemable by the 1929 3¹/₂ per cent. stock (16,961,638¹/₂), the 1941 3 per cent. stock (10,850,000¹/₂), and the 1949 2¹/₂ per cent. stock (2,800,000¹/₂). The old debts of the late Board amounted to 623,531¹/₂. To outside bodies had been lent the sum of 9,820,252¹/₂. The value of lands held by the Council was 2,164,062¹/₂. The net debt owing by the Council came out at 81,426,931¹/₂. There were 1,955 distinct loans

now outstanding. Loans advanced to local authorities in 1892-3 amounted to 1,020,000/. Pensions (including asylum and prison pensions) amounted to 33,620/., and establishment charges to 107,550/., the salaries and wages of the headquarters staff being 76,350/. Judicial expenses amounted to 41,858/. Coming to the various services, he would point out that main drainage stood at 231,075/., being less than last year's estimate by 15,300/., owing to the feeling of the Committee that the improved state of the river justified a reduction in the sum for chemicals; the Fire Brigade stood at 141,100/., being only a small increase; and the Parks and Open Spaces stood at 92,438/., being an increase of 16,100/., due to the augmented pay of labourers, and the provision for new open spaces. There are now 53 parks and open spaces, representing 3,244 acres. Receipts from refreshment rooms, and the letting of boats yielded 2,300/. Bridges and Woolwich Ferry represented 36,510/., dangerous structures 7,625/., theatres and music halls 1,640/., weights and measures' services 14,055/., and industrial schools 25,395/. Pauper lunatics stood at 57,904/., showing a reduction of 26,900/., owing partly to the parish and poor rates now being made a charge on the Asylums Fund, and not on the County rate. Technical education stood at 57,000/. Other items brought the total estimated expenditure to 2,993,326/., making, with the amount which they estimated would be in hand on March 21, 1894 (namely, 57,505/.), 3,050,831/. That expenditure was to be provided for as follows:—The estimated balance in hand at the beginning of the year was 182,031/., being considerably larger than had been anticipated. The main item of receipts other than those from rates, was the Exchequer contribution, which was 537,435/.. It was not safe to assume that that source of income would expand. The local taxation licences were fairly steady, showing a very slight increase. All licences collected in the County of London were placed to the credit of the Council. The estimated receipts from the local taxation licences was 421,000/., and from probate duty 435,000/. The probate duty, which yielded so remarkably in 1891-92, had during the last year fallen off to something like its normal yield. Beer and spirit duties also did not promise to produce quite as much as in 1891-92. The second main item of receipts was the interest on loans advanced, being 355,050/. The third item was represented by rents (93,703/.). With sundry contributions, fees, fines, &c. (99,488/.), the total income other than from rates was 1,085,676/. Adding that sum to the balance, they obtained a sum of 1,267,707/. Deducting that from the total of the estimated expenditure, the difference (1,783,124/.) represented the deficiency which had to be raised from the ratepayers by means of contributions. About 84 per cent., or 1,500,490/., has to be raised by a general county rate levied over the whole of the county, and 282,634/., or 16 per cent., by a special county rate levied over the county outside the City. The Council must not be led away by the thought that as the increase in the rate this year was only 3d. or 1d., it would continue to grow at that low figure. Considering the increased interest to be paid on their loans and the new schemes which loomed in the distance—tramway, market, water supply, and street improvement schemes—it was imperative that new sources of income should be found. The Council could not be accused of being an extravagant body. They had much leeway to make up, and, unless they obtained some fresh sources of revenue, the rate in the future was bound to increase. They had a Government in power that was friendly to them. Would it assist them with their finance? Was it prepared to relieve the occupier, and throw more of the burden on the land? He made bold to say that London would be grievously disappointed if during the year some relief were not found.

The estimates were adopted, and the necessary resolutions for giving effect to them were also adopted, after considerable discussion.

The Hackney and Holloway Storm Relief Sewer.—The Main Drainage Committee presented the following report and recommendation:—

"On the 21st of February last, the Council upon our recommendation accepted the tender of Messrs. J. Mowlem & Co. for the extension of the above sewer from Amhurst-road to Sandringham-road, Hackney, subject to their agreeing to the Council's wages' clause, and to their filling in the schedule. Messrs. Mowlem & Co. having, however, expressed their inability to agree to the wording of the Council's clause as to the rates of wages to be paid and the

hours of labour to be observed, we referred the matter to the General Purposes Committee, who have advised us not to depart in the present instance from the form of words laid down by the Council in December last, and they recommend that the work be executed by the Works Committee. We understand that there will be no difficulty in their undertaking the work immediately, and we therefore concur in the opinion of the General Purposes Committee. The Engineer's estimate of the cost of the work is 14,051/. We recommend—

"That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, the work above referred to be executed by the Council without the intervention of a contractor, and that the plans, specifications, and estimates be referred to the Works and Stores Committee for that purpose."

The recommendation was agreed to, after some discussion, in the course of which it was suggested that the Council should reconsider the wording of its wages clause. More than one speaker, however, while of opinion that Messrs. Mowlem's request was fair and reasonable, said that the relief sewer in question was a work of urgency, and could not be delayed while the terms of the wages clause were being reconsidered.

Athletic Training for the Fire Brigade.—The Fire Brigade Committee presented the following report and recommendation:—

"The work which the junior members of the Brigade are called upon to perform makes it imperative that they should be always in the best physical condition. In order to attain this end we propose to have all the men below the first-class of firemen instructed in the use of dumb-bells and Indian clubs, and in marching and running. As it would be inconvenient to bring the men to one centre it is intended that the instruction shall be given at one station in each of the five districts. Arrangements can probably be made at a small cost for a few men to go through a course of training in order to qualify them as instructors. About 200 sets of appliances will be required, and each man will have to be provided with a pair of rubber shoes, and the total initial outlay will probably not exceed 150/. We are of opinion that such an expenditure would be fully justified in the interests both of the Brigade and of the ratepayers, and we have no hesitation in recommending—

"That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, we be authorised to incur an expenditure of 150/. in connexion with the institution of physical drill for members of the Brigade."

This was agreed to after some discussion, by a large majority. Opposition was made to it by some of the members of the "Labour party," but it was clearly shown that their views were not those of the firemen themselves, who were stated to be eager for the training recommended.

By-Laws under the Public Health (London) Act, 1891.—The Public Health and Housing Committee reported as follows on this subject:—

"On the 22nd of November last we submitted to the Council the draft by-laws under sections 16 and 39 of the Public Health Act, 1891. These proposed by-laws, as required by Section 114 of that Act, were sent to all the sanitary authorities in London for observations thereon. We have received replies with various suggestions from almost all of the sanitary authorities, and have fully considered them. In some instances the suggestions have been valuable, and we have adopted them. In all cases we have tried to meet the desires of the sanitary authorities so far as was possible, having regard to the fact that these by-laws should tend to raise the standard of private and public sanitation in London. We have also received suggestions from the metropolitan branch of the Incorporated Society of Medical Officers of Health, the Royal Institute of British Architects, the Institute of Surveyors, and the Sanitary Institute, for which we desire to express our thanks."

The 30th of June is the latest date up to which the enactments to be superseded by the Council's by-laws can remain in operation. It is not clear that it is necessary the by-laws should be sent again to the sanitary authorities, but the Local Government Board has expressed to us the opinion that there is some doubt as to the interpretation of Section 114 of the Act, and recommends us to local Government Board in accordance with the provisions of that section a copy of the by-laws as now submitted to each of the sanitary authorities two months before applying for their confirmation."

The Act also directs that notice of intention to apply for confirmation of the proposed by-laws shall be advertised one month before the application for that purpose is submitted to the Local Government Board. The time at our disposal does not admit of this last month being subsequent to the two months during which the by-laws must be in the hands of the sanitary authorities, and the Local Government Board is of opinion that these two periods might be concurrent. We therefore recommend—

"That the by-laws as submitted be made and sealed, that they be sent to the sanitary authorities acting within the County of London, that notice of intention to apply to the

Local Government Board for confirmation of the same be advertised as directed by section 114 of the Public Health Act, 1891, and that in due course application be made to the Local Government Board for their confirmation."

This recommendation was agreed to, with some verbal amendment, and after transacting other business the Council adjourned.

Correspondence.

To the Editor of THE BUILDER.

LECTURES, &c., THE ARCHITECTURAL ASSOCIATION.

SIR,—May we be allowed to remind your student readers that the lectures on "Professional Practice," by Mr. Edwin T. Hall, F.R.I.B.A., commence on April 18, and Mr. F. W. Pomeroy's class on "Modelling" on April 20?

We shall be glad to receive as soon as possible the names of those desiring to enter, so that the necessary arrangements may be made.

E. W. S. G. A. W. GOLDSMITH, } Hon. Secs.
56, Great Marlborough-st., W.,
April 11.

TERRA-COTTA AND STONE.

SIR,—I almost regret that it should be necessary for me to traverse so courteous a letter as that contributed by Mr. Brydon to your last issue in reply to mine of an earlier date. But with all due deference to that gentleman, I must contend that the figures quoted by him in the course of his remarks at the Institute, and which figures were put forward as conclusive, do not convey a fair representation of the *average* relative costs of terra-cotta and stone, inasmuch as neither the Battersea Polytechnic nor any public building can be taken as representing an average of buildings generally, and the price mentioned as the price of the stone was exceptional.

The figure quoted by Mr. Brydon as the cost of the Bath stone-work was 4s. 8½d. per cubic foot. In the bill of quantities one-tenth of the work in the main block was given as "enriched," and I will leave it to Mr. Brydon's professional friends, and to the building trade, to say whether 4s. 8½d. per cubic foot is a usual price for Bath stone-work of average complexity, fixed in London, and of which work one-tenth is to be carved "to the satisfaction of the architect," the price of 4s. 8½d. per cubic foot to include the cost of carving.

The price for terra-cotta certainly did include the cost of all enrichment, and in order to fairly compare the price of that material with stone, it would be necessary not only to include with the stone the cost of carving, but to make sure that the same amount of enrichment was executed in the stone as was provided for in the tender for terra-cotta.

Lambeth Pottery. S. H. LEECH.

The Student's Column.

CHEMISTRY.—XV.

"SETTING" OF HYDRAULIC LIMES, CEMENTS, AND MORTARS.

VERY little is known with certainty about the chemical reactions which cause hydraulic cements to set, but the following seems to be the most reasonable explanation. When a limestone containing clay is properly burnt, hydraulic lime, consisting of quicklime mixed with silicate of lime and aluminate of lime, is produced. The difference between hydraulic limes and hydraulic cements is due to the fact that in the cements there is less free lime and a greater proportion of the calcium silicate and aluminate, produced by the occurrence of employment in them, before burning, of a larger proportion of clay.

When water is added to a mixture of silicate and aluminate of lime, a chemical combination occurs. A crystalline solid, termed *hydrated silicate of lime*, is formed, and being insoluble in water, gradually sets, even when immersed in water. In a similar manner hydrated aluminates of lime and hydrated silicate of alumina are believed to be formed.

Ordinary silica, such as sand, will not combine with lime and water to form hydrated silicate of lime; but if the powdered sand is first burnt with the lime, the anhydrous powder of silicate of lime or calcium produced, will then readily combine with water to form the hydrated calcium silicate.

Silicate of calcium may be decomposed by acids, such as hydrochloric acid, into a gelatinous mass of hydrate of silica termed *silicic acid*, and calcium chloride and water. The gelatinous mass is readily soluble when warmed with a sufficient quantity of the dilute acid.

Hence, in a chemical analysis the amount of silica soluble in acid should always be given separately from the ordinary silica, which is insoluble in common acids, and which plays no chemical part in the setting of cements.

When magnesia is present in the cement or mortar, it also combines with the silicic acid, forming a double hydrated silicate of lime and magnesia, which possesses greater strength than other hydrated silicate of lime or magnesia separately.

Experiments. Group 9.

Ascertain qualitatively the composition of various limestones, limes, cements, and mortars in the following manner:—

In a test-tube place about as much of the powdered substance as can be placed upon a six-angled piece, just cover with water, and add a little HCl.

CO₂.—If much carbonate of lime or magnesia is present in the cement, a strong effervescence will be caused in the test-tube due to the liberation of CO₂.

Silicic Acid.—If much soluble silicic acid is produced, the liquid in the tube will turn to a thick jelly.

Insoluble Silicious Matter.—Add more dilute acid, and boil the contents of the tube until only an insoluble gritty residue remains. This will probably consist chiefly of sand. Filter the solution and evaporate the filtrate to complete dryness in a small porcelain dish.

Silica as Silicic Acid.—Now boil some dilute HCl with the dry mass. If silicic acid was present it will now appear as an insoluble white powder, and should be collected and ignited in a porcelain crucible, the acid or hydrate being decomposed by drying and heating into ordinary silica— $\text{SiH}_2\text{O}_2 = \text{SiO}_2 + 2\text{H}_2\text{O}$. The residue thus obtained may be noted down as "soluble silica," meaning that it is silica which has been brought into solution by means of an acid (HCl). Having filtered off this silica, to the filtrate add ammonia solution (NH₄OH) and ammonium chloride solution, and boil.

Oxide of Iron and Alumina.—Both oxide of iron and alumina are precipitated by this treatment, the former being red, the latter white. They are both rather gelatinous precipitates, and the red colour of the iron often conceals the presence of alumina. If the precipitate is white there cannot be much iron present. To separate mixed precipitate of iron and alumina, collect the precipitate upon a filter paper and reserve the filtrate for the estimation of lime and magnesia. Dry the precipitate and transfer it from the paper to a beaker. Dissolve it in a little strong HCl, dilute with water, and add excess of pure potash (KHO). The oxide of iron separates out as a red precipitate and is filtered off, and to the clear filtrate some ammonium chloride is added, which for some time causes most of the alumina to separate out as a white precipitate.

Lime.—To the filtrate obtained by filtering off the first precipitate of iron and alumina, add excess of ammonium carbonate solution; this will throw down the lime as a white precipitate of calcium carbonate. Collect it in a filter, and to the filtrate add a few drops of ammonium hydrate (NH₄OH) and some phosphate of soda solution.

Magnesia.—If any magnesia was present, a white precipitate of magnesium pyrophosphate will be produced.

In the above analysis it is assumed that, as usual, only silica, iron, alumina, lime, and magnesia are likely to be present in appreciable quantities. If other substances were present the analysis would be much more complicated.

Quantitative Analyses.

Quantitative analyses are made in a very similar manner to the above, by taking a known weight of the lime or cement, and washing, drying, igniting, and weighing the precipitates obtained. To estimate the iron and alumina quantitatively, it is best to divide the acid filtrate obtained after the estimation of the silica into two equal parts, and in one to determine the iron and alumina together gravimetrically, and in the other to estimate the iron only, by titration with standard solution of potassium bichromate. By abstracting the iron oxide, Fe₂O₃, from the total iron and alumina, the amount of alumina is obtained.

The CO₂ is estimated quantitatively in a carbonic acid apparatus, as shown in fig. 13.

B is filled with HCl; C contains a little strong sulphuric acid to absorb the moisture in the CO₂ as it is driven off; A contains a small quantity of water. In this condition the apparatus is weighed. Some of the limestone, or other sub-

stance, in a powdered condition, is now placed in A, and the apparatus re-weighed. By this means the weight of the substance taken, and also the total weight of the apparatus, is ascertained. The

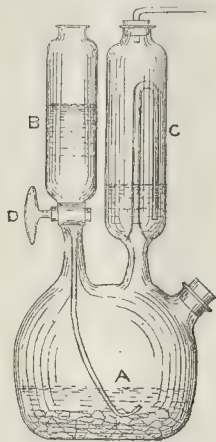


FIG. 13

tap D is now opened, so that the HCl from B runs on to the substance and water. Only a few drops of the acid are allowed to pass into A at one time, and when the effervescence ceases, a few more drops of acid are again run on to the substance. When the substance is completely decomposed, as is shown by the absence of any further effervescence when more acid is added, the apparatus is gently heated until the liquid in A is raised almost to boiling-point, so as to expel practically all the CO₂ from the liquid and apparatus. When cool, the apparatus and its contents are weighed. The loss in weight represents the weight of CO₂ in the amount of substance taken.

Estimation of Sulphates in Cements, &c.

Qualitative.—Place a fresh quantity of the substance in a test-tube and boil it with dilute HCl. Filter, and to the filtrate add some barium chloride (BaCl₂) solution. If sulphates of lime or magnesia were present, a dense white precipitate will be thrown down.

Quantitative.—Place say 5 grains of the powdered substance in a beaker, add about 3 or 4 ozs. of distilled water and about ½ oz. HCl, boil, and then filter off the insoluble matter. Again boil the filtrate, and while still boiling add barium chloride solution until no further precipitation is caused. Continue boiling for a few minutes, then filter and wash, dry, ignite at a bright red heat in a platinum or porcelain crucible, and weigh the white precipitate of barium sulphate (BaSO₄) obtained. Test the filtrate with barium chloride to show that all the sulphate has been precipitated.

Molecular Weight.	Molecular Weight.	Molecular Weight.
Ba 137	Ca 40	S 32
S 32	S 32	O ₃ 48
O ₄ 64	O ₄ 64	—
233	136	80

Now 233 parts by weight of BaSO₄ contain 80 parts of SO₃, and 136 parts by weight of sulphate of lime (CaSO₄) contain 80 parts of SO₃. Assuming that sulphate of lime present in 5 grains of the cement yielded .75 grains BaSO₄, this would be equivalent to .437 grains of CaSO₄ from the 5 grains. The substance would therefore contain 8 ⅓ per cent. CaSO₄. Thus

BaSO₄, BaSO₄, SO₃
233 : 0.75 :: 80 = .257 SO₃.
Now since 136 parts CaSO₄ contain 80 parts of SO₃, therefore .25 grain SO₃ will be contained in .437 grain CaSO₄. Therefore 5 grains of the original substance contains .437 grain, CaSO₄, which is equivalent to nearly 8 ⅓ per cent. of CaSO₄ ($437 \times \frac{100}{5}$).

Estimation of Alkalies.

The alkaline salts, potash and soda, are very soluble in water. To estimate them, treat 10 grains of the cement repeatedly with small quantities of distilled water. Filter and evaporate the

filtrate to a bulk of about 2 ozs. A little lime will also have dissolved out. To get rid of this, add an excess of ammonia, and then a small quantity of ammonium oxalate. Filter off the white precipitate, and evaporate the solution to dryness. Heat the residue to a sufficiently high temperature to drive off all the ammonium oxalate. If any residue now remains, it must consist of oxides or chlorides of soda or potash, and should be weighed. To ascertain whether the chlorides are present, re-dissolve the residue in water, and add a few drops of silver nitrate (AgNO₃) solution. A white curdy precipitate of silver chloride will be produced by the chlorides. If no precipitate is produced, it may be considered that the residue is composed of oxides of potassium and sodium.

Calcium Sulphate, CaSO₄.

This substance is found in nature as *semitic*, as gypsum (CaSO₄ + 2H₂O), and as alabaster.

It is found that the addition of a small proportion of certain anhydrous sulphates to a lime or cement considerably increases its setting power. The setting is due to the combination of the sulphate with a certain amount of water to form a solid sulphate containing "water of combination." Such a lime is termed *semitic*.

Plaster of Paris is obtained by heating gypsum at a moderate heat until nearly the whole of its combined water is expelled. When the powder thus obtained is wetted it recombines with the quantity of combined water that was expelled from it by heating, and consequently sets.

Selenitic Cement, sometimes called *selenitic lime*, contains a small proportion of sulphate of lime, usually plaster of Paris, and derives its name from the native sulphate, *selenite*.

Sulphate of lime is slowly soluble in water. It is soluble in about 500 times its weight of water.

Keene's, Martin's, and Parian cements are plasters consisting principally of sulphate of lime.

Keene's Cement is made by soaking plaster of Paris in a saturated solution of alum and then recalcining it.

Parian Cement by mixing plaster of Paris with a strong solution of borax, calcining it, then grinding and mixing it with a solution of alum and again calcining it.

Martin's Cement is made in a similar manner to Parian cement, pearlash (K₂CO₃) being substituted for borax.

So-called *artificial marbles* are often produced by working colours into any of the above plasters.

Asphaltes.

The substance known most generally as asphalt is a mixture of limestone (CaCO₃) and bitumen, with more or less silicious matter.

Mineral Pitch, or bitumen, its most important constituent, is found in Trinidad and other places. The rock bitumen, which is known as natural asphalt, is found in many countries. Before being used for making roads, &c., it is usually ground and mixed with sand or other silicious matter, and a further quantity of native bitumen. It is then known as *mastic*.

Seyssel Asphalt is manufactured from a rock containing 90 to 92 per cent. of carbonate of lime, and 8 to 10 per cent. of bitumen, which is found at Pymont Seyssel in the Jura mountains. It is made into a mastic in the manner described above.

Val de Travers Asphalt is manufactured from a rock containing a rather larger percentage of bitumen than the Seyssel rock. It is found at Neuchâtel in Switzerland.

Patent British Asphalt is a mixture of quicklime, pitch, saw-dust, and ground iron slag, and is therefore an artificial asphalt.

Coal tar pitch is often employed instead of natural bitumen in the manufacture of inferior artificial asphaltes. Coal-tar pitch is the residue left after distilling coal-tar, and which solidifies on cooling to a hard black mass.

Calcium Chloride, CaCl₂.

is formed in solution when carbonate of lime is treated with hydrochloric acid. It is a residual product from several manufactures. It is very soluble in water and rapidly absorbs moisture from the air, and is much used in laboratories for drying gases.

Calcium Fluoride, CaF₂.

is found as fluor spar or Blue John in the lead mines of Derbyshire, Cornwall, and Cumberland. It is used, as shown in a previous paper, for making hydrofluoric acid for etching glass. It is also used as a flux in smelting operations.

Symbol Ba. Barium Atomic weight 137.

Barium is a metal of a whitish colour. It rapidly

oxidises in the air to form barium oxide. All soluble barium salts are poisonous.

Barium Oxide, BaO , is a greyish porous mass which requires a high temperature to fuse it, and which combines with water to form barium hydrate.

$\text{BaO} + \text{H}_2\text{O} = \text{Ba(OH)}_2$.

Barium Hydrate, Ba(OH)_2 , is soluble in water, and like lime-water, rapidly absorbs CO_2 , forming barium carbonate BaCO_3 . The crystals sold in commerce, as barium hydrate have the composition $\text{Ba(OH)}_2 + 8\text{H}_2\text{O}$.

Barium Chloride, BaCl_2 , may be obtained by dissolving barium carbonate in hydrochloric acid.

Barium Sulphate, BaSO_4 , is found native as *heavy spar*. It is precipitated as a heavy white powder when sulphuric acid or a solution of a sulphate is added to barium chloride solution. It is insoluble in water and acids except concentrated sulphuric acid. Barium sulphate is used as a paint, but has a very poor covering power; it is not, however, discoloured by sulphuretted hydrogen. It is used in large quantities for adulterating white lead and paints.

Barium Dioxide, BaO_2 , is formed when air or oxygen is passed over heated BaO . Its formation during the working of Brin's Oxygen Process has been described in a previous paper.

Barium Carbonate, BaCO_3 , is an insoluble white substance. It is found native as *Witherite*.

Barium Nitrate, $\text{Ba(NO}_3)_2$, may be prepared by dissolving barium carbonate in nitric acid. It is by a soluble salt.

OBITUARY.

MR. VICAT COLE, R.A.—We regret to report that Mr. Vicat Cole, R.A., died suddenly on Thursday, the 6th inst., at his residence, Little Campden-house, Kensington, from failure of the heart's action. According to the *Times*, he was born in 1833 at Portsmouth, and was the son of Mr. George Cole, himself a landscape painter. The father was one of the chief of the "Suffolk-street men," and there, in the Galleries of the Society of British Artists, Vicat Cole made his *début* so long ago as 1852. He soon afterwards became a regular contributor to the Academy, and in 1870 was elected an Associate, and in 1880 he was elected a full Academician.

THE LATE PROFESSOR LÜBKE.—We have to record the death of that well-known and popular German writer on art-history, Professor Lübke, who died at the age of sixty-seven, was a native of Dortmund. At the age of thirty he had produced his "History of Architecture" in consequence of which he was offered the professorship of Architecture in the old Berlin Architectural Academy. His "Elements of Art-History," which has lately reached its tenth edition, gained him the Professorship at the Zürich Technical College in 1867. In 1866 he accepted a similar professorship at Stuttgart, where he remained till 1885, when he accepted a professor's chair at the Karlsruhe "Polytechnikum," where he still held office at the time of his death. Besides the "History of Architecture," his works on the Architecture of the Renaissance in France and Germany were books of great service to the architectural student, and his "Art-History," and his regular contributions to the *National-Zeitung* and other contemporaries, made his name well-known in Germany. He never attained, it is true, a higher position than that of being an able popular writer on art, and his inaccuracies in detail were often severely criticised by more learned specialists; but he did much nevertheless to promote general knowledge of and general interest in art among a wide circle of German readers.

GENERAL BUILDING NEWS.

NEW PRESBYTERIAN CHURCH AT DULWICH.—On the 25th ult. the memorial stone of St. James's Presbyterian Church was laid by Mr. J. A. Campbell, M.P., of Stracathro. The new church is being erected from designs by Mr. R. Watson, architect, King William-street, Strand. The builders are Messrs. Balaam Bros., of Old Kent-road. The building, which is of Gothic design, will be in stock brick, with stone dressings. Sittings will be provided for about 500 persons. There is a centre wide aisle, and naves with stone piers and arches. The pulpit is on the left-hand side of the church, and the choir will be placed in a chancel.

HIGHER GRADE SCHOOL, BATLEY, YORKSHIRE.—On the 8th inst. a higher grade school for girls was opened in Batley by Mr. W. J. Ineson, Chairman of the Batley School Board. The building is situated at Field Hill. There are five class-rooms, which together will accommodate 240 children. The centre hall, which is 50 ft. 9 in. long by 30 ft. wide, has a small gallery. The hall will be used as an assembly room, and will also be available for public meetings. On the lower floor is a room which is to be fitted up with all the necessary appliances for the teaching of practical cookery. The architect was Mr. Harry B. Buckley, of Leeds and Batley. The total cost of the building was 3,429*l.* 16*s.* 8*d.*

FREE CHURCH, AYRSHIRE.—The memorial-stone of the new St. Andrew's Free Church, Ayr, was laid on the 4th inst. by Mr. William Birkmyre, M.P. The church is situated in Bellevue-crescent, is to cost 6,000*l.*, and will accommodate about 800 persons. The edifice is a Gothic structure of red sandstone, with a spire 150 ft. high, and will be built to the design of Mr. J. B. Wilson, Glasgow.

SCHOOL EXTENSION, LIVERPOOL.—On the 5th inst. the new school buildings which have recently been completed in connexion with St. John the Baptist's Church, Wellington-road, Toxteth Park, were opened by Bishop Royston. The buildings contain a schoolroom 40 ft. long by 24 ft. wide and 16 ft. 6 in. high, with large class-room and babies' room adjoining. These are divided from one another with revolving shutters, and are so arranged as to be also available as a parish hall. The architects were Messrs. Woolfall & Eccles, of Liverpool, and the building has been erected by Messrs. Thornton & Sons, contractors, Liverpool.

CATHOLIC CHURCH, TENBY.—On the 5th inst. the new Roman Catholic Church, which has been in course of erection at Tenby for some time past, was opened and consecrated by Cardinal Vaughan. We gave a short description of the building in our issue for September 10, p. 209, but we may here mention that the architect was Mr. F. A. Walters, F.S.A., of Westminster, the builder being Mr. G. Richards, of Tenby. The building will be heated by hot air on Grundy's system.

SUNDAY SCHOOL, PUDSEY.—Memorial stones of the Ratcliffe-lane new Sunday school were laid last July, and on the 4th inst. the premises were opened. The building affords accommodation for about 650 scholars. Internally the large room is fitted with a platform at the east end. Mr. C. S. Nelson, Leeds and Fulneck, has been the architect of the building. The contractors have been as follows:—Mason work, Mr. Thomas Wood; joiner, Mr. Thomas Hinton; slater, Mr. F. Thompson; plasterers, Messrs. J. Laycock & Sons; plumber, Mr. Joseph Scarth; painter, Mr. John Nicholson. Heating apparatus has been supplied by Messrs. Hargreaves & Dewhurst.

NEW NURSES' HOME AT HOLBECK, YORKSHIRE.—A branch home, in connexion with the Leeds Association for Nursing the Sick Poor, is in course of erection at Holbeck. Plans prepared by Mr. Walter A. Hobson, architect, of Leeds, were selected, and the contract for the erection of the building was let to Mr. William Barber. The exterior elevation of the building is faced with pressed bricks, and relieved with stone dressings, the roof being covered with dark Welsh slates. The ground floor comprises an entrance-hall, living rooms, kitchen, and scullery. The upper floor contains the bedrooms and bath-room.

NEW BAPTISTRY AND CHOIR VESTRY AT KIRKLEY CHURCH, SUFFOLK.—A baptistery and choir vestry have been added to Kirkley Church, at the expense of Mr. E. K. Harvey. The baptistery is placed at the south-west corner of the edifice, and measures 25 ft. long by 22 ft. 8 in. externally, with apsidal end, in which are inserted five tracery-headed windows of Bath stone. The walls are 2 ft. 6 in. thick, faced with splint flints and stone dressings. A large window of two lights is introduced in the south wall, and in the east gable end is inserted a traceried head of an old window, taken from the south aisle of the church. The roof is covered with slates, laid on boarding and felt. The walls of the baptistery internally are faced with white and red bricks, with bands of dark glazed bricks. The floor is of solid oak parquetry of ornamental pattern, and raised two steps above the floor of the church. The roof internally is of pitch pine. The five windows in the apsidal end are filled with stained glass, the subject of the centre window being "Our Saviour blessing little children." The two-light windows on the south side are glazed with cathedral glass, with borders of stained glass. The new font is of Caen stone, with carved centre pillar, and four small columns of serpentine marble. The general contractors for the work were Messrs. Elsey & Jenner, builders, of Kirkley. The stained glass windows and brass were the work of Mr. H. J. Salisbury, of St. Alban's, and the oak parquetry floor was executed by Mr. J. Ebner, of London. The Caen stone work of the font was executed by Mr. Whitehead, of Lowestoft, and the stone carving throughout by Mr. W. Savage, of Kirkley. The sculptured marble panels of the font were executed by Mr. C. H. Mabey, of London. Mr. George Versey, of Kirkley, has done the plumbers' and painters' work. The works have been carried out from the designs, and under the superintendence, of Mr. Thomas Porter, architect, Lowestoft.

NEW BUILDING ESTATE, CARDIFF.—We understand that about twelve acres of the new Heath Estate, Cathays, opposite the Barracks, Cardiff, have been acquired by a company, which will shortly be registered under the title of "The Heath Property Company, Limited." Plans for four new streets, to be called Llanishen-street, Manor-street, Talgarth-street, and Allen's Bank-terrace, were on the 8th inst. deposited at the Borough Engineer's office by Messrs. Wall & Salt, who are the architects to the company. Upon the twelve acres about 260 houses will be erected, fifty of which will have a frontage of 18 ft. 6 in. each to Whitechurch-road, facing the Barracks Field, and eighteen will have a

similar frontage to Allen's Bank-road. The depths of these plots will average 120 ft. The other plots will have 16 ft. frontages to the new streets above-named, with depths of 85 ft., and will carry small villas. The main sewers in Whitechurch-road and Allen's Bank-road will be communicated by the Corporation almost immediately.

PARISH-ROOM, CARNFORTH.—A parish-room is about to be erected at Carnforth, Lancashire, from the designs of Mr. Robert Walker, architect, Windermere.

SANITARY AND ENGINEERING NEWS.

AMBULANCE SERVICE IN LONDON.—Mr. Edward Tidman, C.E., at the request of Dr. B. W. Richardson, F.R.S., read a report on the above subject at the monthly meeting of the Sanitary Inspectors' Association, held in Carpenters' Hall, E.C., on the 8th inst. He explained that there were two principal services supported by voluntary contributions, viz., the St. John's Ambulance Association and the Hospitals' Association. The former possessed twenty-two Metropolitan stations, and the value of the service might be judged by the fact that at the Royal Agricultural Show 26, at the Military Tournament 47, and at the Naval Exhibition 479, or a total of 552 cases, had been attended by the ambulances. The annual income was about 13,000*l.*, and the expenditure about 10,000*l.* Mr. Tidman referred to the ambulance work of the Hospitals' Association, which, from their last report, had attended 2,101 cases, or an average of twenty per patient. The above assistance may touch on "infectious cases," but the latter did remove invalids at low fixed charges to all parts of the world. With regard to infectious cases, these were dealt with by the Metropolitan Asylums' Board, which had during 1892 removed 32,000 cases. Particulars of the systems were given by Mr. Tidman; and Mr. Ryan, of the Hospitals' Association, who attended the plan of the work of the new form of ambulance carriage. Mr. Jones, on behalf of the Asylums Board, also gave some interesting details of the work, showing the speed at which the cases were dealt with after notification; and, after an interesting discussion, a vote of thanks was passed to Mr. Tidman for his report.

STAIN SEWERAGE WORKS, BOURNEMOUTH.—We understand that the tender of Messrs. B. Cooke & Co., of Phoenix Wharf, Battersea, have been accepted for the two contracts for the new main sewers through the Central Gardens and Boscombe Chine, amounting to about 12,000*l.* The work is to be carried out under the Engineer to the Corporation, Mr. F. W. Lacy, C.E.

SEWERAGE, CLOWY.—The Worktop Rural Sanitary Authority have accepted the tender of 1,924*l.* sent in by Mr. John Bentley, of Leicester, for the construction of certain pipe sewers, and laying out sewage farm. The estimate of the engineer (Mr. W. H. Radford) for the works was 2,250*l.*, and an additional sum of 500*l.* was included for contingencies.

DRAINAGE, PENNINGTON, HANTS.—In consequence of the recommendation of the Sanitary Authority, it has become necessary to make some provision for drainage at Pennington. A committee has therefore been formed to consider the matter, and they have instructed Messrs. Pinder & Fogarty, civil engineers, Bournemouth, to prepare a scheme for the drainage of the district.

FOREIGN AND COLONIAL.

FRANCE.—The fifth exhibition of the "Société des Peintres-Graveurs" has been opened at the Durand-Ruel Gallery; it will close on April 28.—The Société des Pastellistes opened its annual exhibition last Saturday at the Georges Petit Gallery.—The formation of a new Art-Society is announced at Paris, under the title of "Société des Miniaturistes et Enlumineurs de France"; this society will also have its annual exhibition.—M. Puvion de Chavannes has been commissioned to undertake the decoration of the Public Library of Boston (United States).—The unpublished works of Meissonnier belonging to his widow, and which she proposes to present to the State, will form an exhibition to be opened to-day at the École des Beaux-Arts.—In consequence of its further development, the Société Nationale des Beaux-Arts will this year occupy the large Galerie Rapp at the Champ de Mars, in addition to the galleries already occupied by it in previous years.—The Société Française d'Anthropologie has undertaken an interesting report on the characters inscribed on the well-known Celtic stone monuments of Carnac and Locmariaquer, and it is hoped that the inscriptions may be deciphered.—In the ancient Roman arena at Nîmes-Bains a fine bas-relief has been discovered, executed in white stone, along with gold jewellery of Phœnician character, and some medals and effigies of Roman emperors.—The works for the construction of the fort at Truc, near Bourg-St.-Maurice, have just been commenced.—The most important defensive works of the frontier, near the pass of Petit-Saint-Bernard.—A committee has been formed to raise a monument to Jules Ferry by public subscription, at Saint-Dié (Vosges).—A considerable fire has

curled in the forest of Fontainebleau, destroying the most picturesque portions of the forest, the neighbourhood of Gorges d'Apremont, the "Union Artistique du Nord" will open this year, at Lille, an international fine-art exhibition, which will be open from August 1 to October 1. It is announced that the exhibition of the works of the members of the French school at Rome has been opened at the Villa Medici. It includes, among other things, a restoration of the Pantheon, by Chédanne; a restoration of the Palazzo Vecchio, Florence, by M. Tournaire; a study of the temple of Vesta and the tomb of Bishop Saluti Fiesole, by M. Sortais; drawings of various fragments from the temple of Hercules, by M. Trombadori; and the tomb of Scipio, by M. Trombadori. The drawings will be exhibited in Paris in the latter part of June.—The death is announced of M. Didier Debut, sculptor, a former pupil of David d'Angers. He was sixty-nine years of age.—We have also to record the death of M. Cardos, a distinguished student of coinage, who left a valuable collection of coins to the town of Montpellier; that of M. Camille Paulin Lancelotti, architect, and of M. Jousseaume, a well-known bibliophile, who had created the "Bibliophile" series, among the most remarkable of which was a splendid edition of the works of La Fontaine, illustrated by the first artists of the day.

BERLIN.—The Royal Art Commission has been constituted by the Minister of Education. The members include nine painters, two sculptors, two architects, one chemist, and two laymen. The duties of the Commission will be the selection of works of art for the Prussian National Gallery, the examination of all art work carried out with public money. The two architects on the Commission are the vice-president of the Prussian Royal Academy, Professor Ende, and the church-specialist, Professor Schwechten. The two laymen are the President of the Gallery, Herr Jordan, and the late German Ambassador at Rome, Gen. Rath Von Wendt. As reported in a former number, the abolition of the old cathedral dome has been put to the hands of the royal engineers. The first attempt to blow up the building was unsuccessful. An officer in charge had calculated the amount of dynamite necessary, but an all too careful civil commission that is responsible for any damage done to the neighbouring castle and museums had reduced the charge. The Emperor, who was in attendance, much vexed at the failure. A second attempt was made this week.—A bust of the late Professor Karl Boetticher, the archaeologist and author of the "Tektonik der Hellenen," is to be placed in the Central Hall of the Royal Technical College. A very well-illustrated and very necessary fund is being raised by voluntary subscription.—In Berlin architectural circles, there are always been much admiration for Danish Renaissance work of Christian IV., the fact that this much respected monarch is to have a bust at Copenhagen has given great pleasure.—Interest shown will probably take a substantial form in the coming year, as the competition has been opened for plans of a small "colony" of dwellings for eighty aged artisans. The buildings are to be erected at Halle, at a cost of 25,000l. Among the assessors we see the names of Herr Paul Wallo, the new Imperial Houses of Parliament, Herr Jo Licht, of Leipzig, and Herr Schmieden, of Berlin.

MISCELLANEOUS.

THE CLOISTERS, JESUS COLLEGE, CAMBRIDGE.—The Academy of the 8th instant says that threeteenth century arches have just been found under the plaster of the eastern side of Jesus College Chapel, and that they are, apparently, part of the dining of the cloisters in the old convent. But a survey of arches there is no new thing, for in Vol. I. of Mr. J. W. Clark's edition of Professor Willis's "Medieval History of the University of Cambridge" (reviewed by us on July 24-31, 1886), it is said, in a foot-note, that "some years ago when the wall was stripped off the east wall of the cloister remains of arches were disclosed, which may be portions of the chapter-house doorway, or of the entrance to the internal passage between the chapter-house and the transept gable." Mr. Clark adds: "The one of these arches may still be traced by cracks in the plaster. One of the round windows that are closed to light the bedrooms just cuts into them." The cloister, which has no counterpart in either Oxford or Oxford, stands north of the nave of the church, and is a fine specimen of the late Mary and Rhedgrave, founded in A.D. 1133. Sir John Alcock, Bishop of Ely, established a college here (1497) he retained the cloister, converted it into a church, with changes of its plan, in the interval 1510-1525 into the college chapel. We see that Sir John Rysdale rebuilt the cloister, giving it by the spaces formerly occupied by the choir of the church. In Loggia Master's Hall, Jesus College, circa 1688, we see the deambulatory closed by a wall pierced on the north side with perpendicular square-headed windows, having lights. The cloister has been modernised, except, of course, cloisters in secondary courts; as of red brick at Queens, Cambridge. Indications of Wolsey's intention to place a cloister around his angle at Christ Church.

since; that feature of it is introduced into our two-page illustration, September 3, 1887, of Messrs. Carpenter and Ingelow's addition to the College, including the block of chambers (1870) designed by Mr. Waterhouse, R.A. Various portions of the chapel were restored by Salvin and by Pugin in 1846-9, and in 1884-7 by Mr. Bodley, A.R.A.

ELECTRIC LIGHTING AT CARDIFF.—The Corporation of Cardiff, guided by the Electric Lighting Committee, have decided upon the main lines of their scheme for the illumination of the town by electricity. The lighting station will cover about an acre of ground on the Canton Common. The site belongs to the Corporation, and is situated close to the Great Western Railway on the northern side, and at the extreme end of Eldon-road. The idea at present is to erect only one-fourth of the building, and the extension of the station will depend upon the demand for electric lighting in the town. The plans prepared by the Borough Engineer (Mr. W. Harpur, M.Inst.C.E.) show that the first portion of the station will be 82 ft. square. The space allotted for engines and dynamos will be 80 ft. by 30 ft., with a boiler-house of the same size. Behind the boiler-houses and adjoining the Great Western Railway will be the coal stores, 14 ft. by 60 ft. The chimney which it is proposed to build at first, and which appears to be the larger of the two included in the plans, will be 105 ft. high. It will be octagonal in form, and its external size will be 8 ft. 6 in. at the base. One of the reasons which induced the committee to fix upon the Canton Common site is that the station can be easily supplied with fuel, and negotiations with the Great Western Railway Company for a siding from the main line into the works are now proceeding. If a reasonable arrangement can be made a great saving in haulage will be effected. Mr. W. H. Massey, M.Inst.E.E., has prepared the details for the engines, dynamos, street mains, and services. The estimated cost of the work at present contemplated is 32,000l.

SOCIETY OF ENGINEERS.—At the meeting of the Society of Engineers, held at the Town Hall, Westminster, on Monday evening last, Mr. William A. McIntosh Valon, J.P., President, in the chair, a paper was read by Mr. H. Conradi on "The Cleaning of Tramway and other Rails." The author commenced by offering a few remarks with reference to street-cleaning appliances in general, and the conclusion arrived at by him was, that they do not tend to keeping tramway rails clean, but rather the reverse. He then referred to the regulations enforced by some local authorities which compel the tramway companies to leave their lines in the muddy and dirty condition engendered by the general street traffic unless mud-collectors were used in combination with the apparatus for cleaning the rails. He pointed out that, although the combination of a mud-collector with an ordinary street-sweeping machine had been condemned and abandoned, several local authorities still imposed this combination as a condition on the tramway companies when using rail-cleaning machines. He also showed how prejudicial to both animal and mechanical traction dirty tram rails were, and described several machines devised for effecting their clearance. These inventions, without exception, were of rigid construction, and, therefore, incapable of accommodating themselves to the inequalities of the track. The author next described his rail-cleaning machine, in which the principal of elasticity was introduced, and was combined with lightness of construction. The first apparatus constructed by him consisted of two tubes, each containing a vertical spring. In each of these main tubes was suspended an internal tube, leaving ample clearance for free play. To each of the inner tubes was fixed a leaf spring, to which was attached the scraper-point and straight-plate, forming the cleaner. The lifting and lowering gear, carried on a cross-shaft, was worked by a connecting rod and lever from the driver's seat. After a private trial the apparatus was modified by making the scraper-spring a full coil, by making the scraping-steel and the shovel-plate separate, and the latter of angular shape, and increasing the size of each. Triangular brushes were also added. The author then proceeded to point out the advantages of his cleaner, which he said was subjected to one and the same time to four constantly varying conditions, viz., deviations and irregularities of the permanent way; lateral deviation of engine or car; vertical motion of engine or car; and the forward motion of the car or engine. The apparatus had been fixed to four tram-cars at Reading, and had now been in satisfactory operation for eighteen months. He described several experiments made during the running of the cars, by which it was shown that the traction resistance met with by a car running on rails cleaned by the previous car was from 25 to 30 lb. less than when running on dirty rails. He also compared the cost of various systems of cleaning, arriving at the following results:—By hand, once a day, 1s. per mile of single line in the fine season, and 2s. per mile in the severe season. Watering by cart twice a day, 2s. 6d. per mile. By the author's rail cleaner, as often as required, 6d. per day.

THE FURNITURE TRADES' EXHIBITION.—There is not much in this exhibition (opened on the 6th inst. and to close on the 15th) of special interest to

our readers, but we may mention a few items. Messrs. Tanyges exhibit a circular saw-bench and a hand-sawing machine of good finish and convenient design. The Britannia Company showed a very convenient band-saw machine with inclinable table. Mr. Sydney Butler exhibited three or four very useful wood-working machines. Centres of attraction to the visitors were the three different types of wood-carving machines—two of them American and one English—which are based on the principle of the pantograph. The machines are known as Moore's "Universal" carving machine, the "Seaman" carving machine, and the "Pneumatic Wood-carving Machine"—the last-named being the English machine. They all seem capable of doing work of about the same quality, but of necessity all "carved" work so produced must be tame and lifeless, though it is cheap. Among one or two exhibits left over from the recent Building Trades Exhibition we may mention that of Mr. Robert Adams, who has a good display of his specialities in door-springs. His square-sectioned steel spring hinge for swing doors, the "Victor," with and without check action, will compare with any we know for strength, durability, and continuity of action. His fanlight-openers, casement bolts, and safety reversible sash windows are also well and favourably known.

STANDARD GAUGE FOR MATCHED TIMBER.—Messrs. J. M. Bennett & Sons send us a specimen and description of their metal standard gauges for ordering grooved and tongued boards. These are carefully made iron standards of various sizes, distinguished by numbers, each standard giving a special size and section of groove and tongue. The idea of the patentees is that a general use of such gauges would result in a great saving of time, if all timber for matched work were made according to these gauges, and ordered simply as "No. — Bennett's" Glen Cove "Standard gauge." That the general adoption of such a standard gauge would be a convenience there is no doubt; but its practical utility must depend to a great extent upon its general adoption. It is worth the attention of builders and contractors.

STREET IMPROVEMENTS, READING.—On the 6th inst. Colonel W. M. Ducat, R.E., the Inspector appointed by the Local Government Board for the purpose, held an inquiry at Reading respecting an application made by the Reading Corporation for permission to borrow 16,740l. for the improvement of Minster-street and Wokingham-road. The plans, sections, &c., were explained by the Borough Engineer, Mr. Arthur E. Collins.

ELECTRIC LIGHTING IN EDINBURGH.—At a meeting of the Electric Lighting Sub-Committee of the Edinburgh Town Council on the 5th inst., the question was discussed at some length whether the Corporation should themselves go on to put in force their Electric Lighting Provisional Order, or hand it over to a company. By eight votes to three it was resolved that the Corporation should take the matter in hand themselves, and this recommendation will be reported in due course to next meeting of the Lord Provost's Committee.

ENGINEERING APPOINTMENT.—The post of resident engineer of the deep water lock works at Barry Dock, rendered vacant by the departure of Mr. J. Robinson, M.Inst.C.E., from the district, has been filled by the appointment of Mr. A. H. Case, Assoc.Inst.C.E., a native of the North of England. Mr. Case has, says the *Western Mail*, for years been an assistant to Mr. J. Wolfe Barry, M.Inst.C.E., of London, the consulting engineer of the Barry Railway Company.

NEW PULPIT, PEEL CAUSEWAY.—A pulpit has just been completed in St. Peter's Church, Peel Causeway, Cheshire. It is octagonal in form, and has been designed to correspond in style with the reredos which was erected last year. It is executed in variegated alabaster, and has been made from the designs of Messrs. Tate & Poppelwell, by J. & H. Patteson, of Manchester.

MEETINGS.

FRIDAY, APRIL 14.
Institution of Civil Engineers (Students' Meeting).—Mr. D. Carnegie on "The Manufacture and Efficiency of Armour-plates." 7.30 p.m.
Junior Engineering Society.—Mr. R. W. Newman on "The Sanitary Engineering of Dwellings." 8 p.m.
SATURDAY, APRIL 15.
Architectural Association.—Visit to the French Protestant Church, Soho Square, by permission of the architect, Mr. Aston Webb. 3 p.m.
MONDAY, APRIL 17.
Royal Institute of British Architects.—(1) Special General Meeting (for Members only) to consider the suspension of By-law 25. (2) Ordinary General Meeting; Paper by Mr. H. W. Burrows on "Building Stones." 8 p.m.
Society of Arts (Lecturer).—Mr. Lewis F. Day on "Some Methods of Ornament."—II. 8 p.m.
TUESDAY, APRIL 18.
Institution of Civil Engineers.—Discussion on the late suspension of By-law 25. "Steam-Engine Trials." 8 p.m.
Royal Statistical Society.—Mr. Augustus Sauerbeck on "Prices of Commodities during the last Seven Years." 7.45 p.m.
Builders' Clerks' Benevolent Institution.—Annual Dinner, Cannon-street Hotel, E.C. 6.30 p.m.

shing Apparatus and Water-waste Preventer for Water-

ARCH 30-6,708, F. Sator, Process and Composition Polishing Wood.-6,746, W. Keynor, Prevention of Staining of House or other Drain-pipes.-6,731, J. J. Gowers and Hangings, Cornices, Mouldings, for Walls or Ceilings.-6,729, G. Strong, Plumb-line Level combined to answer Five Purposes.-6,757, G. Vert, Latching Bolts applicable to Rein, Mortice, and other.-6,761, W. Anstey, Gas Brackets.-6,761, H. Henschen, Hinges or Hinge Plates for Use on Bars, Casements, Windows or Doors.

PROVISIONAL SPECIFICATIONS ACCEPTED.

6,745, J. and J. Wilson, Chimney and other Cows.-1,919, Barnsley, Ball Taps.-2,650, C. Porter, Slide Hinge.-4, J. Allan, Plumb-line.-4,129, W. Hostwick, Machinery for the Manufacture of Metal Lathing.-4,185, Anderson, Domestic Fire-grates.-4,403, M. O'Brien and Reasons, Improved Gate.-4,500, A. S. Franklin, T. Set Squares.-4,545, T. Falconer, Window-sash or Light Opener.-4,735, G. Jakes, Opening and Closing Bars.-4,739, F. Cole and J. Rosa, Combined Burglar and Door Fastener.-4,797, C. Rice, Portable Door for Preventing Doors being Shut.-4,908, J. Armistead, Controlling Window-shutters.-4,999, C. Leni, Improving Water-closets.-4,999, H. Budden, Window-sash Fasteners.-5,069, L. Waghorn, Flushing Pipes.-5,551, R. and J. Shaw, Automatic Saw Feeding Machine.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

1,939, T. Riordan, Sash-fastener.-9, G. Bray, Ventilating Rooms.-959, F. Ryan, Roofs and Roofing Plates.-2,351, J. K. Wood, Construction of Bars and Ceiling.-2,591, E. Naylor, Grates.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

1,931, 5-By T. Wakefield, 2 a, and 4, 24 even, Plymouth, Tottenham, at 84, gr. 68, 1, 7, 12, 17, 22, 27, 32, 37, 42, 47, 52, 57, 62, 67, 72, 77, 82, 87, 92, 97, 102, 107, 112, 117, 122, 127, 132, 137, 142, 147, 152, 157, 162, 167, 172, 177, 182, 187, 192, 197, 202, 207, 212, 217, 222, 227, 232, 237, 242, 247, 252, 257, 262, 267, 272, 277, 282, 287, 292, 297, 302, 307, 312, 317, 322, 327, 332, 337, 342, 347, 352, 357, 362, 367, 372, 377, 382, 387, 392, 397, 402, 407, 412, 417, 422, 427, 432, 437, 442, 447, 452, 457, 462, 467, 472, 477, 482, 487, 492, 497, 502, 507, 512, 517, 522, 527, 532, 537, 542, 547, 552, 557, 562, 567, 572, 577, 582, 587, 592, 597, 602, 607, 612, 617, 622, 627, 632, 637, 642, 647, 652, 657, 662, 667, 672, 677, 682, 687, 692, 697, 702, 707, 712, 717, 722, 727, 732, 737, 742, 747, 752, 757, 762, 767, 772, 777, 782, 787, 792, 797, 802, 807, 812, 817, 822, 827, 832, 837, 842, 847, 852, 857, 862, 867, 872, 877, 882, 887, 892, 897, 902, 907, 912, 917, 922, 927, 932, 937, 942, 947, 952, 957, 962, 967, 972, 977, 982, 987, 992, 997, 1,000, 1,001, 1,002, 1,003, 1,004, 1,005, 1,006, 1,007, 1,008, 1,009, 1,010, 1,011, 1,012, 1,013, 1,014, 1,015, 1,016, 1,017, 1,018, 1,019, 1,020, 1,021, 1,022, 1,023, 1,024, 1,025, 1,026, 1,027, 1,028, 1,029, 1,030, 1,031, 1,032, 1,033, 1,034, 1,035, 1,036, 1,037, 1,038, 1,039, 1,040, 1,041, 1,042, 1,043, 1,044, 1,045, 1,046, 1,047, 1,048, 1,049, 1,050, 1,051, 1,052, 1,053, 1,054, 1,055, 1,056, 1,057, 1,058, 1,059, 1,060, 1,061, 1,062, 1,063, 1,064, 1,065, 1,066, 1,067, 1,068, 1,069, 1,070, 1,071, 1,072, 1,073, 1,074, 1,075, 1,076, 1,077, 1,078, 1,079, 1,080, 1,081, 1,082, 1,083, 1,084, 1,085, 1,086, 1,087, 1,088, 1,089, 1,090, 1,091, 1,092, 1,093, 1,094, 1,095, 1,096, 1,097, 1,098, 1,099, 1,100, 1,101, 1,102, 1,103, 1,104, 1,105, 1,106, 1,107, 1,108, 1,109, 1,110, 1,111, 1,112, 1,113, 1,114, 1,115, 1,116, 1,117, 1,118, 1,119, 1,120, 1,121, 1,122, 1,123, 1,124, 1,125, 1,126, 1,127, 1,128, 1,129, 1,130, 1,131, 1,132, 1,133, 1,134, 1,135, 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ESTIMATES GIVEN ON APPLICATION

The Builder.

VOL. LXIV. No. 2620.

APRIL 29, 1893.

ILLUSTRATIONS.

Tower and Spire, St. Michael's, Coventry: Elevation and Plans.—From a Drawing by the late Mr. J. Drayton Wyatt	Four-Page Ink-Photo.
Seaton Delaval Hall, Northumberland.—Sir John Vanbrugh, Architect	Two Single-Page Photo-Litho's.
New R. C. Church and Rectory, Carlisle.—Messrs. Dunn, Hansom, & Dunn, Architects	Single-Page Photo-Litho.
Premises, No. 18, Bishopsgate-street-within.—Messrs. W. E. & F. Brown, Architects	Single-Page Photo-Litho.

Blocks in Text.

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Wakefield County Council Offices Competition.



HE result of this competition was briefly referred to in last week's issue, and we are now able to give more detailed reference to the designs which were submitted. The competition originated in the proposal to provide Council Chamber and offices at Wakefield for the County Council of the West Riding of Yorkshire, and the West Riding General Purposes Committee were empowered by the County Council to take the necessary preliminary steps. The instructions to competitors and the conditions that were issued appear to have been carefully prepared, and giving a schedule of the accommodation required arbitrary restrictions likely to hamper individuality of the architect were avoided. Section 1 dealt with the Council Chamber, seat 150 members, four Committee rooms, Chairman's room, luncheon and smoking rooms, kitchen and caretaker's apartments, whilst Section 2 scheduled nine rooms for the accountant; Section 3 seventeen rooms for the Clerk of the Peace and County Council, deputy, and the Clerk of Indictments, three rooms for Asylums, five for Technical Instruction Department, and three rooms for that of the Weights and Measures. Section 4 enumerated seven rooms for the Medical Officer of Health; Section 5 eleven rooms for the West Riding Solicitor, and Section 6 eleven rooms for the West Riding Surveyor. The site for the new buildings is bounded by Bond-street, Cliffe Parade, Burton and Hardy streets. The present Council offices are accommodated in buildings now occupying the site, and competitors were invited to submit, if they thought fit, an alternative scheme utilising these buildings, but this suggestion was not acted upon by any of the competitors, entirely new buildings being provided. The Council served to itself the right of making its own selection of designs, aided by the assistance of the West Riding Surveyor and Architect, and the award that has been made shows that no injustice has been done to competitors. The premiums that were offered were

200*l.* to the successful competitor, in addition to the usual commission for carrying out the work, 50*l.* to that placed third; and twenty-eight sets of designs were submitted. Of these, three designs were selected in the following order, that by Messrs. Gibson & Russell, of Westminster; Messrs. Cooksey & Cox, of Charing Cross; and Messrs. Simpson & Richardson, of Wakefield. The drawings were publicly exhibited in the Wakefield Corn Exchange on the afternoon of Wednesday of last week, and on Thursday a private view was granted to exhibitors and the press in the Wakefield Grand Jury Room. Recognition is due to the County Council officials for their courtesy in supplying information and offering facilities to those interested in the exhibition. As the names of the authors of the premiated designs only were made known, we are obliged to refer to some of the designs only by the mottoes they bore.

Messrs. Gibson & Russell deserve credit for the able way in which they have grasped the problem offered by the lines and shape of the site, and the simplicity with which they have planned a building in every way suitable to the ground it has to occupy. It needed only a slight deviation from the lines of two of the less important streets surrounding the site to form a true diamond shape, and this has been adopted by the authors, who take Bond-street as the principal frontage and base of the parallelogram, and the position of the principal entrance at the corner of Bond-street and Cliffe Parade. By disposing the buildings around the site in this way, with a perfectly lighted corridor on the interior face of the building, a simple plan is produced, with large central areas each side of the Council Chamber, which is placed on the shorter axis of the parallelogram immediately opposite the principal entrance, and in an interior position which provides the quietness of surroundings necessary for a chamber of debate. The position allotted to the secondary staircases and lavatories on each floor in the interior angles on the long axis is a good one, easily accessible from either corridor. Provision had to be made in the designs for future additions, and these Messrs. Gibson & Russell showed at the angle of Burton and Hardy streets, opposite the main entrance, and until these are made,

the buildings will not continue along the whole of the two less important sides of the parallelogram. The secondary entrances are at the junction of Bond and Hardy streets and Cliffe Parade and Burton-street, so that ultimately there will be entrances at each corner. The secondary staircases are immediately adjacent to the secondary entrances, and the public and officials will have convenient access to all the business departments without necessarily using the principal entrance. The principal entrance leads into a staircase hall, with a waiting-room beyond for deputations, thence the general staircase leads to the first-floor and Council Chamber, where convenient cloak-room accommodation is provided. A large ante-room leads on to the chamber itself, which has its seats arranged amphitheatrically so as to face the Chairman and the officials' table in centre. The Chairman's parlour is placed over the entrance vestibule, and has on the left on the corridor the four Committee rooms facing Cliffe Parade, and on the left hand a corridor with rooms for the clerks' department facing Bond-street. The Councilors' smoking and luncheon rooms are placed beyond the Committee room at the corner of Cliffe Parade and Burton-street, with the kitchen and caretaker's rooms over. The Accountant's department is placed on the ground floor facing Cliffe Parade, with the Surveyor's department facing Bond-street. The offices of the Clerk of the Peace and County Council are on the first and second floor. The Asylums department has been placed on the second-floor between the clerks' and Solicitor's departments. The ground floor of the central Council Chamber block is allotted to the technical instruction offices. The remaining departments are placed as follows:—Weights and Measures on the ground floor facing Burton-street; the Medical Officer of Health on the first floor above the last named; whilst the West Riding Solicitor department is placed on the second floor facing Cliffe Parade and part of Bond-street.

Messrs. Gibson & Russell have not thought it necessary to provide passenger lifts, but lifts for coals have been provided in the angle blocks for lavatories already referred to. The basement is devoted to stores and workshops, and for the introduction of stores, a cart entrance is provided in the centre of the Hardy-street frontage. The

authors state that their elevations are Renaissance with English detail, such as may be met with at Kirby and Wollaton Halls. The main elevations are to Cliffe Parade and Bond-street, and a domed campanile is placed over the main entrance at the angle. The Bond-street elevation has two gables at the Hardy-street and one gable at the other end. The intervening space is differently treated, with large circular windows on the ground floor, mullioned and transomed windows on the first and circular headed windows on the second floor, below which a bold band of strap-work decoration is introduced. The elevations are distinctly graceful, and considerable variety of line and detail is introduced. The portion of the Cliffe Parade façade containing the Committee-rooms is treated in a somewhat similar manner, with the introduction of richer detail and carving. The authors state that they propose to use local bricks, with dressings of Elland Edge stone, and red tile roofs. We notice, however, that the elevations show little indication of such treatment, being evidently designed for stone façades. The limit of cost was not referred to in the conditions, and has therefore led to considerable divergence in the estimates of competitors. Messrs. Gibson & Russell's estimate amounts to 60,000.

Messrs. Cooksey & Cox have adopted an entirely different principle in planning their building. Discarding the shape of the site as guiding lines, they have endeavoured to arrange a right-angled building upon a diamond-shaped site, and though they have been more successful than could have been expected, the result is a loss of simplicity in arrangement and a sacrifice of valuable space. Bond-street is taken as the principal frontage, which is set back so as to be at right-angles to the blocks of buildings facing Cliffe Parade and Hardy-street, and the latter is brought beyond the main front to the full extent of the site. The Council Chamber is well placed in the centre of the site, and the back portion, facing Burton-street, has been reserved for future extensions. The front entrance occupies the centre facing Bond-street, and from the entrance-hall corridors proceed right and left, and lead into the corridors which run the length of the side blocks. At the end of these single corridors secondary entrances for the public and officials are placed, and the staircase to upper floors, with lavatories adjacent, occupy a projecting block between the corridors and the central block. The principal departments are arranged on the two side blocks, the Surveyor's department being placed in the Hardy-street frontage for the sake of the north light. The four Committee-rooms face Bond-street, and are on the first floor, with luncheon and smoking room on the second floor above. The Chairman's room is placed near the head of the main staircase. The special points of the plan of the Council Chamber is the ante-room, with a division lobby on each side. The chamber itself has been planned with a segmental-shaped back wall, and a segmental apse for the Chairman and officials. The plan has evidently been carefully thought out, and has many good points, but we think that a diamond plan is the best arrangement, with the entrance at the angles. The staircases to the principal department in this design are not readily seen on entering the building by the secondary entrances. Messrs. Cooksey & Cox estimate the cost of the building at 55,000. The elevations, which are delicately drawn, are kept quiet in character, and are intended to be executed in brick, with stone dressings and a red tiled roof. A tower has been dispensed with. The central porch is semi-circular on plan, and the central feature is a fleche, which is not quite happy in the lines with which it joins the roof. The considerable projection of the Hardy-street block is not apparent, and the effect in perspective would not be altogether happy, we think. The detail is distinctly original and delicate

in parts, but at times it is weak, as in the central portion of the main front, where thin pilasters appear to support a cornice of somewhat massive proportions. The elevations to Cliffe Parade and Hardy-street are much alike in composition, and are distinguished by four semi-circular pediments, two at each end. This central portion of the long line of roof is kept up, and the centre is emphasised by a copper fleche.

Messrs. Simpson & Richardson, of Wakefield, in their design followed the diamond shape of the plot and placed the main entrance at the corner of Bond-street, and the Council Chamber occupies the position it should in the centre of the site. The darkness of the corridor, however, upon each side of which offices are ranged, is not a good point. The staircases are dotted about in various and not always similar positions, and would not easily be found by the public. The elevations are carefully drawn, and show a considerable amount of quiet dignity.

Only brief reference can be made to some of the remaining designs, and of these the mottoes only were published. "Lux" has a circular Council Chamber in the interior position, and has grouped the Committee-rooms around it. The position is a good one for the Committee-rooms, which are there top-lighted, but it unduly cramps other portions of the plan. The main entrance is in the centre of Bond-street.

"Honi Soit Qui Mal y Pense" places the main entrance in the centre of Bond-street frontage. The corridors are mostly double. The Council Chamber is placed on the Hardy-street frontage. The square plan on the diamond shape is here very evident.

"Toison d'Or" is distinguished by a remarkable similarity of plan to that adopted by Messrs. Gibson & Russell. Position of main entrance, single corridors, position of Council Chamber, and staircases, and lavatories all coincide in a singular manner, and had the elevations, which show a certain refinement of detail in parts, been a little less heavy as a whole, the design might have occupied a better place in the competition.

"Tutus in undis" has a central entrance in Bond-street, with a square and octagonal chamber in the interior position. The plan is simple in its lines, and the elevations are quiet and well-proportioned. A feature is made of the tower.

"Experience" adopts the square-lined plan, and has shown considerable ingenuity in grouping the Committee-rooms round the Council Chamber in the interior with well-lighted corridors. The elevations are a somewhat severe treatment of an early type of the Renaissance.

We are glad to be able to endorse the award made in this competition.

THE MEISSONIER EXHIBITION.

THE exhibition of the works of Meissonier at Messrs. Tooth's Gallery is not quite such a representative one as we are asked to suppose; it does not contain all the works exhibited in Paris, and we can recall in our memory many examples of the small and exquisitely-finished class of miniature works which more especially made Meissonier's reputation, which are not to be seen here. In fact, the larger proportion of the works here exhibited, numerically, are sketches and studies, and not finished pictures. But there are sufficient very fine specimens of the artist's finished work to give an adequate idea of his powers, while the large number of sketches and studies, hitherto unknown to the public, have a new and special interest, as taking us behind the scenes and letting us into the manner of working of a painter who, as craftsman at all events, may claim a place among the greatest masters of the brush that the world has ever known.

A translation of the biographical sketch of the artist's life and character by Dumas is prefixed to the catalogue. As our Paris correspondent has already noted, this is a very *couleur de rose* portrait of the artist by

a very friendly hand. The fact we believe is undeniable that Meissonier was anything but a popular character, and made and left very few friends. Yet there are points in this biographical sketch which may perhaps suggest reasons for this which are not entirely unfavourable to him. To anyone who had asked how he had contrived to produce such an amount of highly finished and indeed faultless work, he might have replied, says Dumas, that it was because he was always thinking about it, and it was probably in some measure owing to this intense pre-occupation with his art that he appeared cold and unsympathetic in his social relations. Of his unwearied application in rendering his works perfect Dumas mentions a remarkable instance in the case of his own portrait, which had been sent to the Salon after about forty sittings. But Meissonier said, "After the picture returns you must give me twenty sittings more, for the portrait is still far from what it ought to be"; and this was for a picture which he was executing as a gift and not for gain. Surely this is a noble and instructive example of the striving after perfection which is the characteristic of the true and devoted artist.

Such a collection as this suggests, indeed, a fresh consideration of the often-repeated question as to what are the qualities which constitute real greatness in the work of a painter. In the whole of this collection there can hardly be said to be one work which exhibits imaginative power or that striving after an ideal beauty which we often speak of as the highest end of art. And yet we can hardly recall any exhibition of the collected works of one painter from which it seemed so difficult to tear oneself away, or in which the principal works seem absolutely certain to retain their position as art treasures of permanent and imperishable value, a value which depends entirely upon the perfection of the artist's mastery of his art within his own limits. To take one of the most typical works in the room, "Le Peintre d'Enseignes" (849), well known from engravings—one could hardly imagine a subject of less intrinsic interest. It is merely a very common-looking tavern-keeper of the Napoleonic era, looking critically at the painting of a Bacchus astride of a cask which an ordinary journeyman sign-painter has been executing for him. But the picture is life itself. The "Patron" is a type of a class; and the admirable drawing and pose of the figure, the expression of his face, screwing up his eyes as he gazes at the work, the careful and conscientious painting of the costume, the manner in which the painting itself, seen in much foreshortened perspective, is yet finished as if this were the main object of the work; all show us an artist who was content with nothing short of perfection in the task he had set himself. Yet even this is surpassed by some others, for instance "Les Joueurs d'Echecs" (851), a small painting of two men over a chessboard, which is quite astonishing in its minuteness and mastery of execution. Each of the small chessmen, even, about an eighth of an inch high, seems a separate study. Say what we will about the prosaic character of the subject, it is impossible to imagine that such a work can ever lose its value (as long as pigments last) as an example of brilliant and conscientious craftsmanship. Another which should be especially looked at is the one entitled "Gentilhomme Louis XIII." (147) a single figure with an architectural background, remarkable as much for the learned and solid painting of the face, turned a little upward in full light, as for the minute and perfect execution of every detail of the costume. "Le Voyageur" (1,074), a horseman riding slowly against a strong wind, is another most remarkable work, more especially in the manner in which the laboured action of the animal is conveyed. A smaller picture which may be taken as a study for this, but with the horse turned the opposite way, is in another room. In the "Féna, 1806"

(1,073), we have one of the most striking of Meissonnier's portraits of Napoleon, looking with fixed and concentrated gaze after the cavalry who are charging. In painting Napoleon Meissonnier comes nearer to the quality of imaginative insight than in most of his other works; he gives the character as well as the outer semblance of the man. The two finest examples of this penetration in painting Napoleon, the "1814" and the "Retreat from Moscow," are not in this exhibition. The "1814" may be said to be one of the most remarkable instances of the expression of a whole history concentrated in one figure and in one moment that has ever been seen in painting; but it must be admitted that this power of intense character-expression is somewhat exceptional in Meissonnier's work; Napoleon seems to have had a special fascination for him. Several studies here indicate the trouble he was at in studying the outer personality of his hero; one of a horseman with the head omitted, facing the spectator, is evidently intended as a study of Napoleon's figure and seat on horseback.

The numerous studies of horses, men, and parts and limbs of men and horses, speak eloquently of the pains Meissonnier took in preparing and perfecting his work. When his great water-colour painting, "1807," was first exhibited in London, we noticed particularly the remarkable drawing of the figure of the officer leading the charge, and half turning in his saddle to salute Napoleon, the left leg stretched out in the stirrups to maintain his balance. There are two or three studies for this leg, of which the perfect and successful attempt seems to be "Jambe gauche du colonel en selle," No. 278. Other figures or parts of figures for the group of galloping horsemen in the same picture are to be met with at intervals all round the room.

The later works in water-colour, on a larger scale than Meissonnier's earlier manner, are perhaps among the finest things in the exhibition, and their breadth and freedom of style seems the more emphasised by contrast with the minutest work of most of the oil paintings. "Le Guide" (423), showing a man walking in front of a group of cavalry riding down a road towards the spectator, is one of the finest of these; and another very remarkable work, a broad and grand sketch in water-colour under the title "Sur l'escalier" (429) is worth special attention; it shows a man and woman looking over the balustrade of a staircase at something or some one below, and has something more of poetic feeling and suggestion about it than is usual with Meissonnier; there is at all events a certain interest in it beyond the power of execution; it suggests a critical point in a story. A highly interesting little picture, which is hung too high to be well seen, is "Ruines des Tuileries" (416), a very carefully painted study of part of the interior of the Tuileries after the fire. At the end of the ruined building is just seen in the distance the top of the Arc de l'Etoile.

It will surprise many who only know Meissonnier by the class of subjects usually connected with his name, to find so many small studies of landscape and buildings, portions of towns, &c., and even two or three seapieces, among the works exhibited; and though he was not so great in these as in his favourite class of figure-subjects, they all show competent and careful handling, the buildings not the least so. The exhibition is one of the artistic events of the season, and should be missed by none who care for art: no such opportunity is likely to occur again.

A NEW J.P. WELL KNOWN TO BUILDERS.—Mr. Alexander Ritchie, Kelvin-house, South Lambeth-road, and of the firm of Steven Bros. & Co., iron-founders, Upper Thames-street, has been appointed by the Lord Chancellor, on the recommendation of the Lord-Lieutenant, the Duke of Westminster, a Justice of the Peace for the County of London. Mr. Ritchie is also a member of the Court of Common Council, and is a "London Scotsman" well known in connexion with Scottish institutions in London.

NOTES.

THE Hull dock strike, as we anticipated last week, was hardly set on foot before all sorts of side issues were brought in, with the object of causing the origin of the dispute to drop out of sight. The employers were represented as making a "dastardly" effort to smash the Dockers' Union, although the Secretary of the Shipping Federation, when charged with this, replied decidedly, "Oh, no! We do not desire to smash anything, and certainly not the trades unions." The Employers' Committee at Hull also distinctly stated very early in the fight that they do not ask any applicant for work whether he is a Unionist or not, and remarked in their manifesto that their sole aim and object was to enforce the elementary right on their part to employ both free and organised labour without let or hindrance. The labour leaders made much of the action of the magistrates and guardians, and of the presence of the military in Hull, but in this they were obviously only following out the policy of directing attention to anything rather than the original point in dispute. This was passed by with the statement that the insistence on the right to combine was all that the men claimed;—a right, the assertion of which by employers is usually stigmatised as "dastardly." As to the military and the additional police, both the local authorities and the Home Secretary held the grand old maxim that "prevention is better than cure," and the Hull ratayers will doubtless consider that the expenditure on this head has not been incurred in vain. The widening of the area of the dispute would have been disastrous from every point of view, and any movement tending to obviate future disturbances of this nature will be universally welcomed. The Bill introduced by Mr. Mundella on Monday has this end in view, through the means of local conciliation boards. Arbitration in labour disputes will thus be encouraged, and it is also proposed to register and report the decisions of arbitrators—a provision which cannot fail to add to the utility of the proposed boards.

SIR JAMES WHITEHEAD'S Bill to declare illegal all railway rates which exceed those paid in 1892 is rather late in the day. Notice of its introduction was not given until the companies had reinstated a very large proportion of the old rates, and promised that such advances as were retained should not exceed 5 per cent. The Bill would have been more to the purpose two or three months back, when rates were put in force which exceeded those of 1892 by 50 and 100 per cent.—and that without any intimation of future modification. As it is, the action now taken by the companies limits their net gain, under the revision, to 2½ or 3 per cent. In any case the proposed legislation is a striking commentary upon that of the past few years. The Acts fixing the maximum rates were only passed after a series of the most exhaustive Parliamentary inquiries ever held, and it is now proposed to practically repeal them. Further inquiry seems inevitable, and Mr. Mundella has promised a Select Committee to consider the effect of the revision, and the best means of settling disputes in the future. In view of the probability of this inquiry resulting in further legislation, Sir James Whitehead's measure, which was read for the first time on Monday, is only of a temporary character.

WE reported some time back that the German Emperor had decided that Professor Begas should be the sculptor of the national monument to the late Emperor William I., and we understand that the sculptor is already hard at work carrying out his commission. We now hear that the architect of the monument has also been selected by the Emperor, who has apparently

given his Court architect, Herr Ihne, the cold shoulder in favour of a Herr Halmhuder, a protégé of the sculptor in question. Whilst Herr Ihne signed the architectural sheets to Professor Begas's competition work, it was Herr Halmhuder who worked for him on the design finally accepted by the Emperor. It is amusing to hear how Baurath Ihne drew the Emperor's attention to certain weak points of Herr Halmhuder's design, and how the Emperor, in his characteristic way, ordered his Court architect to make a better one if he could. Herr Ihne tried to, but the Emperor considered the work shown him too clumsy for the purpose, and far inferior to Herr Halmhuder's scheme. Herr Gustav Halmhuder, who drew up his designs in accordance with the wishes of Herr Begas, is quite a young man, a junior member of the New Imperial Houses of Parliament atelier. His name is well known in German architectural circles, and the Emperor's decision is very popular.

THE pedestal discovered in 1891 at Athens, bearing the signature of the sculptor Bryaxis, has been more than once discussed from the point of view of epigraphy. In the last number of the *Bulletin de Correspondance Hellénique* (viii., Dec., 1892), just published, M. Louis Couve offers us for the first time phototype plates of the sculptures represented on this basis, and discusses their relation to the history of Greek art in general, and the sculptures of the Mausoleum in particular. On three sides of the pedestal the same scene appears, worked in very low relief—a man on horseback advances towards a tripod. On the fourth side is the dedicatory inscription. Three persons, a father and two sons, Demainetos, Demeas, and Demosthenes, have dedicated the monument that surmounted the pedestal, a monument now lost, to commemorate victories gained by all three in succession in the contest known as anthippasia. They contended in their capacity as phylarchs. Below the inscription is the signature of Bryaxis, who was a pupil of Scopas, and a conjoint worker at the Mausoleum. M. Louis Couve, after a detailed examination, concludes that the pedestal supported not a statue, but a tripod. As Bryaxis would not be likely to make a tripod, the inscription must refer to the sculptures of the pedestal. We have, therefore, in them a specimen, and the only one extant, of the work of Bryaxis. Further, they were executed in the early part of his life—as in his middle and later life he moved to Asia-Minor, from which there is no evidence of his return.

THE "Pitt Press," Cambridge, is about to be enlarged under the superintendence of Mr. H. Dawson, architect.* The University Press originated in a grant made by Henry VIII. in 1534 to the University of a right to appoint three printers or "stationers." During the sixteenth and seventeenth centuries, the University printers did the work at their own homes. John Siberch, the first to be appointed, lived in the "Royal Arms," since a part of Gonville and Caius College, opposite St. Michael's church. Another, Thomas Buck, occupied what had been the refectory of St. Augustine's Priory, between Luthburne, since Free School, lane, and Slaughter-lane, since Corn Exchange-street. The Friars' refectory is drawn in Hammond's map (1592): its site is now occupied by the Museums and Natural Science Lecture-rooms. In 1655 the authorities leased from Queens' College a plot at the corner of Silver-street and Queens'-lane. Some premises built there by John Field were enlarged forty years later. It is stated that a printing-house was included in Gibbs's plans (1715) for the Library, Senate House, Schools, &c., opposite Market-hill. In 1762 the Syndics began to acquire the present site in Trumpington-street, between Silver-street and Mill-lane, with

* See our Tenders list of March 25; the accepted contract is for 6,136l. 13s., by Mr. W. Tindall, of Cambridge.

purchasing the "White Lion" on the south side of Silver-street. In 1821 they bought the "Cardinal's Hat" inn, Trumpington-street, and James Walter, architect, built new premises on its site, which were completed in 1827. Meanwhile, the Senate and the Committee of subscribers to the William Pitt Fund, London, agreed to devote the surplus, after payment of 7,000*l.* for Chantry's statue in Hanover-square (erected in 1831), to an enlargement of the Press, to be called by his name. The University voted in the end a total sum of 11,925*l.* for properties adjacent to the "Cardinal's Hat" site, and in March, 1832, the new Pitt Press was finished at a cost of 10,710*l.* after the designs, in the Late Perpendicular style, of Mr. E. Blore, architect. Various additions have since been made, including a building in the south-west corner of the quadrangle, 1877-8, planned and designed by Mr. W. M. Fawcett, architect.*

IT has been announced that the Duke of Westminster has sold to Mr. William W. Astor his Cliveden, or Cliefden estate, which forms so well known a feature on the river's left bank between Taplow and Cookham. "Cliefden's proud alcove" (as it is termed in Pope's often-quoted lines) was originally built of red brick with stone quoins and dressings, for George Villiers, second Duke of Buckingham. It passed to Lord George Hamilton, created Earl of Orkney on January 3, 1696, by his marriage in the previous year with Elizabeth, eldest daughter of Sir Edward Villiers, the first Duke of Buckingham's half-brother. Having been occupied for a while by Frederic, Prince of Wales, for whose entertainment there, on August 1, 1740, Thomson wrote in conjunction with Mallet the libretto for Arne's masque of "Alfred," all excepting the two wings of the house was burnt on May 20, 1795, and with it a set of tapestry hangings illustrating Marlborough's victories, wherein Lord Orkney had played a signal share. In 1819, the property, covering about 400 acres, was divided into seven lots for sale at auction, and some repairs were done to the buildings. But the mansion as we now see it was erected after a second fire of 1849, from the designs of Sir Charles Barry, architect, for the Duke of Sutherland. Barry left the old wings, rebuilding the central block in the Italian style, the front elevation (south), consisting of an engaged order of two stories with an unbroken entablature and a balustrade, standing upon a wider ground floor. The five day-rooms in this central block overlook the original raised terrace 135 yds. long, whence steps lead down to the lawn. Brick, coated with cement, was used. A whole-length plan and elevation, to scale, are given in Bishop Barry's life and works of his father: and a scale drawing of the central block in the *Builder* for July 6, 1850. A temple on the lawn was designed by Leoni in 1735; the water-tower by Mr. H. Clutton in 1861. Barry is said to have taken his general idea from old Somerset (Denmark) House, attributed to *inter alios*, John of Padua, whom some take to be John Thorpe.

THE "Building Stones used in Edinburgh" is the subject of a paper written by an architect, Mr. George Craig, in the current number of the *Transactions of the Edinburgh Geological Society* (Vol. VI., pt. iv., p. 254). He observes that the Scottish capital has long been advantageously situated with reference to good building stones. The oldest known freestone quarries in the vicinity are those of Craigleith, Craigmillar, Salisbury Crags, Lochend, Brunsfield, Ravelston and Quarryholes. Of these, the Craigleith occupied the chief place, and for a long series of years the public and private buildings of the New Town were almost

entirely built with stone from this well-known quarry. Subsequently, Redhall, Binney and others were opened up, and although Mr. Craig says they are somewhat inferior in quality to Craigleith, they are regarded still as very good building stones. About the year 1860 Polmaise and Plean came to be extensively used. Gradually the stones quarried in the district have become practically worked out, or can only be obtained at a high price, so that in recent years Edinburgh architects have had to seek material farther afield. The author says, however, that there is still plenty of good sandstone to the west of the city that could be quarried without much difficulty. Within the last ten years pink stone from the New Red formation has come much into favour. Nearly all the building stones used in Edinburgh are sandstone, and, as the author observes, the weathering qualities of the rock depend upon the nature of the cement binding the grains of quartz together, which varies considerably in different beds, even in the same quarry. Speaking of the Craigleith quarry, he observes that it has an area of about seven acres, and is about 200 ft. deep; the zigzag road to the bottom is three-quarters of a mile in length. Particulars as to locality, geological position, chemical analysis, specific gravity, amount of water absorbed, crushing weight, weight per cubic foot, tint, texture, weathering qualities, and buildings wherein used, are given with each stone, as far as possible. Altogether, it is an interesting and instructive paper.

THE recent case of the Queen v. the Tottenham Local Board of Health, which was decided by the Queen's Bench Division, is of interest, though it decides no new legal point. An attempt was made to obtain a Writ of Mandamus to compel the Local Board in question to construct a sewer. But as the Board had exercised their discretion, the Court decided the Writ could not issue. The practical point was, therefore, more interesting than the legal one. An owner of land built some houses along a lane. The owner was of opinion that the Local Board should construct a sewer down this lane to be connected with an outfall at the end of the owner's land. The Board, on the other hand, were of opinion that the owner should make this sewer at his own expense. The Local Government Board, to whom a kind of appeal on the facts had been made, agreed with the view of the Local Board. The practical difficulty which seems to arise from the decision, is that a Local Board can hand over duties which ought to be performed by a public body to a private person. For *prima facie* it is the duty of a public body to make sewers into which the drainage of the houses can be conveyed. That there is some conflict between the fifteenth and one hundred and fiftieth sections of the Public Health Act 1875 on this point appears obvious, and this may require to be settled by legislation.

AT the last monthly meeting of the Manchester City Council, a question of considerable interest to architects was discussed. The Technical Instruction Committee brought forward a recommendation that the foundations of the proposed Technical Schools, and the brickwork of the basement, should be let by contract or by schedule of prices forthwith. Sir John Harwood at once moved an amendment "that no part of the works be commenced until tenders had been obtained for the completion of the building. No prudent man, he added, in building a house, would commit himself by laying the foundations before he knew whether the structure was to cost him 6,000*l.* or 10,000*l.* After several others members of the Council had spoken, Sir John's amendment was adopted, apparently without a division. We think the Council has done wisely, seeing that, according to the speakers, there is no

need of haste in the erection of the buildings. In cases where rapid progress is imperative or where no limit of cost has been fixed, the foundations and basement may well be let separately. But in cases where a strict limit of cost has been fixed, and especially when the design has been selected in competition subject to such a limit of cost, it is only fair to the building owners and to the other competitors that the cost of the whole building should be known before any considerable amount of work is done. "A Manchester Architect and Ratepayer," writing to the *Manchester Guardian* on this point, instances the case of a church for which there was a competition, 6,000*l.* being laid down as the limit of cost. The successful competitor, "whose designs were accepted on his assurance that they could be carried out for 6,000*l.*," induced the committee to let him put in the foundations before the tenders for the whole were obtained. The church cost about, if not more than, double the stipulated amount." If the facts be as stated, and if the committee did not cause the increase of cost by requiring additions to be made to the original design, the architect's conduct was undoubtedly reprehensible, and the unsuccessful competitors had just cause for complaint. Other instances could be mentioned where preliminary contracts for foundations and basement have committed men to an expenditure far beyond their intentions. Such incidents reflect seriously upon the credit of the professional part of our art, and are likely to make committees think twice before they sanction contracts for only part of a building. They will prefer to wait, as at Manchester, until the cost of the whole is known. No reflection whatever appears to have been cast on the architects of the Manchester Technical School; it is a case of the whole profession suffering for the misleading estimates of some of its members. The just suffer for the deeds of the unjust.

REFERENCE has already been made in our columns to the current dispute between the Tilers' and Bricklayers' Unions as to the "right" of either body to execute tiling. We are glad to see that at a conference between the delegates of the two bodies at the Chamber of Commerce on Friday the 14th, the following resolution was agreed to:—

"That this Conference adjourns on the understanding that the Delegates will refer the questions asked them to their respective Unions, and that the Executive Committee of the London Labour Conciliation and Arbitration Board will be prepared to make suggestions to both parties to the dispute, and that the Delegates will recommend that hostile action on both sides should be suspended pending the adoption or rejection of such suggestions, modified or otherwise."

This is a more sensible course than quarrelling, so far. In the meantime we may suggest that, on the highest grounds, the right to execute the work belongs to those who can show that they can do it best, and that from that point of view ancient custom, one way or the other, is of very little consequence.

THE exhibition of the Society of Water-colours may be reckoned as one of the best that has been seen there. It is true that there is a large proportion of what may be called regulation work by old stagers of the society, who have occupied the same space on the walls for years, whose drawings seem the same every year except where they are deteriorating. This, in a "close" society, is a usual concomitant evil which cannot we presume be avoided. But the work of the best members of the more advanced régime is of the highest character. In particular, Mr. Alfred Hunt may be said to have surpassed himself in the delicacy and loving finish of his two principal works, "A South-country Manor-House" (113) and "Brignall Banks" (212); the latter is one of the most beautiful things we have ever seen in watercolour, giving the effect of the multiplicity of detail

* For some particulars here given we are indebted to Mr. Clark's edition of Professor Willis's "Architectural History of Cambridge University."

of nature while escaping anything like hard realism. Both are works to be studied carefully; their full beauty and tenderness is not to be appreciated at a glance. Next to Mr. Hunt's one of the names we always look to first is that of Mr. A. Goodwin, who we are glad to find is continuing his efforts to illustrate Dante, as seen in the fine and imaginative work "Thence Came We Forth to Behold the Stars" (26); we say "efforts," as the complete realisation of Dante's conceptions in form and colour can hardly be regarded as within the possibilities of painting. The same artist's "Amalfi" (34) is a fine study of light effect. Mrs. Allingham's contributions are "A Source of the Wey" (80), "May on Hampstead Heath" (206), and "A Cottage at Freshwater" (231). Among architectural subjects is an interesting study of "Toledo" (5), by Mr. S. J. Hodson, and a very fine broad painting of the "Court of Lions" at the Alhambra (85), by the impressionist member, Mr. Arthur Melville, whose very impressionist picture of the "Nile at Boulak" (166), whether we approve of the method or not, is a great success in its way, and a most refined bit of colour. Mr. Tom Lloyd sends a large work, "Ploughing on a White Frost" (14), in which we do not seem to be quite sufficiently conscious of the white frost; his "Anchor Inn" (27) is a charming riverside picture. Mr. L. Smythe's "An Impression—Boulogne-sur-Mer" (109), is not an impression in the impressionist sense, but a very realistic yet broad and free study of fisher-folk. Of Mr. Holman Hunt's extraordinary works, "Sunset in the Val d'Arno," and "Athens," we would rather say nothing; what the sunset is meant for one can understand, what is the meaning or the point of the "Athens" is utterly incomprehensible. Among fine landscapes are "The Road over the Downs to Littlehampton" (36), by Mr. Thorne Waite; "Lyne Cage, Cheshire" (16), by Mr. Eyre Walker, who has also surprised us by an excellent little picture study of a boy "In Wonderland" (190); "Kendal Fair" (73) a curious study of effect, by Mr. Cuthbert Rigby; "Oxwich Castle" (94), by Mr. E. A. Waterlow; two scenes on the Stort, by Mr. Eyre Walker (112, 118); "Beyond Blue Hills" (125), by Mr. North; "Königs Spitze from Sulden Thal" (170), a grand painting of a snow-covered mountain by Mr. Philip, and others which we have not space to mention. Mr. Walter Duncan sends several figure subjects, all marked by his individuality of style and fine sense of colour, though none of them showing quite what he *can* do; in his picture of "An Old English May-day" (192), he is to be credited with a humorous attempt to give what was probably the real truth about the boisterous and red-faced jollity of those days. Mr. Walter Crane's pretty decorative fancy, "Poppies and Corn" (180), is in his best vein, the poppy figure especially. Mr. Herkomer sends a small and very fine portrait of Mr. Briton Riviere (207). Among architectural works is a study in the Roman Baths at Bath, by Mr. Poynter (202); and among works of this class by able men are some which nevertheless we cannot accept as satisfactory; *ex. gr.* Mr. Hodson's "St. Mary-le-Bow" (95), which is too lanky in proportion; Mr. Herbert Marshall's "Hyde Park Corner" (61), which is hardly recognisable, and his "Trafalgar Square" (29), in which the front of the National Gallery is seriously misrepresented, and St. Martin's, moreover, is not in its right position in reference to the other building.

"picturesque" in architecture; and his own character and manner were as truthful and free from affectation as his architecture. He will leave many regrets behind him.

ROYAL INSTITUTE OF BRITISH ARCHITECTS:

EXAMINATION OF BUILDING STONES.

THE twelfth ordinary general meeting of this Institute was held on Monday evening last, Mr. Henry Currey, Vice-President, in the chair.

The Hon. Sec., Mr. William Emerson, read the result of the Preliminary Examination, held in March, to qualify for registration as Probationer of the Institute. Ninety-four gentlemen had passed, and their names and addresses, as well as the names of the gentlemen to whom they were articles, were read.

Mr. H. W. Burrows, A.R.I.B.A., then read a paper on "The Examination of Building Stones." He commenced by describing some of the leading types of structure in building stones, and their manner of origin. He described the characteristics of granite, sandstones, limestones, marble, and dolomitic or magnesian limestones. Before selecting a stone, its capability of resisting disintegration should be tested, whether such disintegration might arise from the action of the atmosphere upon the chemical constituents of the mass from the mechanical effect produced upon the stone by frost, wind, or other atmospheric and climatic agencies, or from the crushing strain to which the material might be subjected in the structure to be formed by it. It was often necessary to visit the quarries to ascertain that blocks of sufficient size could be obtained for the required work, and to note the depth of bed, particularly if it were proposed to use the material for columns. It had more than once happened that architects had expected to obtain long monolithic columns, in sandstones or limestones, where the depth of the quarry-bed was not sufficient to supply stones of the required dimensions. In such cases it became necessary to joint the columns, for, if due attention were not paid to that point, they might get to be erected as monoliths, with the planes of bedding vertical. The result of such a proceeding might prove disastrous if the load had been calculated for upon the resistance to crushing ascertained from stones bedded horizontally, the crushing strength being, of course, much less when the bedding planes are vertical. In the same quarry the beds of stone varied very considerably in disposition, texture, grain, and composition; some were hard, compact, and crystalline, while others were soft and incoherent. We might also notice the effect of weathering upon old blocks of the various beds, and would frequently find that they afforded valuable information as to the behaviour of the stone under climatic influences. We might compare the stone with similar material in structures of considerable antiquity, and note the effect produced upon it by the atmosphere. If we could feel assured of the identity of the stone with that we proposed to use, there was much to recommend that method of investigation; but as stones of very similar appearances were often vastly different in composition and structure, it was often a difficult matter to feel certain as to their identity. In any case a more detailed examination was to be preferred, and for that purpose certain tests were usually employed, which might be classed under two main divisions: (a) mechanical and (b) chemical. Of these he only proposed to discuss those regarded by most authorities as of importance—*e.g.* crushing weight, absorption, specific gravity, Brard's test, the acid test, Smith's test, and chemical analysis. Finally he would consider another, and, as he ventured to think, by far the most important method, that of microscopical analysis. Having dealt with the crushing strength of stones, the author referred to the absorption test, and said that, comparing the amount of absorption with the crushing strength, it would be found that as the absorption of water increased, the strength of the stone diminished, and *vice versa*. It would also be noticed that limestones must be compared with limestones and sandstones with sandstones; for a like percentage of absorption in a sandstone and in a limestone did not necessarily indicate that they had the same crushing weight. This was perhaps to be accounted for by the fact that in many of the limestones the whole mass of the stone was more or less of an absorbent material, whereas in the sandstones only the matrix and the interspaces between the component particles could absorb water, the quartz or siliceous matter of the grains

being non-absorbent. The more crystalline forms of limestone, the dolomitic varieties, for example, had a high crushing strength and a low absorbent rate. The broad fact could be stated that the ordinary non-crystalline limestones usually absorbed over 6 per cent. of their dry weight of water, and the sandstones under 6 per cent., and it would also be found that, with very few exceptions, the rise and fall of the crushing strength was synchronous with the decrease and increase of the absorption of water. It might even be suggested, the relationship being so close, that in very few instances need a crushing weight test be instituted, as the absorption test was sufficient to show the crushing strength. There was a considerable range of variation in the crushing strength in similar stone, and the absorption test would in nearly all instances indicate the strength well within this range of variation. It would be advantageous to bear that in mind in selecting untried stones when it was desired to employ local material. An inter-relationship undoubtedly existed in building stones between the absorption of water, the crushing strength, and the action of frost, and it was much to be desired that further experiments should be carried out to establish the connexion. Inferences drawn from the amount of absorption were more to be relied upon for indicating the possible behaviour of the stone under the action of frost than those to be deduced from a study of the crushing strength. Having treated of the specific gravity of stones, the lecturer described Brard's test, which consisted in subjecting the stone to the action of sulphate of soda. Small cubes were boiled in a saturated solution for half-an-hour. The stone was then dried in the air over the vessel in which it was boiled, so that any disintegrated particles might be caught. The process was repeated for four days, and the amount of stone forced off by the crystallisation of the salt in the pores of the stone was determined. Originally that test was supposed to imitate the action of frost on stones, but the late Mr. C. H. Smith had shown that sulphate of soda did not expand in crystallising, like water when freezing. Hence the action was of quite a different kind, and was one to which the stone would not be subjected by the ordinary processes of nature. Why not submit the stone directly to freezing mixtures if the action of frost was to be estimated? The test was essentially one requiring a comparative series of experiments to be of the least value. Isolated experiments here and there gave no indication of the relative behaviour of various stones. What was known as the "Acid Test" was described in Rivington's "Notes on Building Construction" as consisting in soaking a stone for some days in dilute solutions containing 1 per cent. of sulphuric acid and of hydrochloric acid, which, it was stated, would afford a rough idea as to whether the stone would stand a town atmosphere. A drop or two of acid on the surface of the stone would create an intense effervescence if there was a large proportion present of carbonate of lime or carbonate of magnesia. Certainly that was a rough test, for we should reject by it all the limestones, which would readily effervesce with the acid, and many of these were fairly durable, even in town. Mr. C. H. Smith's test consisted in breaking off a few chippings about the size of a shilling, putting them into a glass about one-third full of clear water, and after letting them remain undisturbed for at least half an hour, the water and specimens should be agitated by giving the glass a circular motion with the hand. If the stone were highly crystalline, and the particles well cemented together, the water would remain clear and transparent; but if the specimen contained uncrystallised earthy powder, the water would present a turbid or milky appearance in proportion to the quantity of loose matter contained in the stone. Very varying results could be obtained by that test, and at best it seemed only likely to indicate characteristics which could be as easily determined with the naked eye. Coming to the discussion of chemical analyses of stone, the lecturer said we constantly saw statements put forward by stone merchants and quarry-owners, giving the chemical composition of some particular stone. The point to which most attention was usually directed was the presence of silica, as that mineral was almost indestructible, and the inference was that, the higher the proportion of silica, the more durable the stone. If that argument were correct, we should be driven to the conclusion that all sandstones were, with hardly an exception, better than limestones, or even granites. If we compared the analyses of granites with those of sandstones, it would be found that the pro-

WE hear with great regret of the unexpected death of Mr. R. Herbert Carpenter, the senior partner in the firm of Messrs. Carpenter & Ingelow. Mr. Carpenter was a true artist in his work, which was always, however, characterised by a sobriety and restraint of style which was the more to be valued at a time when there is such a prevailing and conscious effort to be

portion of silica was far less in the former. If we were to judge by that fact alone, we should come to the entirely erroneous conclusion that granites were far less durable than sandstones. Comparing analyses of sandstones with those of limestones, we should invariably find, as would be expected if the origin of the rock were considered, that the proportion of the nearly indestructible constituent—silica—reached a higher percentage than in the limestones, 8 to 10 per cent. of silica in the latter being seldom found. Chilmark, for example, had 10·4 per cent., and Tottenhoe stone 8·5 per cent.; while in many of the best known and most valued limestones, such as Portland, the proportion of silica did not exceed 1½ per cent., the bulk of the residue being carbonate of lime. Comparing analyses of limestones with each other, we should still find that the proportion of silica afforded no guide whatever as to the weathering capabilities of a stone. The grey chalk of Folkestone had an insoluble residue of 3·61 per cent., and the bulk of that was silica; but such excellent weather-resisting stones as Barnack, Ancaster, and Kelson had no silica. Thus any inference drawn from the presence of silica was not to be relied upon unless supported by something beyond the facts supplied by chemical analysis. Before we could arrive at any satisfactory conclusion as to the weathering properties of a stone, it was absolutely essential that its state of aggregation should be ascertained. Having dwelt on this point at some length, the lecturer proceeded to call attention to the value of microscopical examination. He said that to ascertain the capacity for resistance to weathering, it was far more important to understand the manner in which the component grains of the stone were bound together, than to discover the composition of either the grains in detail, or of the rock as a whole. The nature of the cementing material and its disposition around the particles of which the rock was formed, or the state in which the crystals, or grains of the rock occur, should be the chief objects of inquiry, for as a rule it was to this, far more than to the chemical composition, the rock owed its strength and durability; to ascertain that we must resort to microscopical investigation. For that purpose portions of the stone were fixed to glass slides by Canada balsam, and were then ground down till they were transparent. That method of investigation was first used for rock sections by Dr. Sorby in 1856, so that it was unknown to the Royal Commissioners who, in 1839, inquired into the question of selecting stone for the new Houses of Parliament; if it had been known, the lecturer believed it would have been used in preference to the chemical and physical methods adopted, not absolutely supplanting them, but very considerably enhancing their value. With a transparent section of the stone, ordinary transmitted light was sufficient to show the structure of the material, and the disposition of the component particles and matrix. But a far more delicate investigation was also possible by the use of a polariscope. If we passed rays of light through a singly refracting mineral, such as glass, under the polariscope they were apparently unaffected. Bodies which acted in this manner were said to be isotropic; on the other hand, doubly refracting minerals affected the polarised rays of light, and such bodies were said to be anisotropic. The polarised rays of light were affected by different minerals in a characteristic and peculiar manner, so that it had been possible to draw up tables indicating the characteristic behaviour of most rock-forming minerals. Quartz, for example, showed a characteristic brilliant chromatic polarisation, while calcined displayed a minute concentric radial structure. Calcite again, a very common constituent of building stones, showed characteristic iridescent tints of grey, rose, and blue. We had thus a means of detecting the differences in structure, even in minerals which, like quartz and calcined, were chemically identical. Further, the alteration produced upon the component minerals by weathering or decay could be detected. In conclusion, the lecturer, by means of photographic lantern-slides of sections of various stones, highly magnified, pointed out the differences of structure. These sections and slides, it should be mentioned, had been specially cut and photographed for the occasion. The paper, which was also illustrated by numerous tables and diagrams, will be published *in extenso* in the forthcoming number of the *R.I.B.A. Journal*.

In the discussion which followed, Mr. P. Gordon Smith, vice-chairman of the Science Standing Committee, said that in the absence of Mr. Lewis Angell, chairman of that

committee, he wished to say a few words expressive of their thanks to Mr. Burrows for the remarkable and instructive paper which he had read that evening. The importance of the subject to them as architects was very great, and as he watched the exhibition of lantern slides he could not but be struck with the advance which had taken place within the last fifty years in the methods of examining building stones. The discussion which had recently taken place about the relative advantages of building stone and terra-cotta had brought the subject of stone rather prominently before them, and he could not but think that the absence of sufficient knowledge on the subject had led in many cases to the abandonment of the use of stone in favour of terra-cotta. He was brought up a good deal amidst masonry, and when he looked at the workmanship which was displayed in terra-cotta he could not but think that a mason would be very dissatisfied with the character of the work turned out in terra-cotta. Quite apart from any question of colour, ornament, or enrichment, the mere masonry, if he might use the term in connexion with terra-cotta, was exceedingly bad, and he, for one, looked forward to going back to the use of stone when they could ensure its durability, of which he thought there was now some prospect.

Mr. F. W. Rudler, F.G.S., Curator of the Museum of Practical Geology, Jernyn-street, said that, speaking from the point of view of a geologist, he begged to be permitted to express satisfaction that a method of microscopical examination of rocks, introduced originally for purely scientific purposes, should turn out to be a servant of some little value to the architect. There could be no manner of doubt that the examination of a thin slice of rock, highly magnified in transmitted light, offered an insight into the minute structure of that rock utterly unobtainable by any other method. He supposed that very few of our building stones had been examined with any approach to exhaustiveness, and he thought that they would all be deeply obliged to Mr. Burrows if he could pursue his investigations further. There had been several references made to the report of the Commissioners for selecting the stone for the Houses of Parliament, but it should be remembered that nearly fifty years had slipped by since that report was issued. The commissioners of that date were for the most part geologists, rather than physicists or chemists, and the examination to which they subjected the stone selected was not exhaustive. It was not given to them to throw upon the stones they examined the powerful search light of the microscope. After the meeting of the British Association in 1838, the Commissioners purchased an old carriage and drove across the country for three months selecting samples, and these samples formed the nucleus of the collection of building stones in the Jernyn-street Museum. There were now upwards of 600 specimens. That collection, although he believed it to be the best in the country, was very far from perfect, and he looked forward to the assistance of Mr. Burrows and his friend Mr. G. F. Harris, to make it more complete. Mr. Burrows had shown that chemical analysis, even of the most refined character, was open to grave misinterpretation. He (the speaker) would not altogether discourage chemical analysis, but he thought that chemical analysis and microscopical examination should always go hand in hand.

Mr. Henry Dawson, in moving a vote of thanks to Mr. Burrows, said that as a member of the Science Standing Committee he was able to say how greatly that Committee felt themselves indebted to Mr. Burrows. He was afraid, when he first saw the title of the paper, that it was going to be devoted to a crusade against chemical analysis, and to an undue exaltation of microscopical examination, but he was very glad to find that both Mr. Burrows and Mr. Rudler recognised some utility in chemical analysis. For his (the speaker's) own part, he considered chemical analysis to be just as valuable as microscopical examination. He referred to certain of the tables exhibited on the walls in support of this view, more particularly with reference to the amount of silica in stones.

Mr. G. F. Harris, F.G.S., said he had listened with great interest to the paper which had been read by his friend Mr. Burrows, because, from its very inception, they had discussed the matter together. He was not surprised to find Mr. Burrows advocating the microscopical analysis of stone, for, in his opinion, that was the only reliable method for the examination of building stone at present extant. While listening to what the last speaker had said as to the

importance of chemical analysis, and when he heard him reiterating the old story of the proportion of silica in stone as indicating its durability, his mind's eye reverted to a past age. That very same question, when it was first put to him (the speaker), was practically disposed of some six or seven years ago. If we studied very carefully the work which had been done with the microscope, especially in America, for ascertaining the durability of building stone; if we examined such remarkable works as those of Professor Winchell, of Minneapolis, and of Mr. George Merrill, of the United States National Museum at Washington; if we examined, too, the work which had been done in Germany, and in the experimenting rooms and laboratory at Paris, he thought that no one who had given much attention to the subject would for one moment come forward and make the statement that chemical analysis was anything like as important as microscopical examination. On the other hand, he should be very sorry indeed to say that chemical analysis was of no use whatever. First of all they had to determine the chemical composition of the mineral, and they could then identify the latter under the microscope. If that was the only thing, however, that the microscope could teach us, it would be of no earthly use whatever in the inquiry; but when one examined into the stages of decomposition of the various minerals, and considered practically the way in which the stones weathered, there the great value of the microscope was at once apparent. With the aid of the microscope he had examined specimens of stone from various buildings, and he had observed the peculiar conditions under which the minerals had been formed, or had decomposed, and had noted why the stones had absolutely given way or been preserved, as the case might be. He had divided stones into various stages of decomposition. If they took one mineral, calcite, which was the carbonate of lime in crystalline form, they would find that under varying circumstances it weathered in totally different manners—he did not now allude to it when it was in its amorphous condition, but he alluded to it as it was found in oolitic building stones, in which it usually existed in the form of crystalline granules partly decomposed. It was really on the state of decomposition of the minerals, as seen under the microscope, and on the manner of their association one with the other, that the durability of the stone depended, and only by the aid of the microscope could the conditions referred to, be observed and noted. He was, therefore, very glad to hear his friend, Mr. Burrows, so strongly advocating the use of the microscope in estimating the value of building stones.

Mr. W. Topley, F.R.S., said he only wished to express his warm thanks to Mr. Burrows and Mr. Harris for their remarks. He quite thought that to the great majority of architects this microscopical examination of stone would be of great value. The great advantage of microscopical examination was that it showed so much at once; it showed us a great deal of the chemical composition of the stone, and of its physical character; and we could practically learn its porosity, for if we took sufficient note of the constituents, we could find its specific gravity. By the microscopical examination of stone, then, they could learn the larger proportion of the results obtained by the more laborious methods.

Mr. William Emerson, Hon. Sec., seconded the vote of thanks to Mr. Burrows, and expressed his gratification at the presence of Mr. Rudler, of the Museum of Practical Geology. Excellent and valuable as was the collection of building stones in that museum, it was practically useless to the architect, because no particulars were given as to the properties of the stones of which specimens were exhibited. If only Mr. Burrows, or some other gentleman, could schedule the various properties and capacities of the various stones, it would be of great advantage to architects.

Mr. Middleton suggested that a series of tests of the behaviour of stone under frost should be undertaken by the Science Standing Committee.

Mr. J. M. Brydon said it would be interesting to know what were the best building stones for ordinary use by architects, especially in London.

Mr. William Woodward having made a few remarks,

The Chairman, in putting the vote of thanks, expressed regret that there was not time to discuss the subject any further that evening, but on the question raised by Mr. Brydon, as to the best stone for external use by architects, especially in London, his (the speaker's) old-fashioned experience was that there was nothing like Portland stone.

Mr. Burrows, in the course of his reply,

thanked the meeting for the patience with which they had listened to his long paper, and expressed his acknowledgments to Mr. Harris, to whom he owed a great deal of his knowledge of the subject. With regard to Mr. Dawson's observations, the presence of silica in building stone was no criterion of the value of the stone. He by no means advocated the giving up of chemical analysis altogether, but he did maintain that such analysis was capable of being strengthened and confirmed by microscopical examination.

The meeting then terminated with the announcement that the annual general meeting would be held on May 1.

COMPETITIONS.

BOARD SCHOOL, SUNDERLAND.—A special meeting of the Sunderland School Board was held on Tuesday last to consider competitive plans for Chester-road School. Nine plans had been sent in under various mottoes, and the General Purposes Committee recommended that the first premium of 50*l.* be awarded to "Red Cross," the second premium of 30*l.* to "Apropos," and the third premium of 10*l.* to "Left-hand Light," each of whom certified that their plans could be carried out for the sum specified by the Board, viz., 9,800*l.*, inclusive of commission. Mrs. Hancock proposed as an amendment, Mr. Singleton seconded, and it was carried by 6 to 3, that the first premium be awarded to "Apropos." On the motion of Mr. Davison, seconded by Mrs. Hancock, the second premium was awarded to "Red Cross," and the third to "Left-hand Light." The Clerk then opened the sealed envelopes, upon which it was found that the first premium had gone to Messrs. Oliver & Leeson, Bank Chambers, Moseley-street, Newcastle; the second to Mr. Geo. T. Brown, Fawcett-street; and the third to Mr. John Eltringham, Sunderland.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday afternoon at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

Resignation of the Newly-Elected Alderman.—The Clerk read a letter from Mr. J. Fletcher Moulton, Q.C., who wrote to thank the Council for having elected him an alderman, and to explain the singular position in which he found himself. The fact of his holding retainers on behalf of the Council might be deemed sufficient to invalidate his election, as it could be held to involve personal interest. The point was a very difficult one, upon which he could find no authority. He had decided to take no fees for any matters subsequent to the date of his election. That put him right as to the future, but it did not perhaps apply to what had actually taken place, and feeling as he did that no doubt should be allowed to exist as to the validity of an election, he thereby tendered his resignation, enclosing the statutory fine of 1*l.* for so doing. The office of alderman was then formally declared vacant.

Workmen's Trains.—The Council considered and adopted a report from the Public Health and Housing Committee on the subject of workmen's trains. The Committee recommended that the Board of Trade should be requested to convene a conference, in order to discuss a basis of common action on the part of the railway companies in relation to the zone limit and tariffs; that the Board should exercise its powers under the Cheap Trains Act of 1883, and introduce an amending Act if those powers were insufficient; that the Great Western Railway Company should be required to provide an adequate service of workmen's trains to Southall; and that superior cheap trains at half-fares should be run to all the London termini from 7 to 9 a.m., without restrictions as to time of return. The Committee further suggested a model clause for insertion in all Bills relating to new metropolitan railway undertakings, and for adoption by existing railways in any proposed amendment of the Cheap Trains Act, 1883, to meet the views of the Committee as expressed in their Report.

Mr. Bescheroff, the Chairman of the Committee, in moving the adoption of the Report, said that what the Committee wanted was to bring about the zone system, which would be of advantage to the working classes of the metropolis and to the railways themselves. In the thirteen metropolitan companies he found the mean rate per mile varied from one-tenth to one-fourth of a penny, whilst the maximum charge ran from one-third to three-fourths of a penny per mile. He

was afraid they could not hope for a universal 2*½*d. fare, such as existed in New York; but they could hope for a uniform system applying to the 5,000,000 of the population, of whom 3,000,000 belonged to the working classes. As far as he could gather, only 70,000 persons used the workmen's trains. The companies were realising that their profits lay with their third-class passengers, but they had yet to learn that full trains at cheap fares were better than half-empty trains at high fares. The Committee proposed the rate of one-fifth of a penny a mile. They practically proposed three zones, at rates equivalent to one-fourth of a penny for the first zone, one-fifth for the second, and one-seventh for the third; and, in fixing twenty miles as the limit, he might remind them that some workmen's trains already ran up to nineteen miles. What the Committee wished to promote was suburban segregation instead of urban congestion.

Proposed Improvements.—Mr. Charles Harrison, Chairman of the Parliamentary Committee, brought up a report from that Committee pointing out that the London Improvements Bill was down for second reading on the 24th inst., and intimating that up to the present time there had not been any expression on the part of the Government of an intention to provide relief to the occupying ratepayers of London in respect of the burden which the execution of the improvement schemes would involve. The primary condition attached to the resolutions of the Council to seek powers for the Strand improvement and the Tower Bridge approach was, that the scheme should not be proceeded with unless satisfactory provisions were made for payment for them other than by the occupying ratepayers. They were informed by the Members of Parliament having charge of the Bills that Parliament would require some expression of opinion from the Council as to whether the primary condition attached to all the schemes, and whether they all stood on the same footing. Important as it could hardly be described as of an urgently pressing character, and having regard to the very large burden which its execution would entail upon the occupying ratepayers in the absence of any satisfactory relief, they submitted that the Council might be advised to postpone it for the present. They recommended

(a) "That the provisions relating to the new street from Holborn to the Strand, and the subsidiary streets, be withdrawn from the present Bill.

(b) That, notwithstanding any previous resolutions of the Council, the provisions relating to the Tower-bridge approach be retained in the Bill.

(c) That the provisions relating to the rebuilding of Vauxhall-bridge be retained in the Bill.

(d) That the provisions relating to the Rotherhithe and Ratcliff Ferry be withdrawn from the Bill."

The Committee further recommended (e) that the provisions relating to the southern approach to the Woolwich Ferry be withdrawn from the Bill; (f) that the clauses relating to the widening of Wood-lane, Hammersmith, be retained; and

(A) That, notwithstanding any resolutions of the Council to the contrary, the second reading of the Bill, with the omission of the schemes referred to in this report, be proceeded with, and that the Members of Parliament having charge of the Bill be requested to inform the House of the intention of the Council to withdraw such portions of the Bill as relate to the particular schemes which the Council may resolve to withdraw, and that the Bill when amended be prosecuted in the usual way, with a view to its passing into an Act."

Recommendations a, b, c, d, f, and h, were agreed to, but e was rejected.

After sitting for nearly five hours and a half the Council adjourned.

LICENSED VICTUALLERS' ASYLUM.—A marble tablet has been recently unveiled in the chapel of this institution, Old Kent-road, to the memory of the Rev. William George Martin, M.A., the first chaplain, who officiated there from the time of its erection, in 1850, to the date of his death, April 9, 1892. The memorial consists of a white statuary marble panel, 2 ft. 6 in. by 2 ft., enclosed in ornamental framing of the same material, supported on white marble brackets, caps, and bases, and Sienna marble shafts and four brackets over the same, the whole surmounted by a pediment enclosing a carved tympanum, consisting of a circular garter or ribbon, and shield and scroll-work. On the shield is the monogram of the deceased, "W. G. M.," the total dimensions being 6 ft. by 4 ft. The work was executed by Messrs. H. W. Wilkins & Sons, Pentonville Hill, from designs by Mr. W. F. Potter, architect to the institution, in Classic Renaissance style, to harmonise with the chapel and Asylum. The tablet is fixed on the right of the stained-glass east window, which was illustrated and described in the *Builder* of March 27, 1875.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

TWO CHURCHES IN SOHO-SQUARE.

ON Saturday last a numerous party of members of the Architectural Association visited Soho-square, primarily to inspect the new church recently completed, from the designs of Mr. Aston Webb, for the French Protestant community who are the descendants and representatives in London of the Huguenot refugees of the fifteenth and sixteenth centuries. The visitors were met by Mr. Aston Webb, who gave a short account of the history of the body for whom the church has been built, and who originally possessed what is now the Dutch church in Austin Friars. The new church in Soho-square being carried out in terra-cotta, Mr. Webb, in view of the recent discussion, gave his reasons for employing the material, the chief being that his clients are a congregation with limited income, and therefore with no available funds for constant repair or decoration; hence he considered that a terra-cotta building, which would need no more than an occasional washing, would be most suitable. As regards the comparative cost of terra-cotta and stone, Mr. Webb stated that the building could have been carried out with Bath stone if the enriched detail which must have been carved in stone had been omitted. This illustrates what we believe to be the true state of the case; if an architect designs his building with a large amount of enriched and repeated ornament, there can be little doubt that this can be done at a less cost in terra-cotta than in stone. In respect of durability there is little advantage on either side, given the best quality of either material. There are plenty of examples of even Bath stone in London, where work executed thirty or forty years ago is in excellent preservation; there are, of course, plenty of failures also, even in Portland stone. So with terra-cotta, there is good and durable material, and bad and perishable material. Then as regards appearance, the question is entirely one of taste or individual preference, and *de gustibus non est disputandum*.

Returning to Mr. Webb's design, it is notable how much the church reflects the feeling of St. Bartholomew's, Smithfield, notwithstanding the character of the detail, which is clearly based upon the French work of the time of the Huguenot immigration. The difficulties of the site in respect of lighting and ancient lights have been considerable, and have had much to do with the main lines of the design, the narrow nave and lofty chancel, the top-lighted aisles and the apsidal chancel. The end of the site next the square is occupied by the pastor's house, and hence the elevation is somewhat domestic in character, though the fact that it forms the front to a church is indicated by the entrance and gable. The red terra-cotta used here forms, we think, a pleasing combination with the dark purple of the Luton bricks. We are hardly, individually, satisfied with the precise tint of the buff terra-cotta used internally, but there can be no doubt that, given terra-cotta as the material, the design and detail are admirably suited thereto. We may add that we gave a view of the church in the *Builder* for June 27, 1891.

Leaving the French Protestant Church the members proceeded to the new Irish Catholic Church of St. Patrick, where they were met by the architect, Mr. Kelly, whose design was selected in a limited competition. This church is a great contrast in every way to that on the other side of the square. Its campanile in red brick, and its exterior basilica-like treatment prepare one for and are part of the Italian character of the design. Unfortunately the design has suffered from the trouble of ancient lights, through which the length is shortened to such an extent as to spoil the proportions of what would have been a very fine church. Even now the aisle-less nave, with its semi-circular barrel ceiling, will be very impressive when the colour decoration is complete. At present only the ceiling is coloured, and the walls with white plaster. In this, as in all else, the church of the Irish Catholics differs from that of the French Huguenots; the former expect and intend to continually add to the beauty of their church, the latter expend their capital and have no hope of income for material purposes.

A LARGE STEAM COOKING APPARATUS.—The Brighton Board of Guardians have accepted a tender of Messrs. Comyn Ching & Co., for the erection of an improved steam cooking apparatus, capable of supplying 1,500 people, at the Brighton Work-house.

Illustrations.

TOWER AND SPIRE, ST. MICHAEL'S, COVENTRY.

AT the time of the death of the late Mr. John Drayton Wyatt we mentioned, in an obituary notice of him, that among other things he had at considerable trouble and risk, made a large and very careful measured drawing of the spire of St. Michael's, Coventry. This illustration is a reproduction of that drawing, with the plans of the different stages. The original drawing, lent to us by Mr. O. C. Wylson, is on a very large scale, six or seven feet high.

The words "Section, looking south" appear to have been inadvertently written on the original drawing in the wrong place, as they are reproduced here beneath the elevation.

SEATON DELAVAL HALL, NORTHUMBERLAND.

BLENHEIM PALACE, Oxfordshire, and Castle Howard, Yorkshire, are both well known and celebrated examples of the genius of Sir John Vanbrugh. There is, however, a comparatively forgotten and unknown mansion situated in a far remoter part of the country, designed by this architect, viz., Seaton Delaval Hall, Northumberland.

Although much smaller in scale and less ambitious in design than the others before-mentioned, it can justly lay claim to be one of Vanbrugh's most successful works.

The Delavals, who owned the estates, were one of the oldest families in the North, and their name is connected with some of the most important events in English history. They figure more or less in every period, from the time of the Conquest to the Revolution.

The ancestral home of the family was in the Province of Maine. Howard de Laval and his son Guy came over with the Conqueror, whose niece Guy married. During the tyrannical reign of John, we find Gilbert de Laval took up arms against the King, and was with the barons at Stamford at Easter, 1215. Hugh, Lord de Laval, was a man of great note and influence in his day, during the time of the Scotch and French wars of Edward I.

Passing on to later times, we find some record that throws light on the ancient ancestral hall of the Delavals.

In the will of Sir Ralph Delaval, who died in November 24, 1628, is mentioned an inventory of the contents of the several halls, chambers, galleries, nurseries, kitchens, &c., from which we may gather some idea of the vast extent and ample accommodation of the old feudal castle, which previously existed on the site of the present mansion.

To Admiral Lord Delaval we owe the erection of the Hall in 1707.

After spending many years in the naval and diplomatic services, and having amassed great wealth, he commenced the building of this mansion from the designs of Sir John Vanbrugh.

Sir Francis Blake Delaval completed the building. It was he and his brother Lord Delaval whose mad escapades and reckless extravagance made the name of the family notorious.

The family became extinct in the year 1814, and the entailed estates passed on to Sir Jacob Astley. They are now held by the present representative of that family, Lord Hastings.

The Hall is finely situated amid a well-wooded domain, about a mile from the Northumbrian coast. Although in the centre of the Northumbrian coal-field, yet the collieries and the pit villages have failed to entirely rob its surroundings of their charms as seen from the coast.

The Hall is approached from Seaton Delaval station, through a long avenue of trees, with massive gate pillars at the entrance, now fast falling to decay. Between the Hall and the coast is the quaint old-world village of Seaton Sluice, with its deserted harbour and bottle works, relics of more prosperous days under the Delaval family during the seventeenth and eighteenth centuries.

The first appearance of the Hall is very striking. In the centre is the principal block, containing the chief apartments, flanked on either side by wings containing other rooms and the stables. These buildings form a large courtyard, with colonnades connecting the whole together. This is a fine feature in the general arrangement and design.

The stables in the east wing consist of a spacious building 62 ft. long and 41 ft. wide, with

a lofty roof supported by three segmental arches, 21 ft. long.

The stalls are quite unique, with divisions massively constructed of stone; over each are plates containing the names of famous racehorses kept here previous to the fire.

The west wing, which at present contains the principal apartments, was burnt down on May 6, 1752, but was rebuilt on the same lines.

The principal block in the centre was burnt out on January 22, 1822, leaving, however, the main features of the structure intact. After the fire the roof was recovered and the windows reglazed; with these exceptions, the building remains in pretty much the same state as it did after the conflagration. To-day it is a splendid ruin, with blackened walls inside, though the general effect of the exterior is the same as seen after its completion by Sir John Vanbrugh.

The north elevation is a bold composition on a massive base. In the centre is the principal entrance, approached by a broad flight of steps, giving easy access to the doorway. On either side are Doric columns with enriched entablatures. The pediment above is richly decorated with Delaval arms—"Ermine, two bars *vert*; crest, a ram's head erased *argent*, attired *or*; the motto, 'Dieu nous conduit.' " These are quartered with various alliances of the family. The shield is surrounded by mantling and trophies of various kinds.

At each angle of the block are octagonal bays, surmounted by balustrades, and behind are towers containing the staircases.

The south elevation is similar to that of the north in general grouping and design, with the exception of the centre portion, which consists of a beautiful tetrastyle Ionic portico, surmounted by a balustrade which runs along the entire front.

The principal entrance doorway on the north opens into the hall, a fine but ruined interior, 44 ft. long by 25 ft. wide and 44 ft. high. The havoc wrought by the fire is here very apparent.

The original ceiling is destroyed, and only the holes of the timbers mark its place. Two rows of arcades are formed in the thickness of the wall on each side; those in the upper story form niches for mutilated statues representing Music, Painting, Geography, Sculpture, Architecture, and Astronomy. At the end of the Hall is the music-gallery, with an enriched stone entablature, supported on beautiful consoles and surmounted with a wrought-iron balustrade of very chaste design, though very much rusted and twisted from the effects of the fire. The fire-place is very massive, with caryatides supporting a sculptured frieze.

The floor is paved with black and white marble slabs placed diagonally across the apartment.

Leaving the hall you enter into the grand saloon, 68 ft. long by 25 ft. wide, which occupies the whole of the south front.

This fine apartment is, however, a mere shell of its former grandeur. It is open to the roof. Nothing but blackened walls and fragments of Corinthian pilasters and caps are to be seen.

Spacious corridors from the hall communicate with the other apartments and staircases in the towers. These latter are beautifully constructed in an elliptic-shaped well, forming spiral steps with wrought-iron balustrading.

Below in the basement are the cellars, formerly used for domestic purposes. They are groined in stone, and very massively constructed.

A short distance from the Hall is the mausoleum, erected by Sir John and Lady Hussey Delaval to their only son, who died in 1775. It has a Doric portico and leaden covered dome. The building, however, has never been used for the purpose originally intended.

To the south-west of the Hall is the quaint old Chapel of our Lady (recently made a parish church). This interesting structure is planned on typical Norman lines, with nave, choir, and chancel, with a total length of 48 ft. The chancel and choir arches, with zigzag mouldings and bevelled labels on cushion capitals, are the principal features of architectural interest.

In the chancel are two recumbent effigies of some crusading knight and his lady. There are also a few old pennons and hatchments hung on the walls.

J. W. TWIST.

CHURCH AND RECTORY, CARLISLE.

The plan of the church consists of a nave and chancel of equal width, 21 ft. within the columns, and 102 ft. long. At the west end of the nave, and opening from it by an archway reaching nearly to the roof, is the tower, making a total internal length from west to east of 122 ft. There are north and south aisles, each having a

chapel at the east end, respectively 91 and 86 ft. long. The total width of the church across nave and aisles is 52 ft. At the west end of the south aisle is the baptistery, separated from the church by an archway. The principal entrance is at the west end from Warwick-square, opening into a porch under the tower. A staircase from here gives access to a gallery in the next stage of the tower, capable of seating more than fifty persons. A second entrance is provided, having an external porch opening into the south aisle. Adjoining the chancel are two sacristies, 15 ft. by 15 ft., and 20 ft. by 15 ft. A special staircase leads to two rooms of the same dimensions above; the smaller one is an organ-loft, with an archway opening into the chancel. An entrance is provided at this point from Warwick-square east, giving access to the sacristies and organ-chamber, and being also a side entrance to the rectory.

The rectory joins the building last named, and provides accommodation for three priests, with one spare bedroom and a bathroom, also the usual outbuildings and offices. The main entrance is from the garden, on the west, and there is another, through the kitchen yard, on the east.

The design of the church is in the Perpendicular style, and it is being carried out in the redstone of the neighbourhood.

The ceilings of nave, chancel, and aisles are of panelled woodwork.

Sitting accommodation is provided for 732; and the total cost of church, sacristies, and rectory will be about 10,000.

NO. 18, BISHOPSGATE-STREET, WITHIN.

THIS building, which has a narrow frontage to Bishopsgate-street, was planned for letting out in suites of offices, which are partly lighted from a central area—these are supplied with a passenger-lift from first to top floors.

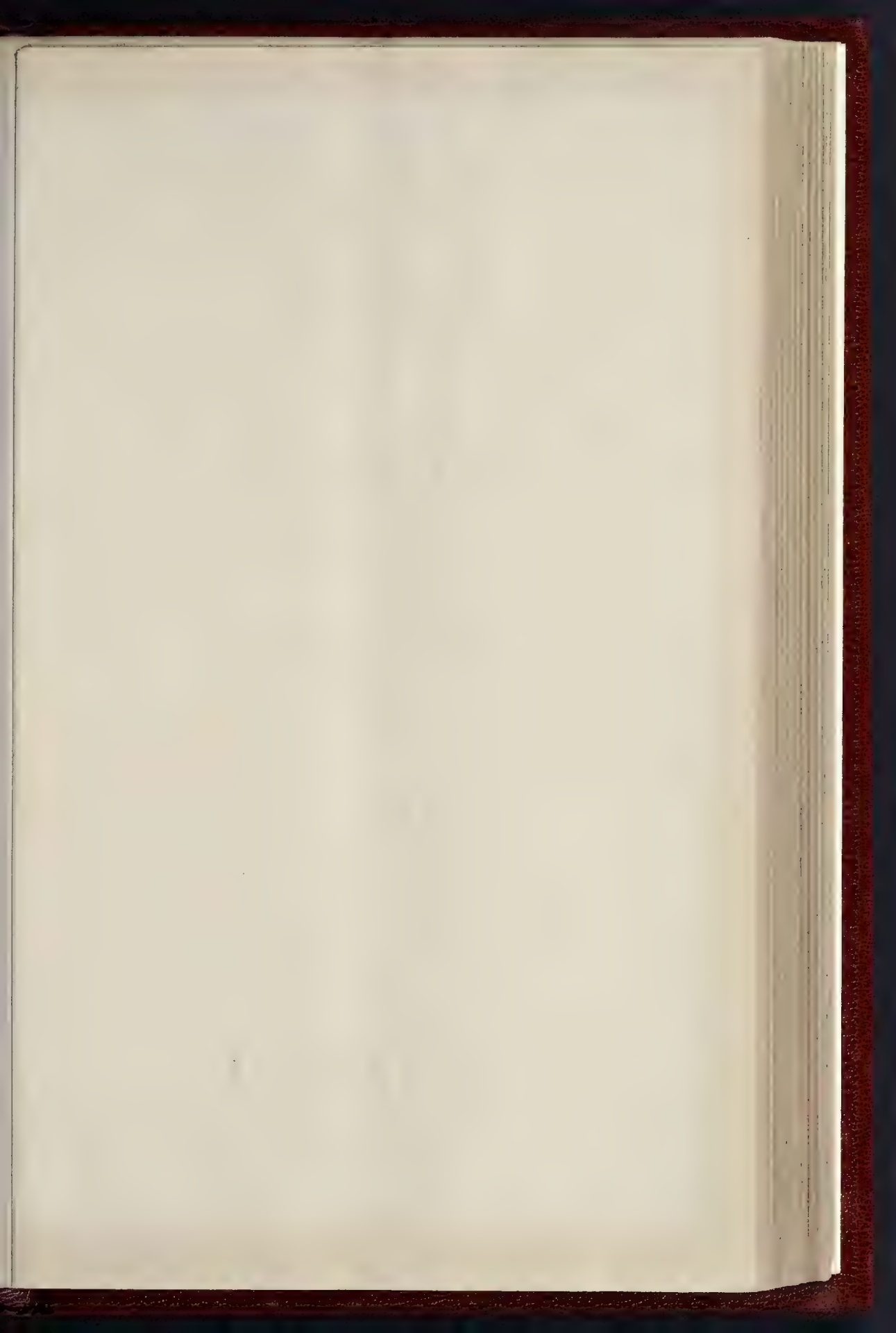
With the exception of the ground floor, which is in polished Cornish granite, the whole of the front is in terra-cotta, which was supplied and fixed by Messrs. Doulton, the modelling of the panels being designed and carried out by the late Mr. R. A. Ledward.

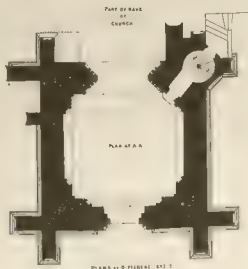
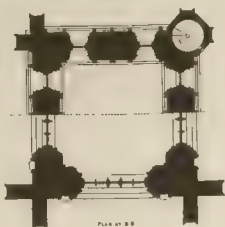
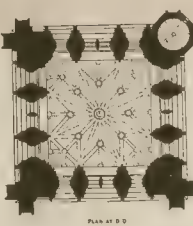
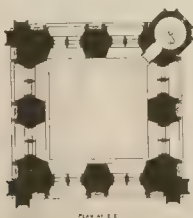
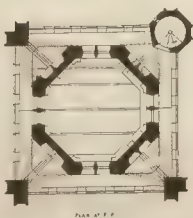
The flooring is fireproof throughout, and laid by Messrs. Homan & Rogers, the general contractors being Messrs. Lascelles, of Bunhill-row. The architects were Messrs. W. E. & F. Brown.

ARCHITECTURAL SOCIETIES.

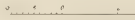
MANCHESTER SOCIETY OF ARCHITECTS.—The annual meeting of this Society was held at the rooms of the Manchester Literary and Philosophical Society, 36, George-street, the President, (Mr. Salomons) in the chair. The annual report was read and adopted. The following gentlemen were elected as officers and members of Council for Session 1893 and 1894:—President, Mr. John Holden; Mr. W. A. Royle; Hon. Sec., Mr. Paul Ogden; Assist. Hon. Sec., Mr. Edward Hewitt; Members of Council—Messrs. A. H. Davies-Colley, T. Chadwick, John Ely, R. Knill Freeman, F. Mee, J. D. Mould, James Murgatroyd, J. H. Woodhouse, T. Worthington (Fellows), and Messrs. P. Hesketh, J. S. Hodgson, and H. E. Stelfox (Associates); Auditors, Messrs. Henry Bridgford and P. E. Barker; Education in Architecture Committee—Messrs. A. H. Davies-Colley, T. Chadwick, John Ely, F. Mee, J. D. Mould, J. H. Woodhouse (Fellows), and Messrs. P. E. Barker, P. Hesketh, E. P. Hinde, J. S. Hodgson, H. E. Stelfox, and P. S. Worthington (Associates).

EDINBURGH ARCHITECTURAL ASSOCIATION.—On the 12th inst. a meeting of this Association took place in the Royal Institution—Mr. W. W. Robertson, the President, in the chair. Mr. A. H. Millar, F.S.A. Scot., read a paper on "The Old Howff of Dundee," on many of the monuments and their inscriptions in which burying-ground he commented, and illustrated them by means of the limelight. He traced the origin of the cemetery, pointing out that the orchard of the Franciscan monastery had been granted by Queen Mary for that purpose in 1567, and that for three hundred years afterwards the "Howff" (which had been so named from the fact that up to 1778 it was used by the crafts as their meeting place) continued to be the chief place of interment in the town. Consequently the sacred spot was peculiarly rich in memorial stones, indicating the alterations that had from time to time taken place in the artistic tastes of the community. At the close of the lecture a cordial vote of thanks was passed to Mr. Millar.





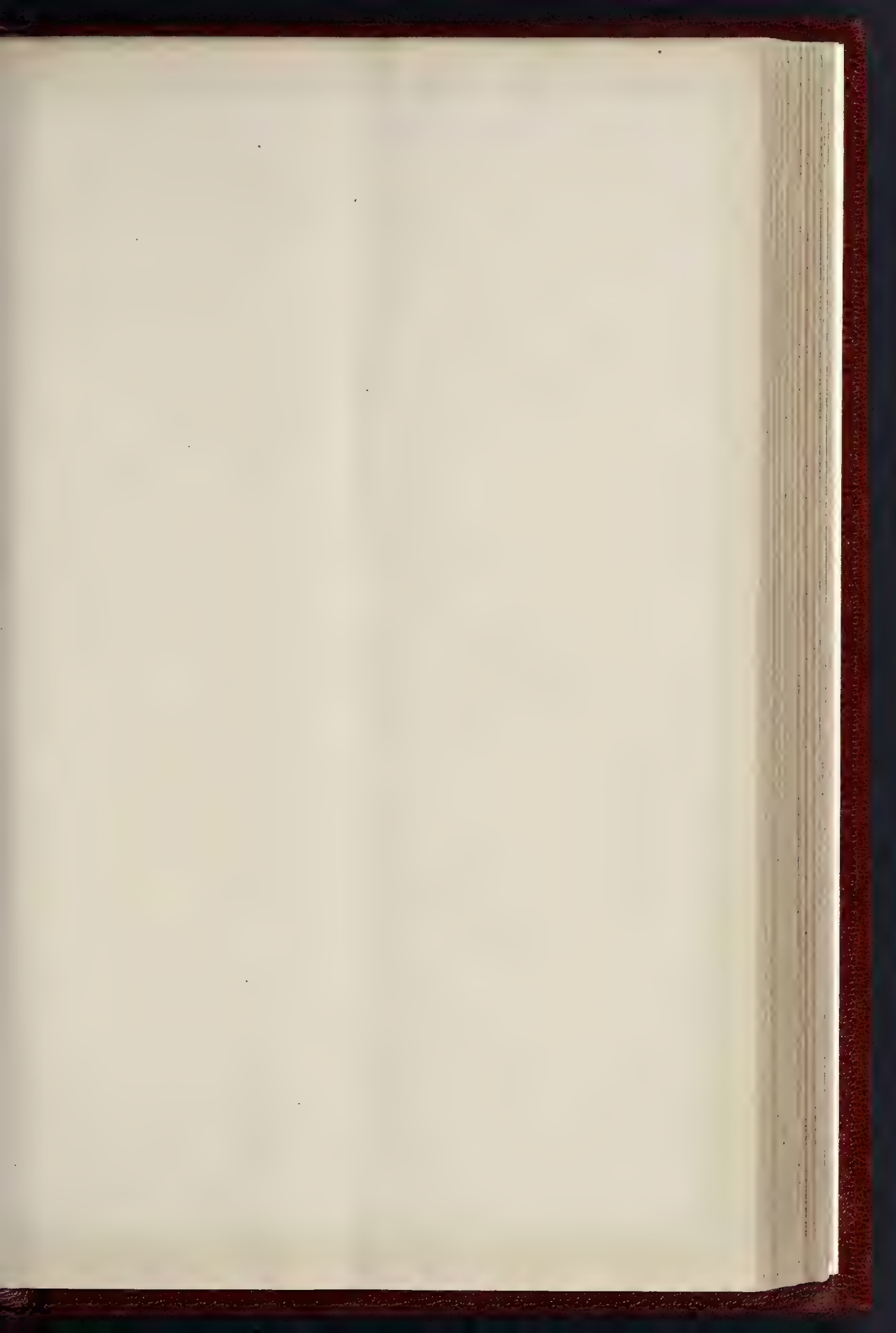
The Tower
of Saint Mary
at Coventry



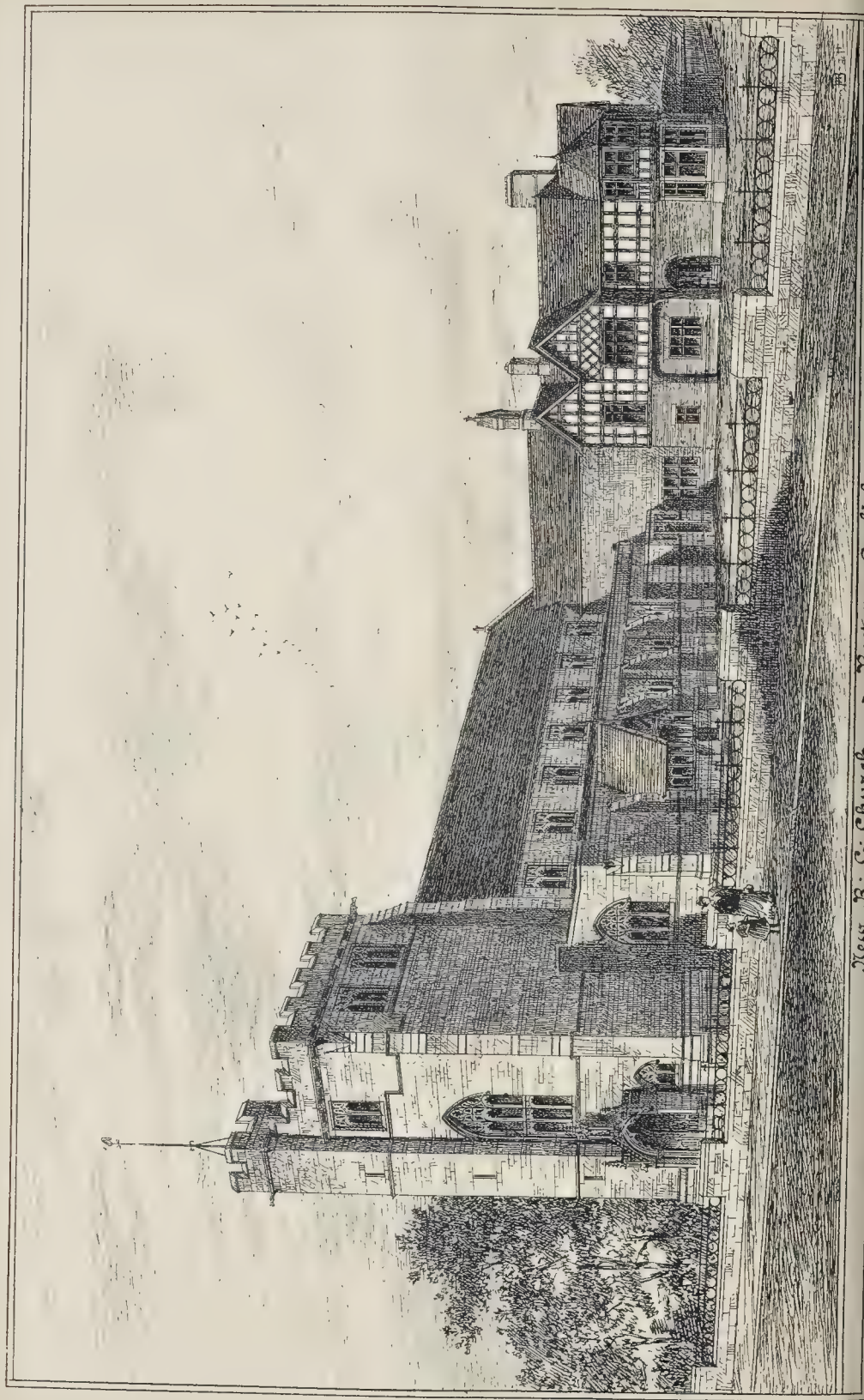
er and Spire of
Michaelis Church
Warwickshire

Scale of Feet
0 20 40 60





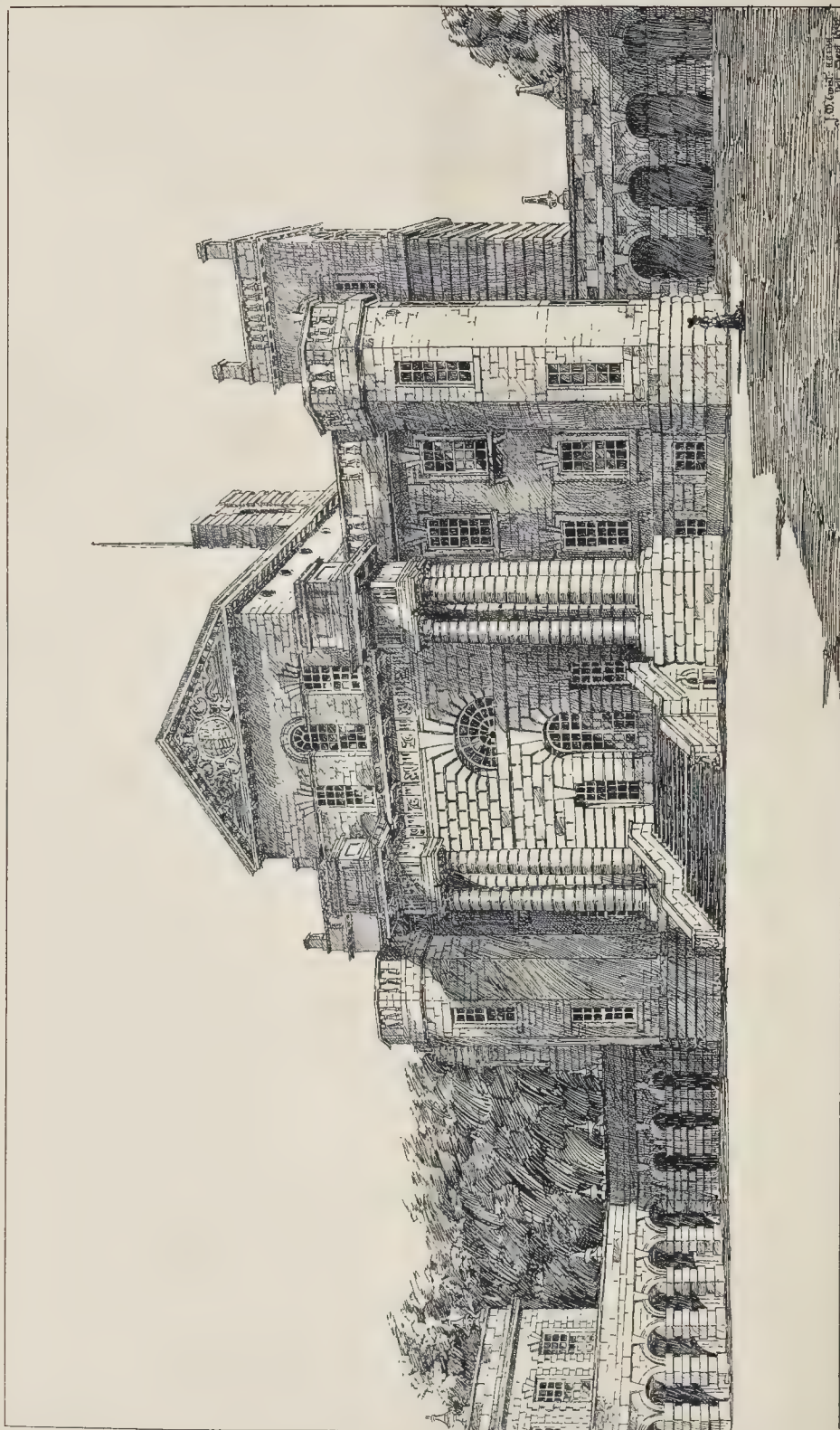
THE BUILDER, APRIL 22 1893



New R. C. Church and Rectory, Carlisle.

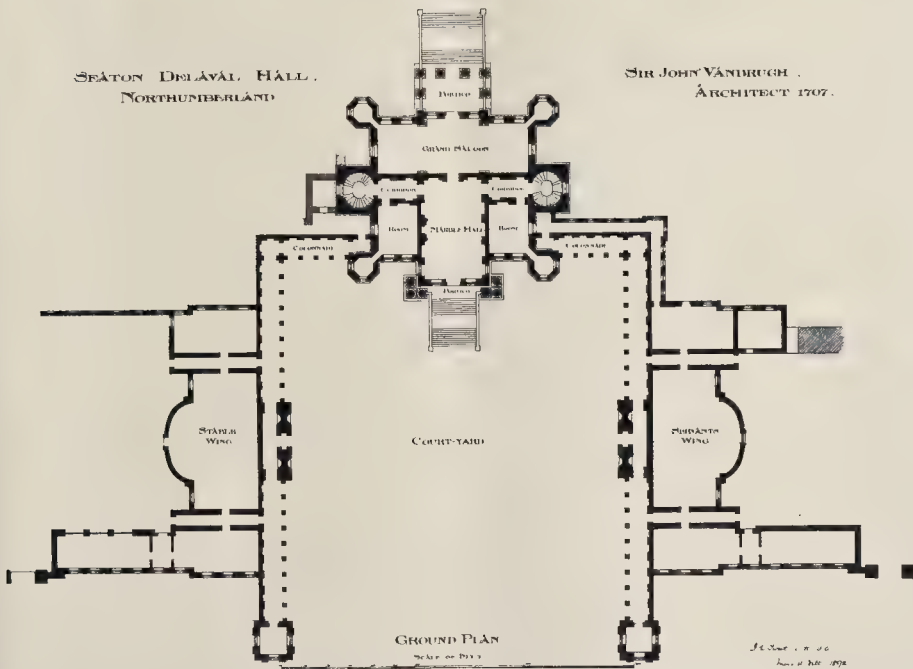
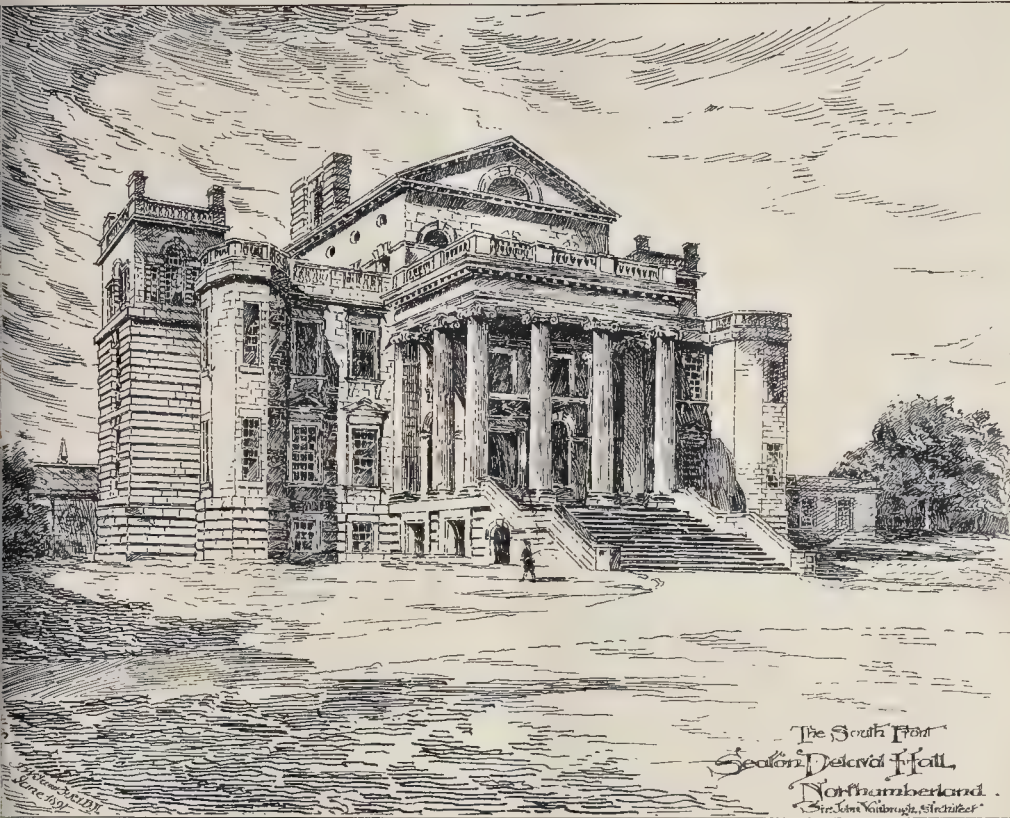
DUNN HANSON & DUNN.

THE BUILDER, APRIL 22, 1893.



— North Front, Section Delaval Hall, Northumberland, Sir John Vanbrugh, Architect, 1707.

PHOTO AND DRAWING BY J. G. G. 1893. PRINTED BY J. G. G. 1893.



No 13 Bishopsgate
Within
E.C.
Messrs W.E. & F. Brown
Architects.



PHOTOGRAPH BY SPARKS & CO. 43, EAST HARDING STREET, LONDON, E.C. 2

THE BUILDERS' CLERKS' BENEVOLENT INSTITUTION:

FIFTEENTH ANNUAL DINNER.

The fifteenth annual dinner in aid of the funds of this Institution was held on Tuesday evening last, in the large hall of the Cannon-street Hotel, when 250 of the members and supporters of the Institution sat down to table. The president of the Institution, Mr. William A. Colls (of the firm of Colls & Son), was in the chair.

The usual loyal and patriotic toasts having been honoured (Mr. James Hill proposing "The Army, Navy, and Reserve Forces," coupled with the name of Captain E. C. Roe).

The Chairman rose to propose the toast of the evening, "The Builders' Clerks' Benevolent Institution." He said he had great confidence in proposing that toast, for the Institution was a most deserving one, and was managed very economically, thanks to the zeal of their indefatigable Secretary (Mr. Wheatley), their equally indefatigable Treasurer (Mr. E. Brooks), and their business-like and astute Committee. The income of the Institution last year was 686*l.*, made up of annual subscriptions, 265*l.*; donations, 300*l.*; and dividends, 120*l.* The expenditure last year was 445*l.*, including 337*l.* paid for pensions, and 20*l.* for temporary relief. The Institution now has the total number of pensioners elected since the foundation of the Institute was thirty-five. The Institution had invested the sum of 1,750*l.* in 2½ per cent Consols, but he and the Committee would very much like to see that amount increased. Since the date of the establishment of the Institution the aggregate income had been 5,270*l.*, and the amount expended in relief had been 12,980*l.* Three presentations to the Orphan Work School had been purchased, at a cost of nearly 800*l.* There was one vacancy for an orphan at the present time, and the Committee would be glad to hear of my qualified applicant for it. Last year the income of the Institution from subscriptions and dividends was only 265*l.*, and as the expenditure amounted to upwards of 400*l.*, they had to take 160*l.* out of the sum received in donations at the last annual dinner; therefore, it would be seen that it was a matter of some importance that the amount of the subscription list should be large, and not wholly dependent upon the Chairman's eloquence in advocating the claims of so excellent an institution. But while he appealed to his hearers to be generous, he confessed that he should be glad to see the Institution better supported than at present by builders' clerks themselves. He knew that their means were not large, but he thought that if they considered the matter they would find it to be to their advantage to subscribe to the Institution. In conclusion, he thanked the company to unite with him in drinking heartily to the success of the Institution. The toast was very cordially received.

Mr. J. Howard Colls, in proposing "The Architects and Surveyors," referred to the controversy as to whether architecture was an art or a profession. However that question might be decided, it was incontestable, he thought, speaking as a builder, that the architect should be a man of business, whatever else he might be; and he was happy to think that there were many architects who united business aptitude to artistic instincts. With the toast he had great pleasure in coupling the names of Mr. T. Chatefield Clarke and Mr. Ellis, an architect, who both responded to the toast in interesting speeches.

The other toasts included "The Builders," proposed by Mr. S. Nicholls and replied to by Mr. Joseph Randall; "The Merchants," proposed by Mr. W. Scrivenor, and responded to by Mr. Fred. Hunter; "The Past Presidents," proposed by Mr. Edwin Brooks, and coupled with the name of Mr. Colin G. Patrick (President last year); "The President," and "The Visitors."

During the evening, the Secretary, Mr. H. J. Wheatley, announced donations to the amount of 35*l.* 11*s.*

Correspondence.

To the Editor of THE BUILDER.

THE SCENERY OF "BECKET."

SIR,—My attention has been directed to a short notice of my work for "Becket," which appeared in your Journal of April 1. To that portion of it referring to the last scene of the play—the scene of the marriage in the north-west transept of Canterbury Cathedral—you will, I feel assured, allow me to make the following reply.

You say, in the first place, that in "treating the scene, I have reverted unfortunately to the typical one-painter's indifference to architectural fact," perhaps rather in this case architectural procedure built upon facts. This remark, I can assure you, is most undeserved—instead of being different, I have an intense love and veneration for architectural consistency and truth, and have never considered a departure from it and actual necessity condoned by pleading "Scenic effect." In this particular case I spent some weeks

in the library and in the cathedral before I started upon the actual work. The scene is built upon the exact lines of the church of Lanfranc (that was in existence at the time of Becket), my authority for which is to be found in Stanley's "Memorials of Canterbury Cathedral," taken I think from Professor Willis's restoration, the proportions of the scene being almost the same as those of the actual transept. You say that I might have taken the north-east transept as my model. To this I must dissent, as with the exception of its north wall, it is in the Transition style, and was built by William of Sens some fifty years after the murder of Becket. The windows in the north-east transept referred to are the only circular-headed arches; all the others are pointed.

The eastern apsidal chapel I am told I "ought to have introduced," and that is just what I have done, in place of the "absurd aisle" with which I am credited, and which is just what I have not done. The details of the side chapel (the chapel of St. Benedict) I borrowed from the chapel of St. Anselm, a portion of the church of Ernulf and his successor Conrad, the cathedral of Becket's time. Now, with respect to the flat roof, of which you say that it is "just in the very place in which there would not be one," I can only meet this statement with a positive contradiction. It is in the only position where I could have placed it, and where it actually was, above it being the chapel of St. Blaise.

The monk Gervase, in his description of the Cathedral of Lanfranc, says, in fact, "In the choir of Ernulf the pier-arches and marble walls between were continued from the tower-pier to the Presbytery, thus cutting off the transepts, which, like the choir, had flat ceilings." The height of the said ceilings being still determinable by the set-off in the wall, by a portion of the string-course still remaining, and by indications of the door which admitted to the chapel of St. Blaise some 20 ft. above. The corresponding staircase and door in the south-west transept is still in existence. Lastly, with respect to the steps, I have only to say that I have placed them in the scene in the position in which they now are and were then, leaving out the tunnel which now runs under the transept, and of comparatively recent construction; these steps lead, not to the dormitory, which is on the other side of the cloisters, but to the choir. In decorating the side of the main steps leading to the choir I have gone beyond fact but not outraged possibility. The little columns and arches I took from the arching that runs under the windows of the choir aisle; the sort of trellis-work decoration of the front steps, up which Becket is forced by the Monks, is taken from the wall a little farther to the east, in the passage leading to the crypt—early work, cut with the hatchet, representing bamboo. From whence came the idea?

One word upon the "servants' area railing to the front steps." I presume this description is given on account of its poverty-stricken appearance; but a plain iron hand-rail is plainly but an iron rail, useful if not ornamental. In what this most primitive arrangement differed in the eleventh century from an arrangement designed to meet a similar purpose in the nineteenth, I regret to say I am perfectly ignorant.

Many years ago, when Mr. Maddox was manager of the Princess's Theatre, Herr Formes, rehearsing for the "Barber of Seville," remarked upon seeing the first scene—"Mainz." "Seville" replied Maddox. "Mainz," repeated Formes positively. Maddox seeking moral support from his scene-painter whispered, "It is Seville, isn't it?" "Yes, sir," replied the naughty painter. "It is Seville," shouted the manager. "I know it, I lodged at the house on the right."

This anecdote, though happily in this case it does not represent the morality of either employer or employed, illustrates the dependent position of the employer. He should be able to say, "So-and-so is right because So-and-so is responsible for it, and I believe him to be an honest workman; and until he is proved otherwise I consider that in offering his work to the public I am not offering a fraudulent or adulterated article."

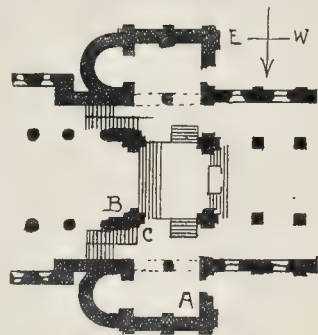
W. TELBIN.

. In regard to the north-east transept, Mr. Telbin is practically right; we forgot at the moment that the interior had been re-faced by William of Sens, though the transept was not "built" by him, as Mr. Telbin says; the bulk of the walls is all Norman, Lanfranc's or immediately after him. For the rest, Mr. Telbin's letter shows that he made more conscientious efforts to understand the problem than we had credited him with, but unfortunately his want of architectural knowledge has rendered them futile. We will take his points *seriatim*.

1. Our remark about the flat ceiling was made under the supposition that Mr. Telbin had assumed the existence of an aisle in the transept, forming the foreground of his view; and our reason for thinking so was that if we were supposed to be looking south out of the transept the view must have been partially blocked by the great crossing piers, whereas we appear to look across into a large empty space.

2. Mr. Telbin now explains that his foreground is the transept, and that he intended to follow the restoration of the cathedral plan in Becket's time, as given by Willis. Unfortunately he understands neither

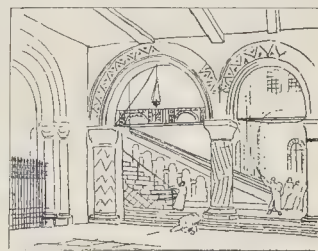
the plan nor the existing building, nor (as appears to us) the ancient records. He quotes Gervase as asserting that the transepts had flat roofs. Amid an unusually busy week we have not had time to get hold of Gervase's original Latin anywhere, but we may point out that Willis, who is a good authority on Latin as well as on architecture, translates Gervase's words as to the pillar in the transept "This pillar sustained a vault which proceeded from the walls on three of its [the transept's] sides," that Willis always refers to it as vaulted, and that the fact that there was a chapel over the transept is exactly the reason why it *would* be vaulted, according to all the habits of Mediaeval building, in order to make a monumental construction. Nothing could be more un-Gothic than Mr. Telbin's assumption of a flat wooden ceiling to the transept, forming the floor of a chapel over it. The "set-off in the wall" supposed to indicate the height of this ceiling must exist in Mr. Telbin's imagination; we can see no trace of it.



Plan of Crossing at Canterbury in time of Becket, as restored by Willis.

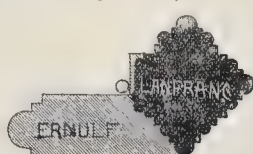
3. Mr. Telbin then goes on to assert that he has placed the steps in the scene "in the position in which they now are and were then, leaving out the tunnel which runs under them." This would be incomprehensible except for the reference to the tunnel, but it appears that Mr. Telbin has actually mistaken the end of the existing wide steps between the east and west crossing piers for the ancient steps shown at C in the accompanying tracing from Willis's plan. Those steps (C) no longer exist, but steps in a corresponding position on the south side of the choir exist, and if Mr. Telbin goes round and looks at them he will see what was really the position of the steps shown by Willis, which were not between the east and west crossing piers, but *built against* the eastern ones.

4. This mistake seems to have led Mr. Telbin to the more serious mistake in his scene, of omitting the great crossing piers near the foreground. The accompanying cut is a reduced outline of



Outline Sketch of Mr. Telbin's Scene, traced from the published illustration.

the main lines of his scene, traced from the published illustration. Comparing it with Willis's plan, it will be seen that from the lines of the perspective the point of sight must have been about opposite A on the plan. Every architect will see



Plan of North-east Crossing-pier (B), as given by Willis.

that in that case the north-east pier of the crossing, against which the steps were built, and which Willis gives the accompanying restoration, must have

blocked up the whole view through the left-hand arch, and the south-east pier would have been partially seen through the right-hand arch. The north-east pier, coming close up to the steps at the foot of which the monk is standing, could only be adequately represented by a built-up piece, if the practicable portion of the stage goes back beyond those steps; at all events it must have been a prominent object obstructing the view, and there is not a trace of it. The fact is that Mr. Telbin has got the steps in the right place according to Willis's plan, but having mistaken them for other steps existing in the building, he has got completely at sea about his position, and has lost sight of the crossing piers altogether.

5. In regard to the "area-railing," Mr. Telbin's remark that a handrail is only an iron rail, whether in the eleventh or nineteenth century, only shows how little he understands the difference between the spirit of Mediaeval and modern handicraft. No Mediaeval craftsman, early or late, would have made an iron rail without putting something of character into it which would entirely distinguish it from nineteenth-century work.

We may add that as the two arches of the transept, according to Willis (and probability) were equal, the right hand one should have appeared a little wider in the view, as more opposite the eye; whereas it is much narrower; that the proportions of the capitals (the details of which are not traceable in the published illustration) are much too deep for early Norman capitals; that the wide steps right across the transept are improbable and without authority; that the object and meaning of the iron-work across the left hand arch is incomprehensible, and that the hanging lamp is classic rather than Gothic in appearance.

We are inclined to think that even Mr. Telbin will agree by this time that he has been a little premature in assuming the position hinted at in his concluding paragraph, that because he did it, the public and the manager may feel assured that it is right; and that it may possibly be worth his while to consult an architect next time he has a purely architectural scene to carry out for an important play.—Ed.

JAPANESE ARCHITECTURE.

SIR,—The notes on Japanese Architecture in the last two issues of the *Builder*, and the extremely interesting drawings with which they were accompanied, will, I hope, be a means of directing attention to this subject from the point of view of accurate record.

The extensive literary and pictorial illustration which Japanese work has lately received has been almost entirely of a merely picturesque character, and it is to be hoped that now an enthusiast may be found to combine ability with willingness to devote the necessary time and labour to the production of a permanent and tolerably complete series of drawings of some of the buildings of old Japan.

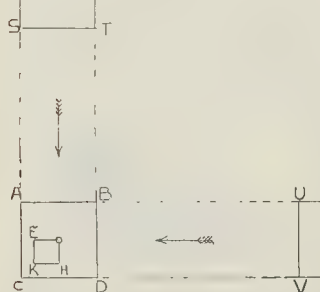
The castles of the feudal lords, which, before the revolution of 1868 were so prominent a feature, have nearly disappeared as complete buildings; the temples and shrines which so astonish the European by their marvellous colour and exquisite finish are falling to decay, never—now that the state of society which produced them is gone—to be replaced; and public and private buildings are rapidly assimilating to Western styles. No better illustration could be had of the tendency of young Japan in these matters than the drawings of the new Law Courts at Tokio in the current number of your journal.

Will not some Penrose or Owen Jones step into the breach and give us a monumental English work on the subject, before the materials for the task are gone?

MATT. GARbutt, A.R.I.B.A.

STABILITY OF PIER OF ARCH.

SIR,—Having recently had occasion to calculate the stresses at the corner pier of an arcade, and not having been able to find the method of doing so described in the text-books to which I have access, I send you the following investigation of a method by which the calculation can be effected, as it may be of interest to your readers.



Suppose ABCD to be the plan (supposed square) of one of the bed joints at a corner pier, which supports the two arches ABTS and EDVU, so

that the pier takes the two horizontal thrusts shown by the arrows. Under such circumstances the greatest pressure per square inch is at C, and the least at B; it is required to determine the pressures at C and B.

First, find the centre of pressure at the joint ABCD, neglecting the thrust of one of the arches, say ABTS. This may be done graphically, remembering that the load due to the arch ABTS has to be included as part of the vertical pressure on the joint. Let this point be E. Next, find the centre of pressure, neglecting the thrust of the other arch. Let this point be H. By drawing EK and HK parallel to AC and CD, we get K, the actual centre of pressure. Assuming that the shearing stress on the joint can be neglected, the resultant stress on the joint ABCD is equivalent to a single vertical force W, applied at K. If O is the centre of figure of the joint, the effect of this resultant force is equivalent to the following combination of forces:—(1) A force W applied at O; (2) A couple whose moment is $W \times OE$, tending to overturn the pier in the direction OE; and (3) a couple whose moment is $W \times OH$, tending to overturn the pier in the direction OH.

The stresses produced will be as follows, supposing the measurements to be taken in inches:—(1) A compression distributed over the joint of

W per square inch; (2) a compression along the edge AC, and a tension along the edge BD, each equal to $\frac{W \times OE}{AC \times CD} = \frac{W \times OE}{AB^2}$ per square inch; and (3) a compression along the edge CD, and a tension along the edge AB, each equal to $\frac{W \times OH}{AC \times CD} = \frac{W \times OH}{AB^2}$ per square inch.

Hence, we get a stress per square inch at C, of—
 $\frac{W}{AB^2} + \frac{6W \times OE}{AB^3} + \frac{6W \times OH}{AB^3}$

and a stress at B of—
 $\frac{W}{AB^2} - \frac{6W \times OE}{AB^3} - \frac{6W \times OH}{AB^3}$

If this last expression works out a negative quantity, it indicates that the corner B is not in compression, but in tension.

GAVIN J. BURNS, B.Sc.

CUNLIFFE v. HAMPTON WICK LOCAL BOARD.

SIR,—The condensed report of the above case and your "Note" thereon, in the *Builder* of April 8, do not clearly give the true facts of the matter, and with your permission I will place them before your readers as briefly as possible.

The contract was for excavating and laying main sewers and branch drains for house connections, the Local Board providing the stoneware pipes. The soil was of a wet, sandy, and treacherous nature, as stated. The pipes had simply to be laid in the ground without concrete or foundations of any kind. The branch drains for house connections to be laid slanting to a regular gradient. Now what occurred was this. Vicarage-road sewer, of only 7 in. pipes, being 18 to 20 ft. deep, the Board thought they could save money by bringing up the branch drains vertical to about 6 ft. from the surface instead of slanting as originally intended. The Surveyor gave orders for the junction pipes to be turned upwards, and being oblique, or Y junctions, a bend to be put on to bring them into a vertical position for continuing upwards. To prevent the curved bend from coming out of joint by the pressure of filled up earth, a small quantity of concrete was ordered to be put round the bend only, thus leaving a space of about 12 in. underneath the concrete to the bottom of the trench to be filled in with the material that came out, which, being silty sand charged with water, there was nothing solid for the concrete to rest on, and this forming a shoulder for the earth above threw all the weight on to the junction pipe, with the result that it broke and let in the sand, causing a stoppage in the sewer.

There never was any concrete either specified or ordered to be put round the junctions, and this is where the mistake occurred. To have been of any service at all the concrete should have gone down to the bottom of the trench and underneath the junction. As one of the Board's expert witnesses said:—"It was like hanging concrete up in the air to put it in such a position." I warned them of the danger, but was obliged to carry out the orders given me, whether right or wrong, and the Board have never been able to prove otherwise but what I did carry out those orders. The fixing of these junctions and vertical pipes in this position was a departure from the contract, so that it cannot be said that I "did not fulfil the obligations into which I had entered."

For the whole twenty junctions, vertical pipes, and concrete in Vicarage-road, I was only paid 3/15s.; at the same time the Board effected a saving of nearly 40l. Thus I get all the responsibility and this costly litigation, and the Board pocket all the benefits. It has been a question of cheapness with them throughout.

* The report (as stated by us) was condensed from a report in the *Times*.—Ed.

This case may not add any more to your legal knowledge, but it will at least serve as one more warning to contractors, not to sign "anything and everything that is put before them," or to go on with work that is weak and faulty in design, for as contracts are now interpreted they will not be assuredly be held responsible if anything goes wrong.

W. CUNLIFFE.

"SHOULD BRICKLAYERS TILE?"

SIR,—The remarks which have lately appeared in the *Builder* under the above heading raise the question, Who may and who may not do "tiling."

From a common sense point of view, to do nothing of its legal aspect, when taking into account the liberty of the subject, the answer is simple enough. In my opinion (and I am no dunce in the matter) the most fit and proper persons to do "tiling" are those who are capable of doing it, and the satisfaction of the employer who requires it to be done and has to pay for doing it.

I maintain that no man or body of men, be they bricklayers or slaters, has a prescriptive right to claim the exclusive privilege of doing this or any other description of work in connexion with the building trade, and any interference with the liberty of the subject and freedom of contract in regard to this and kindred matters is in direct contradiction to the spirit of the law, and should be so treated.

Be that as it may, however, one thing is certain: bricklayers were the one and only recognised "tilers" in times when slated roofs were unknown or before they came to be generally adopted.

Time was, even within my own recollection, when in many provincial localities, the art of plastering was of greater importance to bricklayers, and occupied a considerably larger share of their time than matters appertaining to actual bricklaying. In so far as relates to tiling, the same system prevailed in London until less than a score of years ago, when firms, hitherto considered to be slaters, pure and simple, took up with it, presumably, in the first instance, to recoup themselves for the proportional loss of their slating business caused by the somewhat sudden revival of tiled roofs, coupled with the introduction about the same time of flat roofs covered with concrete and asphalt. Hence the origin of the titular distinction assumed by slaters—"slater and tiler."

It is doubtless quite correct to say there are numbers of bricklayers in London who do not understand tiling, simply from the fact of their having learnt their trade there, and the existence of such a great preponderance of slated over tiled roofs, consequently they have had no opportunity to acquire the knowledge. On the other hand, it is equally true that for every single slater who can justly claim to be called, or to call himself, a thoroughly capable tiler, there are to be found hundreds of bricklayers who, having originally acquired the art of tiling in the provinces, where tiled roofs are the rule, are equally or even more proficient at the claim of work in question.

Again, in the case of a tiled roof, the tiles, if well-understood reasons, should be methodically bedded; or, more correctly speaking, a certain proportion only of each tile should be so bedded in mortar, notwithstanding that in some parts of the country they used to be bedded, or rather laid, on moss, hair, or straw, a practice that cannot be sufficiently condemned. Well, whoever may be called upon to execute the work, it is necessary that he should be master of the use of a bricklayer's trowel, and not for the purpose of effectually laying the mortar, but also for cutting the tiles, as in the case of hip valleys, vergings, &c., &c., and I never yet saw a slater, or even a mason or plasterer, who could successfully fulfil that essential condition. The slaters whom I have had opportunities of seeing do this work simply bite off the portion of a tile they needed cutting with a pair of powerful pliers, some like a rat gnawing at a piece of wood.

Where the mischief—I had almost said absurdity—of this controversy comes in, is, where the bricklayers' trade union interfered and brought about a strike, thereby causing a large number of men, who might otherwise have been profitably employed, to be thrown on the streets, to swell the already overcrowded ranks of workmen of branches seeking work.

Why, it is only the other day that several trade societies in connexion with the building business were moving heaven and earth to federate for mutual protection, as it was stated; yet here we have the sorry spectacle of two out of the so-called federated already tearing at each other's throats.

COMMON SENSE.

THE ENGLISH IRON TRADE.—In but few instances are there any signs of improvement in the English iron trade. Both prices and demand in the crude iron branch lack steadiness, although nominal quotations are adhered to in most cases; but Lancashire rates are a trifle lower. Business in finished iron is restricted to hand-to-mouth requirements. Tinplates, however, continue to experience a better enquiry, although values are still stationary. Steel is only in limited request. The shipbuilding and engineering industries continue to manifest dullness. The coal trade is quiet.—Iron.

CHEMISTRY.—XVI.

Clays used for Terra-Cotta and Tiles.

	Thames Mud (dirt dark red) Dr. Playfair.	Blue Barrow, Cornwall. Dr. Playfair.	Red London Clay	Blue Clay, W. Devon. Mr. Weston.	Red Clay, W. Devon. Dr. Playfair.
Silica	44.15	45.52	50.40	48.99	57.83
Alumina	11.27	40.76	24.00	32.11	20.55
Iron	5.95	...	...	2.34	7.75
Lime	17.02	2.17	2.70	0.43	1.68
Magnesia	2.25	traces	1.30	0.22	0.97
Carbonic acid .....	...	...	...	...	0.90
Phosphoric acid .....	...	...	...	...	traces
Potash .....	...	1.90	...	3.31	...
Soda	1.30	...	...	...	0.26
Manganese .....	...	...	...	...	traces
Sulphate of lime	4.53	...	...	...	...
Phosphate of lime	0.72	...	...	...	...
Organic matter	5.15	...	...	...	4.39
Loss and water	3.66	9.61	21.60	11.96	2.13
	100.00	99.96	100.00	99.36	100.63

Brick Clays.

Authority.	Abney.	Abney.	Abney.	Knapp.
	Burham Clay.	London Brick clay.	Loam.	Marl.
Silica	42.92	49.5	66.7	43.0
Alumina	20.42	34.3	27.0	...
Oxide of Iron	5.00	7.7	1.3	3.0
Carbonate of Lime	18.91	1.4	0.5	40.5
Carbonate of Magnesia	0.12	5.1	...	3.5
Potash and Soda	0.33	...	...	4.0
Water	0.68	...	...	...
Organic matter	5.01	1.9	5.0	...
	99.39	99.9	100.5	100.0

OBITUARY.

MR. R. HERBERT CARPENTER, F.S.A., F.R.I.B.A.
We have to record, with great regret, that Mr. Richard Herbert Carpenter, F.S.A., F.R.I.B.A., died quite unexpectedly at his residence, Leinster-square, on Tuesday night. He had been unwell for some little time, but his death was the last thing that his friends expected or feared. Mr. Carpenter, who was in his 52nd year, was elected an Associate of the Institute in 1863, and a Fellow in 1875. He died a Member of the Council. The interment will take place this Saturday afternoon (April 22), preceded by a funeral service at St. Stephen's, Bayswater, at 2.30.

GENERAL BUILDING NEWS.

PROPOSED NEW THEATRE FOR SHEFFIELD.—According to the *Sheffield Daily Telegraph*, a new theatre is shortly to be erected in Tudor-street, Sheffield. Protracted negotiations with the Corporation having come to a conclusion, the Council have accepted the plans prepared by Mr. Walter Emden, architect, London, in conjunction with Mr. Edward Holmes, of Sheffield. The building is to be of a domestic design, of red-pressed brick, with stone dressings, a cupola turret at the corner of Tudor-street and Arundel-street being the special feature. At this corner a portion of the building not needed for the theatre will be used for shops. There will be a pit, circle, and gallery. The stage will be 34 ft. deep, 72 ft. wide, the proscenium being 32 ft. wide and 30 ft. high. It is cut off from the auditorium by a fire-proof curtain. The entrance to the dress circle, which is to accommodate 350 persons seated, and 200 more standing, will be from Tudor-street, and it is to be reached by two flights of stairs of 30 steps. The entrance hall is 14 ft. square, and the main corridor upstairs is 14 ft. wide. Coffee and smoke rooms are provided. The entrance to the pit, which is to accommodate 700 persons seated, and 250 more standing, is also to be from Tudor-street, and it will be level with the road. Here, again, coffee and smoke rooms are to be provided. The gallery will be entered by a staircase of 42 steps, 8 ft. 6 in. wide, from Arundel-street, and for this portion of the building coffee and smoke rooms are also provided. There will be seating accommodation here for 600 persons, and standing room for 200

more. All the entrances, passages, and corridors, lobbies and staircases, are to be made fire-proof, and the doors in every instance open in both directions, and it is calculated that the building could be emptied of its 2,500 people easily in five minutes. Several extra exits are arranged for. The ventilation throughout is by means of exhaust fans, in some cases fixed in the walls, and in others in the roofs, with chimneys and cowls.

CHURCH, HAZELBURY BRYAN.—The chancel of the church at Hazelbury Bryan, Dorsetshire, has recently been restored and decorated. The oak choir-stalls were made by Messrs. Merrick & Son, of Glastonbury. The tile work was entrusted to Messrs. Carter, of Poole. A portion of the design is from an old tile found in the church, and evidently one of the original ones used when the church was built, about A.D. 1397. The new tiles have been accurately reproduced by Messrs. Carter. The reredos consists of three large centre panels of alabaster and Devonshire marbles, with supporting columns of green Connemara marbles, with the caps, amulets, and bases of red and dark Devonshire marble. This part of the work was carried out by Mr. Barnes, of Portland. The four side panels are of large size and are of terra-cotta, manufactured by Messrs. Carter, of Poole. The designs on them are various emblems of the Passion. The painting is in Carter's "Tile Fresco," the work being carried out on the unburnt clay with different coloured clays, and the whole then burnt in so that the surface of the panels gives no glittering reflection, though it is just sufficiently vitreous to allow of its being washed and even scrubbed, without injury. The elaborate stone-work was carried out by the Bath Stone Firms in Corsham Down stone, and came from their works ready for fixing. The work was carried out from the designs of the Rev. Canon Wheeler, the rector.

REFORM CLUB, WIGAN.—On the 12th inst. the foundation-stone of the new Reform Club at Wigan was laid by Mrs. Woods. The design comprises the basement a restaurant, smoke-room, bar, kitchen, &c. The ground floor contains a large shop and show-room, and the first floor contains the club premises, consisting of a dining-room 36 ft. by 20 ft., with a movable partition between the reading-room, a billiard-room for two tables, a large front smoke-room, a committee-room or private room, and a bar, which forms the approach to the balcony over the front entrance. The second floor contains a billiard-room, a smoke-room, a bar, and the caretaker's living rooms, &c. The rooms for the club are arranged so as to be easily accessible from the central staircase and landings. Provision is made in the basement for hot-water apparatus, and the rooms are intended to be ventilated by special air flues built with the chimney-breasts; the large billiard-room by roof ventilators. The front is to be built of pressed brick, with stone dressings. The architects are Messrs. Heaton & Ralph.

WESLEYAN CHAPEL AND MISSION HALL, LEEDS.—A new Wesleyan Chapel is about to be erected in Roundhay-road, and a new mission-room in Roseville-road, Leeds. Fronting to Roundhay-road, the building will be in the Classic style, with a main entrance in the centre and two side entrances for the gallery. There will also be a means of access from the adjoining building. The structure, which is to be of pressed bricks, with stone tracery, will be 94 ft. long by 60 ft. wide, and with seating accommodation for about 900. At the entrance there is to be a large vestibule, 31 ft. long by 8 ft. wide. The chancel will be separated from the rest of the chapel by a moulded arch, supported on granite columns. A minister's vestry and two or three other rooms are also shown on the plans. The total cost will be about 5,000l. The new mission-hall in Roseville-road is to take the place of a small room in Enfield-road. The new building will cost about 2,300l. The plans, both for the chapel and mission-hall, have been prepared by Mr. G. F. Danby, architect, Leeds.

FOREIGN AND COLONIAL.

BERLIN.—After the unsuccessful attempt to blow up the old "Dom" with some 108 kg. of dynamite, a second attempt was made with 150 kg. of the same explosive. This charge also proved to be insufficient for the purpose, and the total destruction of the foundations of the cathedral were so weakened by the vibrations that they suddenly gave way some hours after.—Professor Otto, the great sculptor, who died last week, was buried with much ceremony, the Government and the learned and art societies being represented. There will be an exhibition of Professor Otto's work in connexion with the coming International Art Show.—It has now been practically decided that the old Schlossplatz and the historical "König Strasse" are to be remodelled at the joint expense of the Emperor, the Government, and the City. The tramway company will be permitted to run its lines over the Schlossplatz to the Town Hall, as the Emperor will not oppose any of the necessary improvements of the city.

HABBOUR AT BENGAZI.—According to a recent report of the British Consul at Bengazi, Tripoli, the construction of the jetty is being proceeded with, and one of the two arms is in a fair way towards completion. The construction of the other arm will be postponed until the completion of the first, and until the utility and

force of resistance of the more exposed portion have been properly tested. To transport the huge blocks of stone required for the further end of the breakwater, a railway, 3½ miles long, has been constructed from the quarries of Tythad to the landing stage and thence on to the jetty's end. The rails were obtained from Messrs. Cockerill Brothers, Seraing, and the locomotives from France. The cost of the line, including its appurtenances and labour employed, was 8,600l.

MISCELLANEOUS.

BURTON-UPON-TRENT MAIN ROAD ARBITRATION.—The award of the Local Government Board in the Arbitration held before Mr. Coddington, November last, as to the amount to be paid by Staffordshire County Council to the Burton Urban Council for the maintenance of the main road within that Borough for the year 1890-91, has been made. The dispute arose in consequence of the County Council refusing to pay the amount claimed by the Borough. The original claim made by the Town Council was for the cost of 2,361l. 16s. 11d. Of this amount the County Council paid only 1,359l. 11s. 1d. Subsequent negotiations ensued between the authorities, and eventually the County Council agreed to increase the amount of their contribution, but as the amount even then was not considered reasonable, the Town Council, on the advice of their Borough Engineer, Mr. J. E. Swindlehurst, C.E., decided to appeal to the Local Government Board. The award made is, that the County Council shall pay the sum of 2,347l. 19s. 6d., or 267l. 17s. 6d. only less than the original claim of the Town Council, the amount of the award being much greater than the Corporation had at one time offered to accept in a view to settle the matter.

GROUND-RENT AT CROYDON.—We are informed that at the Auction Mart, on Thursday, 19th inst., Messrs. Bull, Norris, & Hadley sold a ground-rent of 500l. 10s. a year, secured upon the premises occupied by the London and County Bank Company, Limited, in High-street, Croydon, 11,500l., being nearly thirty-two years' purchases.

ROYAL STATISTICAL SOCIETY.—At the meeting of the Royal Statistical Society on Tuesday last, a paper was read by Mr. Augustus Sauerbeck, F.R.S., on "Prices of Commodities during the last seven years." The author, in examining the course of prices of commodities, found that in comparison with the average of the eleven years 1867-77 prices in 1892 had fallen 32 per cent.; from 1888-91 they were somewhat higher, declining again in 1892 to the same level as in 1887. A table of movements of prices from quarter to quarter was illustrated by diagrams showing the relative fluctuations of various groups of commodities, and a condensed review of the principal events during the last seven years was given as an account of the trade activity from the end of 1886 to the middle of 1890, of the over-speculation, of a panic promotion, &c., the crisis, the natural reaction from a period of prosperity, and of the extensive depression of corn, textiles, and minerals, but not of other commodities, during the last few years. With regard to the immediate future, a similar comparison shown between the movements of prices from 1889 and from 1883-85. The improvement then commenced at the end of 1887, and at the present time in 1885-86, the production of commodities appears to be stationary. Although the price of raw materials is still elapsing before a considerable development takes place, the author thought that with production arrested, a more healthy tone may set in, and some improvement in certain branches may perhaps not be very distant.

ROYAL SCOTTISH SOCIETY OF ARTS.—The meeting for the season of the Royal Scottish Society of Arts was held in the hall of the Society, George-street, Edinburgh, on Monday last, Charles A. Stevenson, B.Sc., M.Inst.C.E., in the chair. The second part of a paper on the utilisation of water for power was read by Mr. John Ritchie. The lecturer described the most modern appliances for obtaining power from water, and the theories of their action. He showed the difference between pressure and impulse turbines, and the practical application of each to varying falls of water; an improved means of regulating the flow of water into turbines invented by the lecturer was illustrated by diagrams and models. A description was given of several applications of water power to electric lighting purposes carried out by Mr. Ritchie, with exceptionally high falls, one having a head of water of 650 ft., and giving off 35 horse-power, the whole of the water being conveyed through a rivetted steel pipe. An interesting discussion followed, and in reply Mr. Ritchie stated that the public were waking up to the fact that an enormous waste was taking place—a waste that was capable of being utilised to the benefit of the landowner and the manufacturer. It was also stated that the plans were being contemplated for the introduction of electric light, the water entering the reservoir under considerable pressure to supply the motor power, and that that arrangement had been worked in Greenock for some years.

MAINTENANCE OF MAIN ROADS IN CORNWALL.—The want of a proper system of control for

in roads of the County of Cornwall has frequently been commented on at the meetings of the County Council. The scheme introduced in the West Penryn Division has been pointed to on many occasions to prove the contention that economy in maintenance follows direct responsible control. Before the introduction of the present scheme 20½ miles of road of four bridges used to cost an annual sum of £20,000. Last year the expenditure on the same mileage amounted to £13,437, from which £1,000 has to be deducted for value of stone stock, cost of improvements, water and carts, &c., showing the total net cost for the year to have been only £1,065. A saving of £18,935 has thus been effected in the working of the scheme, and last year it was reported that the saving was 7000. If such an annual saving can be effected in the management of twenty miles of main roads, what great saving of the rates may not be effected in the cost of maintenance of the whole of the main roads of the county? The introduction of such more costly material than was ever before used, the expense of watering the roads, and other additional improvements, have only resulted in the system of reducing the cost of maintenance. The system under the West Penryn roads managed seems worthy of the close attention of the Council. *Western Morning News.*

THE NINETEENTH CENTURY ART SOCIETY has on Tuesday, May 2, for the reception of works entered for the Summer Exhibition (the Thirtieth) at the Society, at the Conduit-street Galleries.

THE TECHNICAL ASSOCIATION DISCUSSION No. 11. The eleventh meeting of the session was at the rooms of the Association on Wednesday evening, the 19th inst. Mr. A. W. Cooksey, I.B.A., read a paper on "Polytechnic Institutions." Assuming that no justification for their existence was necessary, he chiefly confined himself to the consideration of their management, their curriculum, and the part of technical education, physical education, and social recreation. The discussion which followed obtained special value from the presence of Mr. E. W. Mountford, who gave the Section the benefit of his special experience. At the next (the last meeting of the session) a paper will be read by Mr. E. W. Mountford on "English Gardens."

CAPITAL AND LABOUR.

STRIKE OF MASONS AT OKEHAMPTON.—According to the *Western Morning News*, about a fortnight ago the carpenters of Okehampton decided to ask the employers for more wages, and if not forthcoming met to stop work. Their grievances were laid before the employers, and it was arranged instead of being paid by the week at the rate of per week, they are to be paid by the hour at the rate of 4½d. On account of the carpenters' success, the masons have been knocked off work in accordance with a resolution passed by them at a meeting a few days ago, agreeing to do so, unless they were paid per hour. The masons' employers do not look upon their grievances very favourably, and the meeting (unless they start work again) to be out in time.

THE BUILDING TRADE DISPUTE AT NEWPORT.—According to the *Western Mail*, the local dispute between the men in the building trade and the employers is practically at an end. The bricklayers' employers have come to terms with their masters, some slight modification of the conditions of work. The carpenters have agreed to settle their terms on the old terms, so that now only the free-masons have a difference with the employers, and it is possible that this will result in a strike.

MEETINGS.

SATURDAY, APRIL 22.

Crystal Palace School of Practical Engineering.—(a) 8 p.m. (b) 9 p.m. (c) 10 p.m. (d) 11 p.m. (e) 12 p.m. (f) 1 p.m. (g) 2 p.m. (h) 3 p.m. (i) 4 p.m. (j) 5 p.m. (k) 6 p.m. (l) 7 p.m. (m) 8 p.m. (n) 9 p.m. (o) 10 p.m. (p) 11 p.m. (q) 12 p.m. (r) 1 p.m. (s) 2 p.m. (t) 3 p.m. (u) 4 p.m. (v) 5 p.m. (w) 6 p.m. (x) 7 p.m. (y) 8 p.m. (z) 9 p.m. (aa) 10 p.m. (ab) 11 p.m. (ac) 12 p.m. (ad) 1 p.m. (ae) 2 p.m. (af) 3 p.m. (ag) 4 p.m. (ah) 5 p.m. (ai) 6 p.m. (aj) 7 p.m. (ak) 8 p.m. (al) 9 p.m. (am) 10 p.m. (an) 11 p.m. (ao) 12 p.m. (ap) 1 p.m. (aq) 2 p.m. (ar) 3 p.m. (as) 4 p.m. (at) 5 p.m. (au) 6 p.m. (av) 7 p.m. (aw) 8 p.m. (ax) 9 p.m. (ay) 10 p.m. (az) 11 p.m. (ba) 12 p.m. (bb) 1 p.m. (bc) 2 p.m. (bd) 3 p.m. (be) 4 p.m. (bf) 5 p.m. (bg) 6 p.m. (bh) 7 p.m. (bi) 8 p.m. (bj) 9 p.m. (bk) 10 p.m. (bl) 11 p.m. (bm) 12 p.m. (bn) 1 p.m. (bo) 2 p.m. (bp) 3 p.m. (bq) 4 p.m. (br) 5 p.m. (bs) 6 p.m. (bt) 7 p.m. (bu) 8 p.m. (bv) 9 p.m. (bw) 10 p.m. (bx) 11 p.m. (by) 12 p.m. (bz) 1 p.m. (ca) 2 p.m. (cb) 3 p.m. (cc) 4 p.m. (cd) 5 p.m. (ce) 6 p.m. (cf) 7 p.m. (cg) 8 p.m. (ch) 9 p.m. (ci) 10 p.m. (cj) 11 p.m. (ck) 12 p.m. (cl) 1 p.m. (cm) 2 p.m. (cn) 3 p.m. (co) 4 p.m. (cp) 5 p.m. (cq) 6 p.m. (cr) 7 p.m. (cs) 8 p.m. (ct) 9 p.m. (cu) 10 p.m. (cv) 11 p.m. (cw) 12 p.m. (cx) 1 p.m. (cy) 2 p.m. (cz) 3 p.m. (da) 4 p.m. (db) 5 p.m. (dc) 6 p.m. (dd) 7 p.m. (de) 8 p.m. (df) 9 p.m. (dg) 10 p.m. (dh) 11 p.m. (di) 12 p.m. (dj) 1 p.m. (dk) 2 p.m. (dl) 3 p.m. (dm) 4 p.m. (dn) 5 p.m. (do) 6 p.m. (dp) 7 p.m. (dq) 8 p.m. (dr) 9 p.m. (ds) 10 p.m. (dt) 11 p.m. (du) 12 p.m. (dv) 1 p.m. (dw) 2 p.m. (dx) 3 p.m. (dy) 4 p.m. (dz) 5 p.m. (ea) 6 p.m. (eb) 7 p.m. (ec) 8 p.m. (ed) 9 p.m. (ee) 10 p.m. (ef) 11 p.m. (eg) 12 p.m. (eh) 1 p.m. (ei) 2 p.m. (ej) 3 p.m. (ek) 4 p.m. (el) 5 p.m. (em) 6 p.m. (en) 7 p.m. (eo) 8 p.m. (ep) 9 p.m. (eq) 10 p.m. (er) 11 p.m. (es) 12 p.m. (et) 1 p.m. (eu) 2 p.m. (ev) 3 p.m. (ew) 4 p.m. (ex) 5 p.m. (ey) 6 p.m. (ez) 7 p.m. (fa) 8 p.m. (fb) 9 p.m. (fc) 10 p.m. (fd) 11 p.m. (fe) 12 p.m. (ff) 1 p.m. (fg) 2 p.m. (fh) 3 p.m. (fi) 4 p.m. (fj) 5 p.m. (fk) 6 p.m. (fl) 7 p.m. (fm) 8 p.m. (fn) 9 p.m. (fo) 10 p.m. (fp) 11 p.m. (fq) 12 p.m. (fr) 1 p.m. (fs) 2 p.m. (ft) 3 p.m. (fu) 4 p.m. (fv) 5 p.m. (fw) 6 p.m. (fx) 7 p.m. (fy) 8 p.m. (fz) 9 p.m. (ga) 10 p.m. (gb) 11 p.m. (gc) 12 p.m. (gd) 1 p.m. (ge) 2 p.m. (gf) 3 p.m. (gg) 4 p.m. (gh) 5 p.m. (gi) 6 p.m. (gj) 7 p.m. (gk) 8 p.m. (gl) 9 p.m. (gm) 10 p.m. (gn) 11 p.m. (go) 12 p.m. (gp) 1 p.m. (gq) 2 p.m. (gr) 3 p.m. (gs) 4 p.m. (gt) 5 p.m. (gu) 6 p.m. (gv) 7 p.m. (gw) 8 p.m. (gx) 9 p.m. (gy) 10 p.m. (gz) 11 p.m. (ha) 12 p.m. (hb) 1 p.m. (hc) 2 p.m. (hd) 3 p.m. (he) 4 p.m. (hf) 5 p.m. (hg) 6 p.m. (hh) 7 p.m. (hi) 8 p.m. (hj) 9 p.m. (hk) 10 p.m. (hl) 11 p.m. (hm) 12 p.m. (hn) 1 p.m. (ho) 2 p.m. (hp) 3 p.m. (hq) 4 p.m. (hr) 5 p.m. (hs) 6 p.m. (ht) 7 p.m. (hu) 8 p.m. (hv) 9 p.m. (hw) 10 p.m. (hx) 11 p.m. (hy) 12 p.m. (hz) 1 p.m. (ia) 2 p.m. (ib) 3 p.m. (ic) 4 p.m. (id) 5 p.m. (ie) 6 p.m. (if) 7 p.m. (ig) 8 p.m. (ih) 9 p.m. (ii) 10 p.m. (ij) 11 p.m. (ik) 12 p.m. (il) 1 p.m. (im) 2 p.m. (in) 3 p.m. (io) 4 p.m. (ip) 5 p.m. (iq) 6 p.m. (ir) 7 p.m. (is) 8 p.m. (it) 9 p.m. (iu) 10 p.m. (iv) 11 p.m. (iw) 12 p.m. (ix) 1 p.m. (iy) 2 p.m. (iz) 3 p.m. (ja) 4 p.m. (jb) 5 p.m. (jc) 6 p.m. (jd) 7 p.m. (je) 8 p.m. (jf) 9 p.m. (jg) 10 p.m. (jh) 11 p.m. (ji) 12 p.m. (jj) 1 p.m. (jk) 2 p.m. (jl) 3 p.m. (jm) 4 p.m. (jn) 5 p.m. (jo) 6 p.m. (jp) 7 p.m. (jq) 8 p.m. (jr) 9 p.m. (js) 10 p.m. (jt) 11 p.m. (ju) 12 p.m. (jv) 1 p.m. (jw) 2 p.m. (jx) 3 p.m. (jy) 4 p.m. (jz) 5 p.m. (ka) 6 p.m. (kb) 7 p.m. (kc) 8 p.m. (kd) 9 p.m. (ke) 10 p.m. (kf) 11 p.m. (kg) 12 p.m. (kh) 1 p.m. (ki) 2 p.m. (kl) 3 p.m. (km) 4 p.m. (kn) 5 p.m. (ko) 6 p.m. (kp) 7 p.m. (kq) 8 p.m. (kr) 9 p.m. (ks) 10 p.m. (kt) 11 p.m. (ku) 12 p.m. (kv) 1 p.m. (kw) 2 p.m. (kx) 3 p.m. (ky) 4 p.m. (kz) 5 p.m. (la) 6 p.m. (lb) 7 p.m. (lc) 8 p.m. (ld) 9 p.m. (le) 10 p.m. (lf) 11 p.m. (lg) 12 p.m. (lh) 1 p.m. (li) 2 p.m. (lj) 3 p.m. (lk) 4 p.m. (ll) 5 p.m. (lm) 6 p.m. (ln) 7 p.m. (lo) 8 p.m. (lp) 9 p.m. (lq) 10 p.m. (lr) 11 p.m. (ls) 12 p.m. (lt) 1 p.m. (lu) 2 p.m. (lv) 3 p.m. (lw) 4 p.m. (lx) 5 p.m. (ly) 6 p.m. (lz) 7 p.m. (ma) 8 p.m. (mb) 9 p.m. (mc) 10 p.m. (md) 11 p.m. (me) 12 p.m. (mf) 1 p.m. (mg) 2 p.m. (mh) 3 p.m. (mi) 4 p.m. (mj) 5 p.m. (mk) 6 p.m. (ml) 7 p.m. (mn) 8 p.m. (mo) 9 p.m. (mp) 10 p.m. (mq) 11 p.m. (mr) 12 p.m. (ms) 1 p.m. (mt) 2 p.m. (mu) 3 p.m. (mv) 4 p.m. (mw) 5 p.m. (mx) 6 p.m. (my) 7 p.m. (mz) 8 p.m. (na) 9 p.m. (nb) 10 p.m. (nc) 11 p.m. (nd) 12 p.m. (ne) 1 p.m. (nf) 2 p.m. (ng) 3 p.m. (nh) 4 p.m. (ni) 5 p.m. (nj) 6 p.m. (nk) 7 p.m. (nl) 8 p.m. (nm) 9 p.m. (no) 10 p.m. (np) 11 p.m. (nq) 12 p.m. (nr) 1 p.m. (ns) 2 p.m. (nt) 3 p.m. (nu) 4 p.m. (nv) 5 p.m. (nw) 6 p.m. (nx) 7 p.m. (ny) 8 p.m. (nz) 9 p.m. (oa) 10 p.m. (ob) 11 p.m. (oc) 12 p.m. (od) 1 p.m. (oe) 2 p.m. (of) 3 p.m. (og) 4 p.m. (oh) 5 p.m. (oi) 6 p.m. (oj) 7 p.m. (ok) 8 p.m. (ol) 9 p.m. (om) 10 p.m. (on) 11 p.m. (oo) 12 p.m. (op) 1 p.m. (oq) 2 p.m. (or) 3 p.m. (os) 4 p.m. (ot) 5 p.m. (ou) 6 p.m. (ov) 7 p.m. (ow) 8 p.m. (ox) 9 p.m. (oy) 10 p.m. (oz) 11 p.m. (pa) 12 p.m. (pb) 1 p.m. (pc) 2 p.m. (pd) 3 p.m. (pe) 4 p.m. (pf) 5 p.m. (pg) 6 p.m. (ph) 7 p.m. (pi) 8 p.m. (pj) 9 p.m. (pk) 10 p.m. (pl) 11 p.m. (pm) 12 p.m. (pn) 1 p.m. (po) 2 p.m. (pp) 3 p.m. (pq) 4 p.m. (pr) 5 p.m. (ps) 6 p.m. (pt) 7 p.m. (pu) 8 p.m. (pv) 9 p.m. (pw) 10 p.m. (px) 11 p.m. (py) 12 p.m. (pz) 1 p.m. (qa) 2 p.m. (qb) 3 p.m. (qc) 4 p.m. (qd) 5 p.m. (qe) 6 p.m. (qf) 7 p.m. (qg) 8 p.m. (qh) 9 p.m. (qi) 10 p.m. (qj) 11 p.m. (qk) 12 p.m. (ql) 1 p.m. (qm) 2 p.m. (qn) 3 p.m. (qo) 4 p.m. (qp) 5 p.m. (qq) 6 p.m. (qr) 7 p.m. (qs) 8 p.m. (qt) 9 p.m. (qu) 10 p.m. (qv) 11 p.m. (qw) 12 p.m. (qx) 1 p.m. (qy) 2 p.m. (qz) 3 p.m. (ra) 4 p.m. (rb) 5 p.m. (rc) 6 p.m. (rd) 7 p.m. (re) 8 p.m. (rf) 9 p.m. (rg) 10 p.m. (rh) 11 p.m. (ri) 12 p.m. (rj) 1 p.m. (rk) 2 p.m. (rl) 3 p.m. (rm) 4 p.m. (rn) 5 p.m. (ro) 6 p.m. (rp) 7 p.m. (rq) 8 p.m. (rr) 9 p.m. (rs) 10 p.m. (rt) 11 p.m. (ru) 12 p.m. (rv) 1 p.m. (rw) 2 p.m. 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CONTRACTS—Continued

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tender to be delivered
*Erection of School.....	Heywood Corporation	Woodhouse & Wilkinsons	May 1 st do.
Two Dwelling Houses	Bradford Corporation	J. H. Doe	do. do.
Cast Iron Pier, and Wharf, at Port of Hull	Hull Corporation	W. H. Doe	do. do.
Cast Iron Pier, and Wharf, at Port of Hull	Wainwright & Co. Ltd.	A. E. Turner	do. do.
Public House, at Port of Hull	do. do.	do. do.	do. do.
Public House, at Port of Hull	do. do.	J. A. Goodford	do. do.

[illegible]

Nature of Appointment.	By whom Advertised.	Salary.	Appointments to be filled.
*Inspector of Nuisances, Surveyor, &c., ...	Ware U.R.S.A.	1207.	May

Public Appointment, p. xx.

[illegible]

TIMBER.		TIMBER (continued).	
reenheart, B.G.		Lath, Dntsic, fath	5/10 f
ton	9/10 0/10	St. Petersburg..	5/10 f
reak, E.I., load	9/10 15/10	Deals, Finland	
sequola, U.S.f.cu.	2 1 7/6	and 1st std 100	7/10 9
rich, Canada load	2 10 0 4/0	Do. 4th & 3rd ..	6/10 10
rich, do.	3/10 4/10	Do. Riga	6/10 10
lira, do.	3/10 4/10	St. Petersburg,	
er, Dantsic, &c.	1/10 3/50	1st yellow	10/10 1
ak, do.	5/10 5/5	Do. and yellow ..	8/10
Canada	5/10 7/10	Do. and yellow ..	8/10
Canada red ..	5/10 7/10	Swedish	7/10 15
Rg. Yellow ..	5/10 4/10	White Sea	8/10 16

Canada, Pine rat	21/10/01
Do. do. 2nd	15/10/01
Do. do. 3rd	7/10/01
Do. Sp. 1st	8/10/01
Do. do. 3rd & 2nd	6/15/01
New Brunswick Battens, all kinds	6, 10/01
Flooring boards, sq., x in. prep.	3/9/01
1st	0/9/01
2nd	0/9/01
Other guano	0/9/01
Cedar, Cuba ..ft.	1/4
Honduras, ..&c	1/4
Mahogany, Cuba	1/4
St. Domingo, cargo av.	1/4
Mexican do. do.	1/3
Tobacco do. do.	1/3
Honduras do. do.	1/3
Rose, Turkey, ton	4/0/01
Rose, Rio	9/0/01
Bahia	8/0/01
Satin, St. Do	

Walnut, Italian ..	6/0 3/4
METALS.	
Iron—Pig, in Scot- land	2/0 3/4
Bar, Welsh, in London	5/17 1/2
Do. do. at works in Wales	5/7 1/2
Do. Staffordshire, in London	6/0 3/4
COPPER —British, cake and ingot	

3/0	Best selected ..	49/10
2/0	Sheets, strong ..	50/10
0/0	Chili, bars ..	44/13
1/0	YELL BOW METALB.	0, 4, 1
8/0	LEAD—Fig.	
5/0	Spanish.....	ton 9 13
	English com.	
	brands	9/16
1/5	Sheet, English,	
7/16	6 lbs. per sq. ft.	
9/16	and upwards ..	11/5
1/4	Pipe.....	11/5
	ZINC—English	
	sheet.....	ton 17/10
	Vieille Mon-	
1/6	tagne	22/0
1/4	TIN—Straits.....	94/2
1/6	Australian.....	94/2
13/0	English Ingots ..	97/0
20/0	Banca	94/15
18/0	Bulion	94 10

0/0/7	Cocanut, Cochin	29/0
	Do. Ceylon	26/15
	Palm, Lagos.....	30/0
	Rapeseed, English	
0/0/0	pale	25/10
	Do. brown	24/0
6/0/0	Cottonseed ref....	22 10
	Oleins	23/0
5/10/0	Lubricating, U.S.	4/0
	Do. refined	5/10
6/10/0	TAR—Stockholm	
	barrel	0/18
48/5/0	Archangel	0/12

The Builder.

VOL. LXIV. No. 2621.

APRIL 29, 1893.

ILLUSTRATIONS.

Decoration for Smoking-Room.—Designed by Mr. T. Wallace Hay	Double-Page Ink-Photo.
Selected Design for West Riding County Council Offices, Wakefield.—Messrs. Gibson & Russell, Architects.....	Two Double-Page Ink-Photo's.
Wayside Notes in East Anglia; Sketches at Clare, Hawkedon, and Posingford.—By J. S. Corder	Double-Page Photo-Litho.

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Architecture at the Royal Academy.



HE collection of drawings in the Architectural Room at the Royal Academy shows no sign of any departure from its usual character—an assemblage of pictorial perspective views, mostly un-

accompanied by plans, and affording little opportunity for the study of architectural design in any serious fashion; while the recurrence of the same hand and style of execution in several of the leading drawings bearing different names, tells emphatically of the extent to which this is essentially a draughtsman's exhibition. The improvement in the selection and method of hanging under the management of an architect, as compared with last year, is pretty obvious; there are few drawings which have not a fair right to their place; some exhibitors who have been very favourably dealt with in the last year or two are reduced to their proper proportion of representation, and some drawings which were ignominiously and unexpectedly returned last year, to the surprise of others besides their owners, are found occupying favourable places this year. We have no means of knowing whether the same apparent caprice is met with in the hanging of pictures, but it is certainly curious in the architectural department to find that drawings which in one year are abruptly dismissed with the fatal cross, are found the next year holding honoured positions on the wall. This year, however, we have no reason to believe that any just complaint can be made of the hanging. The reasons which prevent the Architectural Room from being a satisfactory department of the exhibition are chronic, and must exist until there is more space allotted to architecture and its auxiliary arts, and until a desire is shown to favour really scientific representation of architectural design instead of mere attractions of draughtsmanship. The desire may exist in some quarters already, but the

space for realising an exhibition on such lines is absolutely inadequate, and small perspective representations are mostly all that can be found room for.

The illustration of the class of public, that is, State or municipal, buildings, is rather emphasised this year, as some of the results of several important competitions for buildings of this class find place on the walls. The most important of these in point of size is Mr. Henman's view of the "New General Hospital, Birmingham" (1,578), one of the best also in other respects, though the want of a plan in the case of such a building as this is really what we may call an almost criminal neglect, as implying that a hospital may be judged merely as a piece of architectural grouping, independently of its suitability to its purpose. The drawing, in pen line and by a well-known draughtsman who appears to have this year executed nearly all the largest drawings in the room, shows a building occupying three sides of a quadrangle, with wings returned towards the spectator. The effect of the large octagonal turrets, with conical roofs, at the re-entering angles, and the smaller but somewhat similar ones at the angles of the projecting wings, is fine and effective, though as to the part which these features have in the plan we are left quite in the dark. An open arcade at the upper end of the quadrangle connects the wings and the centre with a triangular carriage porch formed at the entrance by turning out two of the bays at an angle of 45 degs., to meet on a pier opposite the centre of the door; affording, however, we should imagine, rather a tight fit for the carriage. In general, the building is far more picturesque than most hospitals are, and there is no reason to suppose, in the absence of the test of a plan, that the hospital has suffered practically on account of this.

At the west end of the room we have, hung one over the other, drawings of three of the competition designs for the completion of the South Kensington Museum, those of Mr. Emerson (1,618), Mr. T. Manly Deane (1,619), and Mr. W. Young (1,620). The first-named is a very dignified and powerful

looking design in a rather mixed style; the minor details are of Renaissance character, but the circular turrets at the angles of the projecting wings give a certain degree of Gothic character and outline to the whole. The building is treated, as are both of the others, with a recessed centre, over which is a rather small dome, not large enough in any way to dominate the design; probably the requirements of the plan could hardly have afforded opportunity for a large dome; but none of the three designs have plans appended; their interest and value would be doubled if they had. In Mr. Emerson's design the ground story is treated very plainly with continuous rustication and square-headed windows; on the principal story the window spaces have circular arched heads springing from coupled columns, but the tympanum of the arches is filled up and decorated with sculpture. There is an evident attempt to assimilate the building with the existing completed portions of the museum in regard to smaller details, but in its general appearance it is rather at variance with the *genius loci*, the result mainly of those rather military-looking circular turrets. Mr. Deane's design, less striking in some respects, has the merit of being remarkably well fitted to its situation and surroundings. It is an eminently terra-cotta design in character and detail; we do not say that is an absolute merit, but it is one relatively to the situation. The general impression it conveys is somewhat similar to that of the Spanish type of architecture known as *plateresque*: the main features which break up the façade are lofty panelled pilasters running through two stories, and carrying elegant baluster-like columns or colonnettes on the upper story: the whole very profusely ornamented. If there is somewhat too much of the look of furniture-design on a large scale in all this, it is at any rate graceful and rich in effect. The author of this design also employs a recessed centre, with (as in the last-mentioned one) a screen across the space thus left; but he does not introduce either a central cupola or a flanking tower; the main lines of the building are horizontal, and though of course this means

a loss of effect to some extent, there is some merit in the attempt to show that a building of this class may be designed so as to look pleasing and satisfactory for its purpose without the introduction of features which are not practically called for. The employment of a concave outline (on plan) at the angle of the building, apparently for the purpose of introducing a fountain as an object on the centre of the curve, is piquant, and the fountain is a pleasing incident; but the treatment gives rather a weakness of appearance to the angle of the building, nor can one imagine that it would work out well on the interior plan; but this we are not allowed the opportunity of seeing.

On the opposite wall to this is a perspective view, apparently by the same hand, of the accepted design for the Glasgow Art Galleries (1,526) by Messrs. Simpson & Allen; again without a plan. This is a very fine and picturesque group of buildings; especially good is the effect of the front pavilion, as it may be termed, raised over the main entrance and its steps, and standing in front of the central mass with its two towers, which fill up the background. The drawing being in pen line, no indication of material is given; it might be executed with either terra-cotta facing or stone, which implies that it has somewhat of the character proper to the former material. The wall space on the wings is divided up by flat pilaster-like projections, between which are square-headed mullioned windows in the lower part of the space, with cornice and slight pediment over them, and the space above this occupied partly by a wall-arch enclosing sculptured decoration; a small continuous colonnade over gives horizontality and binds the whole together. The defect of the building as a whole perhaps is that it is rather too much cut up in outline, with the result of some deficiency of repose; but altogether it is a fine and original piece of architecture, of which both its architects and the city for which it has been designed may be proud.

Messrs. Aston Webb and Ingress Bell exhibit a drawing of their New Police Offices at Birmingham (1,603), which forms part and parcel of the design of their Law Courts, filling up what may be considered a portion of the same site. That the same architects should have been employed to carry out a building which architecturally must have been so closely connected with their first and larger one was only right, but it is not the less to the high credit of some of the Birmingham architects that they should have recognised this and warmly urged it in the local press. The design is completely a continuation of the Law Courts design, the left-hand gable of the latter forming (in appearance) the right wing of the new building, balanced by a new gable treated symmetrically with it, and the same window treatment being continued in the new portion. The whole makes one design now, and the addition of the new building has the advantage of doing away with the awkward and unfinished look of the original termination of the Law Courts building, with its end wall askew (following the line of the original site). Let it be noted that a plan is appended. The same architects send also, in one frame, three drawings of their new building for the United Service Institution (1,602), adjoining the Banqueting House; two small perspective drawings showing the fronts towards Whitehall and Whitehall gardens, and a large geometrical elevation of the Whitehall front; again setting the good example of adding a plan. They have wisely avoided any correspondence, in their elevation, with the lines of the Banqueting House, so as to leave its individual architectural character untouched; the new building is kept rather lower and none of its architectural features range with those of the old one, although it is sufficiently in keeping with the latter in general character, being of symmetrical Classic type, and plain and simple in treatment. The window treatment in each story is, however, effectively varied, and

the whole makes a very satisfactory elevation. The pleasantest bit of the design, however, is the treatment of the semi-circular exterior of the lecture theatre on the Whitehall-gardens side, with its two tiers of elegantly treated windows, contrasting effectively with the space of blank wall above them. This is a very delicate architectural task, considering the close connexion of the new building with a very famous existing structure, very successfully carried out.

The system seems to have been adopted in this year's hanging of grouping together as much as possible designs by the same architect or designs made with the same object; an arrangement altogether to be commended. Thus, we have Messrs. Webb and Bell's two large works together; we have three designs for South Kensington Museum hung all together; and again we find two designs for Oxford Municipal buildings hung one over the other; the accepted one by Mr. Hare (1,590), and one of those in the second competition (1,588, 1,589) by Mr. E. Rüntz. Mr. Hare's design has been improved in some respects since the competition, in the treatment of the upper portion of the wings, and in the greater emphasis given to the main entrance, and looks a very satisfactory design for its place and purpose, though it is not quite done justice to in the clever and careful but rather heavy water-colour drawing by which it is illustrated. In this respect Mr. Rüntz has an advantage, for he has sent a beautifully executed water-colour perspective of his design, which gives it every advantage that drawing can give; and though it is what may be called rather corrupt and perhaps eccentric in detail (in which quality it is kept in countenance by some of the old Oxford buildings), it is nevertheless a very picturesque design, especially in regard to the treatment of the massive square central tower with its small circular cupola connected by buttresses to the angles of the tower. The windows seem rather isolated in the design, which wants connexion in this sense, but is picturesque as a whole. The author sends also his geometrical line elevation submitted in the competition. No plans are given of either, by which omission again Mr. Hare suffers, as his plan was a quite exceptionally good one, and the same could not be said of the other design.

Mr. Colcutt's "Staircase of the Imperial Institute" (1,586) is an effective brush drawing in Indian ink, showing a fine solid interior effect, with considerable originality of treatment. An order of dark marble columns is introduced at the sides, between round arches, and the principals form arches springing across the hall, the spandrels being filled with vertical and horizontal bars with open space between, and finishing in a small arcade, but it is not very apparent from the drawing of what material these principals (if they are to be so called) are made; they are coloured dark. The ceiling is divided out into large compartments by soffits, one of which rests on the principal: a good deal of ornament is introduced in the panels. The effect of the whole is solid and rich, without being over-elaborated.

Mr. Waterhouse's two contributions are hung together, "New Premises for the National Provincial Bank of England, Piccadilly" (1,498), and "Head Offices of the Refuge Assurance Company, Manchester" (1,499). The Bank is a very bank-looking building, the walls divided by massive rusticated pilasters running up the greater portion of the height, and subdued in the attic into flat pilasters with a monogram ornament; the windows are grouped between these, the ground floor ones, as required in a bank, have a very large lighting area filling up the space between the piers, and strengthened by stone mullions and transoms, not however of Gothic type. The balustrade is decorated with panels with oblique crossbars, something like a feature employed in Roman architecture in a similar position and the piers terminate in massive gilded finials. The entrance is at the angle, as also in the other build-

ing, the Refuge Assurance, where however the canted angle develops above into an effectively designed spirelet. A solid mass of wall is preserved near the angle of the building, on both faces, which seems to form a pier to support the remaining portion of the walls, which are largely cut into for window space. Both these buildings are shown in very powerfully executed water-colour drawings in Mr. Waterhouse's well-known style as architectural drawings they are the most solidly-executed things in the room.

A perspective view of the proposed British Art Gallery (1,582) is given a central place, rather we may presume in regard to the importance of the building than to its architectural treatment, for which we fear there is little to be said; but as Mr. Tate is presenting the building we presume we must not look a gift horse in the mouth, though we cannot but regret that such an opportunity for making the case for English works of art a work of art in itself should have been thrown away. Mr. Belcher sends a tinted sepia geometrical elevation of the library and council chamber of the Institute of Chartered Accountants (1,513), a portion of which, the Council Chamber, was illustrated in our "Jubilee" issue for January 7 of this year. It is a plain-looking classic room with a large order of columns, and a lantern over with a small order; the representation of the painting in the centre of the wall is rather too solid to keep its place in the drawing in comparison with the portions which are really in relief. We perceive, however, from comparing it with the plan annexed, that this picture is really a representation of the room in perspective, and is therefore perhaps purposely executed with more than pictorial precision in order to supply the place of a perspective view, though peopled with figures of another date than the present. The design is a good specimen of simple and dignified treatment of an interior on classic lines.

Messrs. Roger Smith & Son send an elevation (1,511) of their competition design for the Northampton Institute, which appears as far as one can judge to be a suitable and not ineffective treatment for a building of that type; but while we are always glad to see geometrical drawings forming part of the Academy architectural exhibition, it is even more necessary than in the case of perspectives to have plans to accompany and explain them, and we cannot see the use of sending such drawings without a plan. The same remark applies to Messrs. Morris & Hunter's elevation for the Glasgow Art Galleries (1,526), of which it is impossible to form any judgment in the absence of a plan.

Three drawings of public buildings by Mr. Mountford are hung together. The "South-west angle of the Sheffield Town Hall" (1,516), is a broadly-executed washed drawing in Indian ink of a portion of this building, with the character of which all our readers are pretty familiar. The Battersea Town Hall (1,523) is a simply treated and solid looking classic building of somewhat Queen Anne type, but with a special character of its own; the slightly projecting wings are rounded off at the angles, giving a very solid effect; the basement is treated very plainly with rusticated window dressings; in the wings the windows here are semi-circular arches (with a slight stilt) springing from the subbase line. An order is introduced in the upper story, with broken pediments on the wings and over the centre window of the recessed portion, and a projecting semi-circular porch gives an agreeable relief to the otherwise rather severe lines of the design. Altogether this, though a plain and unpretending building, is a very satisfactory one for its purpose as a municipal building of the smaller class. Mr. Mountford's perspective view of the Northampton Institute building (1,524) was published in our illustration pages for April 15, and is a design worth attention for its picturesque and original treatment, while preserving the practical sobriety of style proper to a building of this class; the treatment of the buttresses along

the front wall, Gothic in feeling but not in detail, is very effective; the upper part of the tower might be capable of improvement, without losing its picturesque character, and we should certainly recommend a reconsideration of the design of the projecting clock bracket, which looks too much like a small detail magnified. Mr. Mountford exhibits also a drawing of the east side of Battersea Town Hall.

Mr. Deane's competition design for the Glasgow Art Galleries (1,533) is a powerful group, but rather fails in architectural expression for a building with such a purpose; the bastion-like effect of the large pavilion towers with their round turrets suggests rather a military building, or an idea for a Gothic railway station.

Messrs. J. Burnet Son & Campbell's Glasgow Athenæum (1,555) is a very original front, shown in a clear and powerful pen drawing. The treatment of the right-hand portion, evidently the staircase, seems a little heavy and rather crushes on the doorway. In the other portion the windows of three stories are cleverly combined into one feature architecturally, while keeping the separation of stories quite distinct; the lower part of the projecting bay which they form is recessed within the outer plane of the wall, the upper part appearing as corbelled out from and carried by it. This front may be accused of being a little heavy in detail, but it has plenty of character and has been very carefully worked out.

There are many other designs, some of them of great merit, which we will notice in turn, but we may go out of the way to call attention to Mr. Jackson's drawing for the repair of St. Mary's, Oxford (1,559), and the reconstruction of the pinnacles, which is a matter of considerable public interest at present. A drawing is subjoined on the same sheet showing the pinnacles as restored in 1852 from Mr. Buckler's design. The new design reduces the height of the pinnacles; in fact it appears probable that Buckler superintended a second stage of pinnacle on what were probably the original proportions of the mediæval ones. Mr. Jackson strikes these away, replacing them by crocketed spirelets rising from the lower pinnacles. This will slightly alter the outline of the spire as it has been familiar to the Oxford eye for the last forty years, but there is no doubt that it is an improvement in the balance of the design, and more like the tower as originally built, and Buckler's additional pinnacles have no archaeological value.

We may conclude this notice by remarking that the general effect of the Architectural Room this year owes something, in a decorative sense, to the large and effective coloured design for a frieze by Mr. A. Gwatkin, which, with some smaller designs by the same hand, makes a fine show at one end of the room, and is a very good example of the conventional treatment of foliage for coloured decoration.

WORKING MEN'S COLLEGE, GREAT ORMOND-STREET.—Last Saturday was, according to the late J. O. Halliwell-Phillips's "Outlines," the anniversary of Shakespeare's birth. It formed an appropriate occasion for the delivery at the College of a lecture upon "Elizabethan London," by Mr. T. F. Ordish, F.S.A. (formerly editor of the *Antiquary* and of the *Bibliographer*), in which he dwelt mainly upon the London theatres and dramatic performances of that time. His paper, illustrated with lantern-views of old maps, the Bankside playhouses, &c., was highly appreciated by a large audience. One view reproduced a drawing of the interior of the "Swan," from a MS. by Arend van Buchell (1596), found five years ago in the Utrecht Library, by Dr. Gaedertz.

THE SANITARY INSTITUTE'S EXAMINATION FOR INSPECTORS OF NUISANCES.—At an examination for Inspectors of Nuisances, held in London on April 14 and 15, 153 candidates presented themselves as Inspectors of Nuisances. Questions were set to be answered in writing on the 14th, and the candidates were examined *ad vocem* on the 15th. Sixty-five candidates were certified to be competent, as regards their sanitary knowledge, to discharge the duties of Inspector of Nuisances.

NOTES.

THE Employers' Liability Bill passed the second reading without a division on Tuesday last. It cannot be said that the final discussion threw additional light on the subject. It was perhaps most remarkable for the fact that Mr. Forwood, a prominent member of the Conservative Party, supported the amendment of Mr. Chamberlain, by which the employer would be made liable for accident caused by workmen in his employment, even if no negligence were proved. For good and all, therefore, by this Parliamentary proceeding, the doctrine of common employment has gone for ever, and employers must make the best of the situation. We can only hope that the pessimistic forebodings to which some employers give vent will be falsified by the event, and that workmen will not endeavour fraudulently to make capital out of the Bill when it becomes law.

SOME of our readers will probably be interested to know that a few of the plants from the coal measures found in the Dover boring are now on exhibition in the "Fossil Plant Gallery," at the Natural History Museum, South Kensington. They were presented to that establishment on Saturday last by the Engineer, Mr. Francis Brady, together with portions of the solid cores. The fossil plants in question prove that the Dover coal at present struck is on the horizon of the upper part of the middle coal measures, so that there is every probability of the occurrence of other productive seams lower down. The specimens were obtained from two horizons, viz., 1,262 ft. and 2,234 ft. from the surface of the ground, and are similar to those identified and reported upon by M. Zeiller, the well-known French palæobotanist, in the *Comptes-Rendus* of the French Academy of Sciences last year (vol. 115, pp. 626-629). Ever since the first report of the discovery of coal at Dover the public has demanded the production of the "fossil evidence," and although no doubt could possibly have been entertained by anyone who had carefully studied the scientific aspect of the question, it is satisfactory now to have that evidence placed in a prominent manner in such a public place as the Natural History Museum.

THE Bishop of London has appointed a Commission to inquire into the expediency of uniting the City parishes of St. Edmund the King and Martyr, and St. Mary Woolnoth. Each of the two churches has been threatened before; the latter by the City and South London Railway (Islington extension) Bill of 1890-1; the former under a previous Commission, issued four years ago, for the union of St. Edmund and All Hallows benefices, together with the parishes already united with them.* We expressed at the time a hope that the tower, at all events, of St. Edmund's would not be sacrificed. It carries a leaden octagonal lantern—in the opinion of many one of the most pleasing of Wren's designs—its cornice supported by brackets on the angle piers, above which are placed flaming urns. From the lantern rises a concave octagonal spire surmounted by a pedestal, with finial and vane; the total heights being about 135 ft. The church itself is notable as being that wherein "Joseph Addison, of Bilton, in the county of Warwick, Esquire, was married unto Charlotte, Countess Dowager of Warwick and Holland, of the Parish of Kensington, on the ninth day of August, Anno Domini, 1716, by me, Mr. Nathaniel Hough." Of the interior of St. Mary Woolnoth, as remodelled by Mr. Butterfield in 1876, we published, together with a description, on May 28 last, a two-page lithograph illustration from a monochrome water-colour drawing by Miss A. Fooks.

* *Vide the Builder* for July 6, 1889 (paragraph); and May 18, 1889, and August 17, 1889 ("Notes").

FROM the *Écria* we learn that the new campaign at Troy begins this week—the funds for the expedition are entirely provided by Madame Schliemann—and Dr. Dörpfeld has already started. It is intended to make a thorough investigation of all points at which the previous work was prematurely suspended, and it is hoped that the present excavations will be final. The excavations will begin on the fifth stratum, or "city," as Dr. Schliemann used to call it. This fifth stratum, it will be remembered, is supposed, from the fragments of vases found there, to have close analogies to the civilisation of Mycenæ. Some of the grave mounds near to Troy will now be investigated. Dr. Dörpfeld is accompanied by several members of the German School of Archaeology at Athens, and these gentlemen have promised to "personally conduct" all professional visitors to the site during their stay there. If any one wants the epoch discussed by Homeric questions *in situ* they should lose no time in starting for Hissarlik. The English school, we may add, begins next week its work at Aigosthena, where substantial remains are still above ground. It is remarkable that remains so obvious should so long have remained uninvestigated. Pausanias records (1-44) that a temple of the Seer Melampus existed there in his day.

WE hear from Munich that Dr. Heinrich Brunn, the aged Winckelmann of our century, is engaged in a great history of Greek Art. That the man who half a century ago, wrote the still standard work, "Die Griechischen Künstler," should now embark on the monumental side of his subject, is a striking testimony to vitality. Whether at his age he can possibly cope with the vast mass of additional material that has accumulated we must judge later. It is a curious evidence of the intentional blindness of Germans to what is doing in France, that with M. Perrot's book before their very eyes, the German publishers state that no comprehensive work on Greek art in its entirety, as opposed to sculpture alone, now exists. The book is to be copiously illustrated.

THE mosaic decoration of the dome of the Greek church at Bayswater, which has been recently carried out, forms one of the most important pieces of interior church decoration in London. It is carried out in accordance with that Byzantine tradition which the late Mr. Burges, with much less reason, proposed to introduce into the interior of St. Paul's; a colossal figure of Christ forming the central part of the scheme, surrounded by figures of the Apostles on a smaller scale. Where this method of pictorial treatment is applied to an apse, the colossal figure naturally rises in the centre of the back of the apse, and faces, like the subordinate figures, towards the centre of the plan. Here, in applying the decoration to a central dome, Mr. A. G. Walker, the artist who designed the work, has adopted what is perhaps the only or, at all events, the most effective treatment that can be employed, viz., placing the colossal figure in the centre of the dome, hovering over the central space and as if looking down from it; the apostolic figures being ranged round the lower part of the dome in the usual nearly upright position. The drawback to this treatment of the central figure is, of course, that which is common to all horizontal ceiling paintings of figures, that it is seen upside down, more or less, from one side of the floor. In a decorative sense, however, it has a more impressive effect in this position than it could have had in any other. Of course the colossal figure more or less dwarfs the scale of the dome, but it is in accordance with the traditions of Greek church symbolic decoration, and must therefore be criticised from that point of view. The figures are treated in a sufficiently severe style to harmonise with the general style of the

building and (again) with the Byzantine tradition, though not reproducing the archaic character of Byzantine mosaic, which, impressive as it is in its place in ancient buildings, would be an anachronism in a modern one. The pendentives of the dome are decorated with figures of cherubim, one in the centre of each pendentive; these and the dome figures being relieved on a plain gold ground. The mosaic work has been carried out by Mr. Mecenero from the designs and cartoons of Mr. Walker.

A CATALOGUE of the casts on sale in the National Museum at Athens has just been published in Greek, under the auspices of the Antiquities Department, and edited by Mr. Kabbadias. It should be of great service to all other European museums and also to the many universities, schools of art, &c., who are now forming museums of casts. All credit is due to Mr. Kabbadias for the promptness with which he has had all available new discoveries cast, e.g., those at the Heraeion of Nigos and the sculptures by Damophon found at Lykosura. Epidaurus, too, has received full attention. Hence the book serves, not only as a register of casts for commercial purposes, but also as a scientific guide to the recent additions to the Athenæum collections, wherever the work of art in question has been already published a reference is added. Side by side with the catalogue of casts appears also the first volume of the catalogue of original marbles. Visitors in past years to Athens will remember that in 1886-1887 there appeared the beginning of such a catalogue, but so fundamental have been the changes, so frequent and extensive the additions to the National Museum, that Mr. Kabbadias has had to put in hand an entirely new work. The museum was completed in 1889, the bulk of the funds having been contributed by the wealthy Greek, Bernadakis, while the Government contributed 800,000 drachmas. The discoveries in the Acropolis are, of course, still kept distinct; as it is, the present catalogue describes 1,044 works of art, of which 125 are archaic. The book is supplied with an excellent plan, and with short introductory notice of the chief periods of Greek art. Another interesting feature is a history of the getting together of the collection, illustrated by a reproduction of the first MS. catalogue of the old collection of antiquities at Ægina.

THE splendid first volume of "Monumenti Antichi," published by the Academy dei Lincei of Milan, is chiefly devoted to the report by Messrs. P. Orsi and Sav. Cavallari on their excavations at the site of Megara Hyblæa, in Sicily. Megara Hyblæa, it will be remembered, was destroyed by Gelon in 483 B.C.—the height of its prosperity fell in the seventh and sixth centuries B.C.—hence among the hundreds of vases discovered only one is of the red-figured style. Upwards of 400 graves were opened, and these of the most diverse kinds. Some children's graves were discovered containing each as many as eighty tiny vases entirely covering the body of the child. No arms are found in any of the graves, and but few objects made of metal. The style of the vases found shows the closest connexion with the mother-city, Megara—the so-called proto-Corinthian. Corinthian, black-figured and bucchero vases occur in large quantities, and a good many very rude vases of local ware. The find in inscriptions is quite insignificant, and the only sculptural work of importance, now in the Museum of Syracuse, is a female head of fine-grained limestone, obviously a local work of art.

ACCORDING to the *Rundschau für Geogr. u. Stat.*, a buried town has recently been discovered at the foot of the volcano Agua about two miles to the east of Santiago de los Caballeros, an important

town of Guatemala. Excavations were undertaken at the instance of the owner of the site, Don Alvarado, he having previously found certain articles much resembling the household utensils in use among the aborigines at the time of the discovery of the New World. At depths varying between 6 ft. and 16 ft. the workmen brought to light a large number of household utensils (including engraved and painted vases) weapons and articles of personal adornment, amongst which were many necklaces of precious stones. The vases were found to be decorated with well executed drawings, and with inscriptions in hieroglyphics. There were also discovered some statues in black basalt, remarkable for their execution if it is to be assumed that only stone tools were used on them, there being no trace of metal implements of any description in the excavations. The ruined walls of tenements were met with at a depth of about 5 ft., and on a level with the foundations of these houses numerous human skeletons were discovered.

THE building stones of Indiana have recently* been reported upon by Mr. Maurice Thompson, ex-State Geologist, from which it appears that the principal materials in the State are limestones and sandstones. There are no granites, slates, nor marbles in Indiana. The "oolitic" limestone is said to be the most valuable; "its strength is sufficient to safely sustain a structure, properly designed and systematically constructed, one half-mile or more in height." The oolite of the St. Louis group is said to be the best limestone yet met with in America. We cannot discover why the author calls it "oolite," however, for we learn that it consists entirely of minute shells or fragments of shells, cemented together by carbonate of lime. A State Geologist should be more careful in his nomenclature, for the structural (and hence weathering) peculiarities of an oolite are very different to that of a shelly limestone. We wish we could believe the author's statement "That in . . . England . . . in cities where large quantities of sulphurous coals are burnt, the oolitic limestone has withstood the sulphuric acid of the fumes without the slightest damage." Durability in a building stone, says Mr. Thompson, includes every quality tending to make the material lasting and unchangeable after it is laid in a structure. "Hardness, elasticity, tensile strength, power to resist the greatest crushing force, imperviousness to water, and invulnerability to the attacks of air and its corrosive and disintegrative burdens, are some of the qualities that should be possessed by a good stone, but not all. Evenness and homogeneity of composition, unity of substance, so to speak, and the power to resist extremes of heat and cold are quite as necessary." Referring to the selection of sandstone for building purposes, he remarks that the substance of the rock will often show unmistakable evidence of inequalities of structural composition, such as horizontal cavities caused by the weathering out of seams or streaks, that, on account of bearing too much iron, have oxidized and crumbled away. Such stones should not, of course, be selected, yet we know they are commonly found and used in certain parts of England. In regard to limestones, he states that they are much more injuriously affected by hidden faults of composition than are sandstones, and for this reason they demand a much more careful examination—a remark which we fully endorse. Altogether Mr. Thompson's report seems a good one; there is much in it that applies to building stones in general and not to Indiana stones in particular, and this makes it more widely useful than would otherwise be the case. It would have been considerably improved, however, if the author had not adopted the too prevalent American style of claiming that almost everything which came under his purview in the State was "better,"

"bigger," "stronger," and "greater," than it was anywhere else. Such "high falutin'" nonsense might do very well for a stone-merchant's circular, but it is out of place in a scientific work, issued under the authority of a State Department.

THE fatal disaster at Kilburn, occasioned by the fall of a quantity of corbelled-out brick and cement coping, is a form of accident (if accident it can be called), to which the public are far more exposed than they are aware of. The carelessness and want of workmanlike skill and precaution with which overhanging cornices are frequently built is matter of common knowledge to those who pay attention to the habits of builders; and there are probably many more cornices which are just near the point of danger of falling, and which stand more by good luck than by care in building. Even in a first-class building under the conduct of an architect we have seen lengths of heavy stone cornice on a building in progress, with so little wall-bearing in comparison with their projection that it would have taken very little to tip them over. As it is perfectly possible to make all such projections safe, and the failure to do so results either from want of proper skill and knowledge, or from an effort after undue economy, it appears to us that a verdict of manslaughter against the persons responsible for such dangerous cornices (if they can be got at) would be perfectly justifiable, and would be a wholesome lesson to unconscious or incapable constructors which would probably not be forgotten.

THE appointment of Mr. Harrison, the principal Goods Manager of the London and North Western Railway, to be the General Manager, in place of the late Sir George Findlay, shows the great importance attached by the Directors to the goods traffic. Specialism is rigidly carried out in the large railways, and Mr. Harrison has hitherto had nothing to do with the passenger traffic. In these days it has long been obvious that the General Manager largely controls the policy of a railway company. He must be something more than a competent head of a department. It remains to be seen how Mr. Harrison will act in his new and important post; there is no doubt that he has great capacity for work and has all the details of the goods management at his fingers' ends. It is doubtful, however, whether he will take a sufficiently broad view of railway management, and whether in looking after the interests of the shareholders he may not forget the just demands and requirements of the public. A general manager must be tactful and conciliatory on occasions. At the present juncture these occasions are certain frequently to arise, and we should not be surprised if the traders and the public found Mr. Harrison a somewhat too obstinate opponent.

JUDGING from some correspondence in the *Standard* recently, some of the residents at Folkestone appear to be very angry with the authorities of that Borough for looking too well after its sanitary condition, and for presuming to send sanitary inspectors to houses, unasked, to inquire into their condition. One correspondent, "a resident of over twenty years," complains indignantly of the following enormities—that the authorities demand 14-in. outside walls for two-story buildings, though 9-in. walls are considered enough in London and elsewhere (we presume this gentleman is a speculating builder); that they disallow valve closets, and three-gallon flushing cisterns. If this latter charge means, as we suppose, that they do not consider three gallons enough, we can only say that the Folkestone authorities are right on all three points, and are in advance of their age in sanitary legislation; and the inhabitants ought to consider themselves fortunate in

* "Indiana: Department of Geology and Natural Resources," 17th annual report, pp. 19 et seq.

living in a town so well looked after, instead of grumbling at the enlightenment of their rulers.

BERECHURCH HALL ESTATE, a property about two miles from Colchester, and in a parish known otherwise as West Donyland, which will shortly be offered for sale, once formed part of the demesne of St. John's Abbey, the great Benedictine house of that town, founded by Eudo the Dapifer, to whom is attributed the building of Colchester Castle. The monks gave Berechurch to Thomas Audley, who had been town-clerk of Colchester, and became Henry VIII.'s Lord-Chancellor.* The manor remained in the Audley family until the death, in the Fleet Prison (1714), of Henry Audley, whose widow gave it up to James Smyth, mortgagee. In the parish church of St. Michael, restored in 1872, are some monuments of the Audleys, including that of Sir Henry, erected in his life-time. Having been sacked during the civil war, the Hall was occupied as a farmhouse. About eleven years ago it was partly rebuilt, on the same foundations, and we understand that whilst the dining and drawing rooms are the only remaining apartments of the former house, some of its interior fittings, carved ceilings, and mantelpieces, have been preserved. Sir Robert Smyth, *ob.* 1802, was a patron of Fuseli, and made a collection of his paintings at Berechurch. This estate, which has belonged latterly to the late Octavius Coope's trustees, is watered by the estuary of the Colne, and has been estimated to return a total rent-roll of about 3,500*l.* per annum.

THE collection of water-colour drawings by Sir James Linton and Mr. Orrock in illustration of "Marmion" and "Rokeby" derives its chief value, to our thinking, from the beautiful landscape studies by Mr. Orrock, which form the larger part of the exhibition. These are so fresh and atmospheric in effect, so broad in style, and in such complete accordance with the best traditions of water-colour art, that they form an exhibition well worth a visit, quite apart from any special interest they may have as illustrations of the scenery of Scott's two poems. Among the finest are "Kelso" (5), with its river and bridge framed among masses of foliage, and the large picture of "Smailholm Tower" (12); "Wark Castle and the Tweed" (27), and "Holy Island from the Mainland" (48) are specially noteworthy for the fine treatment of the sky, and the small picture of "The Cheviots from Flodden Field" (46), with its delicate gleams of light on the hills, is one of the most beautiful in the collection. All, however, among these eighty examples of landscape painting in water-colour are masterly in style. Among other subjects are two of Twisel Bridge, two or three giving different views of that picturesquely-placed town Berwick-upon-Tweed; several of Holy Island and Bamborough Castle; a fine view of Tantallon Castle, and a view of Edinburgh from the High School. Sir James Linton's works, fifteen water-colour drawings and a small oil-painting, include some examples of his very best work in regard to richness and harmony of colour and study of costume; in this respect we may especially name "Matilda" (59) and "Lady Heron and James IV." (63); but, unfortunately, as was the case with a previous exhibition by the same artist of figures, said to be an illustration of Scott's characters, there is little study of character in them, and they give the impression of being merely labelled with the names of characters for which the costume was suitable. The conception of "Marmion" (56), if it was really painted as such, is absurd. There are four studies named "Lady Clare," one of them being the oil painting before mentioned, but the faces are not those of the same person, nor did Clare, who occupies

but a subordinate place in the poem, merit so large a share of illustration; the name is obviously only a convenient label for so many studies of heads and costumes; that of "Lady Clare the Novice" (62), the only character in which Clare appears in the poem, is the only one which justifies its title. Of the rest "Constance as Marmion's page" (54), the best of the set in point of invention and character, and "Bertram" (67), are the only two which gave one any idea of having been deliberately studied to represent the characters they are named after; and when we are told that pictures are intended as illustrations of such and such characters we do expect to find a definite attempt to realise the character, and not a mere costume picture, however fine in colour and picturesque in design. The sketch for a picture of the trial and sentence of Constance (66), the most impressive scene in the poem, looks as if it had the making of a fine and effective work, and is really an illustration of the poem, and we shall hope to see it in some future exhibition in its finished form. The other sketch for a picture, "The Spectre Knight and Marmion" (55), is wrongly named, as the knight was not a spectre; it was only that Marmion's heated imagination took him for one for the moment; another reason for thinking that Sir James Linton illustrates Scott without taking the trouble to read him.

THE small exhibition of the works of Calvert at Messrs. Goupil's new gallery in Regent-street does not seem to have attracted the public much, though one would have thought that the important place given to his works at the last Burlington House Loan Exhibition ought to have sufficiently called attention to the exceptional interest of his works. It is true that the collection at Goupil's does not give so favourable an idea of him as that at Burlington House, where naturally most of the best examples were secured first, and the Goupil exhibition professes to limit itself to works not previously exhibited. This is not quite the case, as the frame of small engravings was at Burlington House as well as (we think) one or two of the smaller of the oil studies. The works exhibited show the same general characteristics as those already known; a peculiar and very original scheme of colour, a vivid poetic fancy, accompanied often by very careless drawing. Among the finest are the "Sacrifice of Iphigenia" (13); "Cyrene" (5) a beautifully designed draped figure seated in a landscape; a chalk drawing of two figures called "A Silician Pastoral" (28), and a beautiful figure of a "Recumbent Nymph" (31). A curiosity of the collection is a seated figure (25) described as "Reading of figure in Ety's 'Garden of the Hesperides,' transferred by Edward Calvert into his own system of colour"; in which Ety's realism in the treatment of the nude is replaced by an entirely abstract system of colouring, removing the figure into a totally ideal world. Whether the copy represents the drawing of Ety correctly may be much questioned. A little illuminated picture of "A Primitive City," very minutely executed, is very curious, and has an interest of its own; both in conception and execution it is quite unlike anything else in the collection. On the whole, Calvert may be said to have been a dreamer of beautiful fancies in painting rather than a painter in the full sense; his conceptions are exquisite, but he seems to have wanted either technical power or energy to carry them out fully, except in the case of his little engravings, which are executed with the minutest care; the oil paintings are rather visions of possible pictures than completed works, but they have a great interest of their own.

A VERY fine collection of Nankin blue porcelain is at present on view at the Fine Art Society's Gallery in New Bond-street, partly on sale, and partly the loan

collection of Mr. Orrock, the water-colour artist. We are not of those who take a collector's view of blue china, and value it for the completeness of the set or for a special colour, though the purity of the blue is no doubt an element of artistic value. But porcelain of this class has the merit of for the most part showing better designed outline than many types of pottery which are run after, and not unfrequently the surface design is also of a fine and noble artistic quality, though collectors make little distinction in this respect, and are as ready to pay high prices for pieces with poorly-designed ornament and grotesque figures, as for those which are really fine examples of pattern design. Among the work on view in Bond-street the best things artistically in the sale collection are the large jars in the lower part of the centre case—a very fine set both in colour, form, and decorative detail—and the four circular plates on the top row of those at the side of the room. These latter are superior to most of those that accompany them, as a matter of design, though we doubt if they will command any better price on that account. To a typical collector blue china is blue china, and is all supposed to be *ipso facto*, artistic, independent of any consideration of design.

AN interesting exhibition of Nepal and Thibetian brasswork has been opened at Messrs. Howell & James's premises in Regent-street. The objects have been consigned to Messrs. Howell & James by a resident in India, who has collected them as opportunity offered from time to time. The origin of most of the pieces exhibited are the temples at Goorkha and around Katmandu, and there is little doubt that they are the proceeds of extensive robberies of temples by natives at times of local disturbance. Many were also purchased from Thibetian horse and sheep dealers. The objects are interesting from their associations, and many of the vases and lamps displayed are very graceful in form, with refined decoration. Hanging lamps, vases, incense burners, water-bottles, ink pots, and bells are amongst the objects shown. The exhibition will well repay a visit.

THE Paris Salon (the old Salon at the Champs Elysées) though nominally opening always on the 1st of May, will be open to the public this year on Sunday April 30, at a charge of two francs. The Champs de Mars Salon is to open on May 10, closing on July 10.

SCHOOL FURNITURE.—Mr. John Heywood, of Deansgate, Manchester, has erected a large factory for the manufacture of school and church furniture. The manufactory is fitted with the most modern labour-saving machines.

WORKS BY THE LATE MR. R. HERBERT CARPENTER.—The following works by the late Mr. R. Herbert Carpenter have been illustrated in the *Builder*, those preceded by an asterisk having been designed and carried out by him in conjunction with his partner, Mr. Benjamin Ingelow:—Church of St. Mary, Crown-street, Soho (*Builder*, October 2, 1875). Design for proposed new Cathedral for Manchester (March 11, 1876). *Enlargement and alteration of Knoyle House, Wilts (January 31, 1880). Sketch of Leon Cathedral, Spain (May 29, 1880). *St. Oswald's School, Ellesmere, Shropshire (May 8, 1880, and December 27, 1884). *Stoughton Grange, near Leicester (May 29, 1880). *New Buildings, The King's School, Sherborne (September 3, 1881). *Tomb of Mr. and Lady Mildred Beresford-Hope, Kilnwood Church, Kent (May 6, 1882). *Reredos in Lady Chapel, Chichester Cathedral (September 16, 1882). *Tower, St. Mary's Abbey, Sherborne (May 31, 1884). *Additions to Jesus College, Cambridge (September 3, 1887). St. Chad's College Chapel, Denstone (January 28, 1888). *Choir, Workshop Priory Church (July 14, 1888). *The "Abbey House," Sherborne (October 20, 1888). *Completion of Chancel, St. Paul's, Bedford (September 28, 1889). *West Front of the Cathedral, Honolulu (November 2, 1889). *Interior, Armagh Cathedral (September 27, 1890). Suggestion for Addition to Westminster Abbey (January 10, 1891). *St. Cuthbert's College, Workshop (January 30, 1892).

* Vide the *Builder* of June 28, 1890. * Audley End and Saffron Walden."

ORIENTATION OF CHURCHES.

A GLANCE at a map to a good large scale soon shows that very few, if any, old churches are placed at all true to the Cardinal points of the compass, and the theory put forward in solution of the observed facts that old churches were set out so that the east end should face directly towards the position of sunrise on the day sacred to the name of the Saint to whom the church was dedicated has either been tacitly accepted as a possible, and certainly poetical solution, or hastily set aside as not proven, without the systematic collection of evidence necessary for absolute proof or refutation. This may be due to the labour and research involved being disproportionate to the results to be attained should the key to the varying deviations be ultimately found; but to render the path of investigation easier and more generally accessible we give a table of the horizontal angles of sunrise measured in degrees north and south of true east, for three different latitudes, 50-53 and 56 north, thus covering England from the Lizard in the south, to Berwick in the north; as regards times, four centuries are given, commencing with 700 A.D. down to 1700 A.D., the latter century given both for the old and the new style. The generally-recognised Saints' Days are given, and will be found to be sufficiently close together to enable the reader to interpolate any other days accurately enough for all practical purposes. With this end in view, the days have been arranged consecutively, and not in alphabetical order. Intermediate latitudes and centuries may in like manner be found by interpolation.

The subject of orientation has recently excited some interest in our pages, and, if proceeded with, it should be systematically and upon an extended scale. A few suggestions, therefore, may not be out of place.

Taking latitude 53 N., it will be found that the horizontal angular distance of sunrise north or south of east exceeds 28 deg. on exactly half the days of the year, and as it is probably safe to assume the Saints' Days are fairly evenly distributed over the various days in the year, a considerable, if not a like, proportion of observed deviations should be found with an angle also exceeding 28 deg. Another field also opens itself for consideration as soon as the movable feasts are examined: a list of angles is appended to the main table for three of these days; from this it will be seen again in latitude 53 deg. N., Easter Day covers in A.D. 1000 all the angles from about 5 deg. N. to 25 deg. N., and Ascension Day, in like manner, those from 28 deg. N. to 44 N. Now should further evidence produce any large or marked preponderance of bearings falling within either of these groups, and especially if there be an increasing proportion towards the central periods, conspicuously so as compared with similar angles to the South, then it might be that Easter Day or Ascension had governed the setting out. It is by no means attempted to lay down that this would be borne out by the facts of the case, but the days in question are interestingly suggestive of the possibility of such a custom having been the governing principle.

Should a considerable proportion of churches conform sufficiently closely to the table to confirm the theory, but with an error always to the south, then the advocates of orientation at physical sunrise, or watching for the shadow from the staff or pole, made famous by the poet Wordsworth, and after all the more probable explanation, would have their hands considerably strengthened; for unless upon a most pronounced hill, the sun would actually rise several degrees to the south of astronomical sunrise given in the table; or it may be that in different localities or districts the deviations are, as a rule, similar, all northerly or southerly, irrespective of dedication. This, if proved, would be a dangerous blow at orientation. Rededication has been mentioned in the correspondence. Each case should receive most careful corroboration, or it becomes a loop-hole for that most reprehensible habit, adjusting the facts to suit a preconceived theory. This tendency also shows itself in sometimes finding it expedient to adjust for the gradually increasing error of the Julian Calendar and not always. The date of the existing or original church being known, no such choice is allowable.

Approximate Horizontal Angles of Sunrise North or South of true East.

	Dedication.	Degrees of Latitude North.	A.D. 1700.		A.D. 1400.	A.D. 1000.	A.D. 700.
			New Style.	Old Style.			
JANUARY.							
1	Circumcision	50 53 56	S 37°15' 40°15' 41°0'	S 34°30' 37°20' 41°0'	S 35°30' 38°20' 42°0'	S 35°15' 38°45' 42°30'	S 36°30' 39°30' 43°20'
21	St. Agnes	50 53 56	31°30' 34°0' 37°0'	27°0' 29°0' 31°20'	28°15' 30°30' 33°0'	29°0' 31°15' 34°0'	30°30' 32°40' 35°40'
25	St. Paul, Conversion of.....	50 53 56	30°10' 32°20' 35°15'	25°0' 27°0' 29°0'	26°40' 28°45' 31°0'	27°30' 29°40' 32°0'	28°0' 31°0' 33°40'
FEBRUARY.							
2	St. Mary, B.V. The Purification	50 53 56	26°20' 28°30' 30°50'	21°0' 22°30' 24°30'	23°0' 24°30' 26°30'	23°40' 25°20' 27°20'	25°0' 27°0' 29°0'
24	St. Matthias	50 53 56	15°0' 16°0' 17°0'	8°20' 9°0' 9°30'	10°15' 11°0' 11°30'	11°15' 12°0' 12°20'	13°0' 14°0' 14°30'
1	St. David	50 53 56	12°0' 12°40' 13°20'	5°30' 5°50' 6°15'	7°20' 8°0' 8°30'	8°15' 9°0' 9°30'	10°15' 10°45' 11°20'
17	St. Patrick.....	50 53 56	N 1°45' 2°0' 2°15'	N 4°45' 5°15' 5°45'	N 4°0' 4°20' 4°45'	N 2°0' 2°15' 2°30'	N 0°00' 0°00' 0°00'
20	St. Cuthbert	50 53 56	0°30' 0°40' 0°50'	6°0' 6°30' 7°0'	4°40' 5°0' 5°20'	3°15' 3°40' 4°0'	1°10' 1°20' 1°30'
25	St. Mary, B.V. The Annunciation	50 53 56	N 2°40' 3°0' 3°20'	N 9°0' 9°40' 10°10'	N 7°30' 8°0' 8°40'	N 6°0' 6°15' 6°45'	N 4°15' 4°40' 5°0'
APRIL.							
4	St. Ambrose	50 53 56	8°20' 9°0' 9°30'	15°0' 15°50' 16°40'	13°30' 14°20' 15°0'	12°0' 12°40' 13°15'	10°20' 11°0' 11°30'
23	St. George.....	50 53 56	19°30' 20°40' 22°30'	25°0' 27°0' 29°0'	23°40' 25°30' 27°30'	22°10' 24°20' 26°20'	21°15' 22°45' 24°45'
25	St. Mark ..	50 53 56	20°30' 21°45' 23°40'	26°0' 28°0' 30°10'	24°40' 26°30' 28°40'	23°30' 25°20' 27°20'	22°20' 24°0' 26°0'
MAY.							
1	St. Philip and St. James	50 53 56	23°30' 25°20' 27°20'	28°40' 30°50' 33°30'	27°30' 29°30' 32°0'	26°40' 28°45' 31°0'	25°0' 27°0' 29°0'
19	St. Dunstan	50 53 56	31°30' 34°0' 37°0'	35°0' 38°0' 41°30'	31°15' 37°0' 40°30'	33°30' 39°15' 40°40'	32°20' 35°0' 38°15'
26	St. Augustine of Canterbury ...	50 53 56	33°45' 36°30' 40°0'	36°40' 39°40' 43°0'	36°15' 39°15' 43°0'	35°40' 38°40' 42°20'	34°50' 37°40' 41°15'
JUNE.							
11	St. Barnabas.....	50 53 56	37°30' 40°40' 44°30'	38°10' 41°20' 45°15'	38°10' 41°20' 45°10'	38°5' 41°10' 45°5'	38°0' 41°0' 45°0'
17	St. Alban	50 53 56	38°10' 41°15' 45°10'	38°0' 41°10' 45°0'	38°5' 41°20' 45°15'	38°10' 41°20' 45°15'	38°10' 41°10' 45°15'
24	St. John the Baptist.....	50 53 56	38°10' 41°20' 45°15'	37°15' 40°10' 44°0'	37°40' 40°50' 44°30'	37°5' 41°0' 44°45'	38°5' 41°15' 45°10'
29	St. Peter.....	50 53 56	36°0' 41°10' 45°0'	35°0' 39°0' 42°40'	36°50' 39°45' 43°40'	37°15' 40°10' 44°0'	37°40' 40°50' 44°30'
JULY.							
2	St. Mary B.V. The Visitation	50 53 56	37°40' 40°50' 44°30'	35°20' 38°15' 41°50'	36°15' 39°15' 43°0'	36°30' 39°30' 43°20'	37°15' 40°15' 44°0'
4	St. Martin, Conversion	50 53 56	37°20' 40°30' 44°15'	34°45' 37°30' 41°15'	35°30' 38°30' 42°15'	36°10' 39°0' 42°40'	36°40' 39°40' 43°30'
20	St. Margaret.....	50 53 56	33°15' 35°45' 39°0'	29°10' 31°20' 34°0'	30°40' 33°0' 36°0'	31°0' 33°30' 36°30'	32°0' 34°40' 38°0'
22	St. Mary Magdalen	50 53 56	32°20' 35°0' 38°15'	28°20' 30°30' 33°0'	29°40' 32°0' 34°50'	30°20' 32°45' 35°40'	31°20' 34°0' 37°0'
25	St. James	50 53 56	31°30' 34°0' 37°0'	26°50' 29°0' 31°15'	28°30' 30°40' 33°20'	29°0' 31°15' 34°0'	30°20' 32°15' 35°40'
AUGUST.							
6	Transfiguration.....	50 53 56	26°30' 28°30' 30°45'	21°0' 22°30' 24°30'	22°45' 24°20' 26°30'	23°30' 25°20' 27°15'	25°0' 27°0' 29°0'
10	St. Lawrence	50 53 56	24°30' 26°30' 28°30'	18°45' 20°15' 21°15'	20°40' 22°0' 24°0'	21°30' 23°0' 25°0'	23°0' 24°40' 26°40'

Dedication.		Degrees of Latitude North.	A.D. 1700. New Style. Old Style.		A.D. 1400.	A.D. 1000.	A.D. 700.
AUGUST (continued).			N	N	N	N	N
15	St. Mary, B.V.	50	22° 0'	16° 0'	18° 0'	18° 50'	20° 15'
	The Assumption	53	23° 30'	17° 0'	19° 15'	20° 15'	21° 40'
		56	25° 30'	18° 0'	20° 30'	21° 40'	23° 30'
24	St. Bartholomew	50	17° 15'	11° 0'	13° 0'	14° 0'	15° 50'
		53	18° 30'	11° 40'	13° 45'	14° 50'	16° 40'
		56	19° 45'	12° 0'	14° 15'	15° 30'	17° 30'
29	St. John B. Beheaded	50	14° 30'	7° 50'	9° 45'	10° 45'	12° 30'
		53	15° 15'	8° 30'	10° 30'	11° 30'	13° 15'
		56	16° 0'	9° 0'	11° 0'	12° 0'	14° 0'
SEPTEMBER.							
1	St. Giles	50	12° 40'	6° 0'	8° 0'	9° 0'	10° 50'
		53	13° 0'	6° 30'	8° 40'	9° 40'	11° 40'
		56	14° 0'	7° 0'	9° 15'	10° 15'	12° 0'
8	St. Mary B. V. The Nativity...	50	8° 20'	1° 50'	4° 0'	5° 0'	6° 30'
		53	9° 0'	2° 0'	4° 20'	5° 20'	7° 0'
		56	9° 30'	2° 10'	4° 40'	5° 40'	7° 30'
14	Holy Cross	50	S 4° 45'	S 1° 50'	S 0° 15'	S 1° 10'	S 3° 0'
		53	S 5° 15'	S 2° 0'	S 0° 20'	S 1° 20'	S 3° 20'
		56	S 5° 40'	S 2° 10'	S 0° 25'	S 1° 30'	S 3° 30'
21	St. Matthew	50	S 6° 40'	S 6° 0'	S 4° 40'	S 3° 10'	S 1° 10'
		53	S 6° 50'	S 6° 30'	S 5° 0'	S 3° 40'	S 1° 20'
		56	S 7° 0'	S 7° 0'	S 5° 20'	S 4° 0'	S 1° 30'
24	St. John B. Conception	50	S 1° 0'	S 7° 45'	S 6° 15'	S 5° 0'	S 3° 10'
		53	S 1° 15'	S 8° 30'	S 6° 45'	S 5° 20'	S 3° 40'
		56	S 1° 30'	S 9° 0'	S 7° 15'	S 6° 0'	S 4° 0'
29	St. Michael and All Angels	50	S 4° 30'	S 11° 0'	S 9° 0'	S 8° 0'	S 6° 0'
		53	S 4° 50'	S 11° 50'	S 9° 30'	S 8° 30'	S 6° 30'
		56	S 5° 15'	S 12° 10'	S 10° 20'	S 9° 15'	S 7° 0'
OCTOBER.							
6	St. Faith	50	S 8° 20'	S 14° 50'	S 13° 30'	S 12° 0'	S 10° 20'
		53	S 9° 0'	S 15° 45'	S 14° 20'	S 12° 45'	S 11° 30'
		56	S 9° 30'	S 16° 30'	S 15° 0'	S 13° 10'	S 11° 30'
18	St. Luke	50	S 15° 30'	S 21° 30'	S 20° 20'	S 19° 0'	S 17° 30'
		53	S 16° 30'	S 23° 0'	S 21° 40'	S 20° 20'	S 18° 40'
		56	S 17° 30'	S 25° 0'	S 23° 30'	S 22° 0'	S 20° 0'
28	St. Simon and St. Jude	50	S 21° 0'	S 26° 30'	S 25° 20'	S 24° 0'	S 22° 40'
		53	S 22° 30'	S 28° 30'	S 27° 10'	S 26° 0'	S 24° 20'
		56	S 24° 30'	S 30° 45'	S 29° 20'	S 28° 0'	S 26° 20'
NOVEMBER.							
1	All Saints	50	S 23° 10'	S 28° 20'	S 27° 0'	S 26° 0'	S 24° 30'
		53	S 24° 40'	S 30° 30'	S 29° 0'	S 28° 0'	S 26° 30'
		56	S 26° 40'	S 33° 0'	S 31° 20'	S 30° 15'	S 28° 20'
11	St. Martin	50	S 27° 50'	S 32° 0'	S 31° 15'	S 30° 20'	S 29° 15'
		53	S 30° 0'	S 34° 40'	S 33° 40'	S 32° 50'	S 31° 30'
		56	S 32° 30'	S 37° 50'	S 36° 30'	S 35° 40'	S 34° 15'
20	St. Edmund	50	S 31° 30'	S 35° 0'	S 34° 15'	S 33° 40'	S 32° 15'
		53	S 34° 0'	S 37° 45'	S 37° 0'	S 36° 20'	S 35° 0'
		56	S 37° 0'	S 41° 30'	S 40° 30'	S 39° 40'	S 38° 15'
25	St. Catherine	50	S 32° 15'	S 36° 15'	S 35° 40'	S 35° 0'	S 34° 15'
		53	S 35° 50'	S 39° 15'	S 38° 40'	S 38° 0'	S 37° 0'
		56	S 39° 10'	S 43° 0'	S 42° 20'	S 41° 30'	S 40° 30'
30	St. Andrew	50	S 34° 40'	S 37° 20'	S 36° 50'	S 36° 15'	S 35° 40'
		53	S 37° 30'	S 40° 30'	S 39° 40'	S 39° 15'	S 38° 40'
		56	S 41° 20'	S 44° 15'	S 43° 30'	S 43° 0'	S 42° 20'
DECEMBER.							
6	St. Nicholas	50	S 36° 20'	S 38° 0'	S 37° 45'	S 37° 30'	S 37° 0'
		53	S 39° 30'	S 41° 10'	S 40° 30'	S 40° 0'	S 39° 0'
		56	S 43° 0'	S 45° 0'	S 44° 50'	S 44° 20'	S 43° 45'
8	St. Mary B.V. The Conception	50	S 36° 50'	S 38° 0'	S 38° 0'	S 37° 45'	S 37° 30'
		53	S 39° 50'	S 41° 15'	S 41° 10'	S 41° 0'	S 40° 30'
		56	S 43° 40'	S 45° 0'	S 45° 0'	S 44° 50'	S 44° 15'
21	St. Thomas	50	S 38° 10'	S 37° 15'	S 37° 40'	S 37° 45'	S 38° 5'
		53	S 41° 20'	S 40° 15'	S 40° 40'	S 41° 0'	S 41° 15'
		56	S 45° 15'	S 44° 0'	S 44° 30'	S 44° 45'	S 45° 10'
26	St. Stephen	50	S 38° 0'	S 36° 0'	S 36° 30'	S 37° 15'	S 37° 40'
		53	S 41° 5'	S 39° 0'	S 39° 30'	S 40° 15'	S 40° 40'
		56	S 45° 0'	S 42° 50'	S 43° 20'	S 44° 0'	S 44° 30'
27	St. John E.	50	S 37° 45'	S 35° 50'	S 36° 30'	S 37° 0'	S 37° 30'
		53	S 41° 0'	S 38° 50'	S 39° 30'	S 40° 0'	S 40° 30'
		56	S 44° 50'	S 42° 40'	S 43° 10'	S 43° 15'	S 44° 20'
MOVABLE FEASTS.			N	N	N	N	N
Easter Day—							
	Earliest Day, March 22	50	0° 40'	7° 0'	5° 30'	4° 15'	2° 30'
		53	0° 50'	7° 30'	6° 0'	4° 30'	2° 45'
		56	1° 0'	8° 0'	6° 30'	5° 0'	3° 0'
	Latest Day, April 25	50	20° 30'	26° 0'	24° 40'	23° 30'	22° 20'
		53	21° 45'	28° 0'	26° 50'	25° 20'	24° 0'
		56	23° 40'	30° 10'	28° 40'	27° 20'	26° 0'
The Ascension—							
	Earliest Day, April 30	50	23° 20'	28° 20'	27° 0'	26° 0'	24° 40'
		53	25° 0'	30° 30'	29° 0'	28° 0'	26° 30'
		56	27° 0'	33° 0'	31° 20'	30° 15'	28° 40'
	Latest Day, June 3	50	36° 0'	38° 5'	37° 40'	37° 30'	36° 40'
		53	39° 0'	41° 10'	40° 50'	40° 30'	39° 40'
		56	42° 40'	45° 0'	44° 40'	44° 15'	43° 30'
Corpus Christi—							
	Earliest Day, May 21	50	32° 0'	35° 40'	34° 45'	34° 0'	33° 0'
		53	34° 40'	38° 30'	37° 40'	36° 45'	35° 45'
		56	38° 0'	42° 10'	41° 20'	40° 30'	39° 0'
	Latest Day, June 24	50	38° 10'	37° 15'	37° 40'	37° 5'	38° 5'
		53	41° 20'	40° 10'	40° 50'	41° 0'	41° 15'
		56	45° 15'	44° 0'	44° 30'	44° 45'	45° 10'

It should be added that frequently, in the present Church Calendar, one associated with each saint, where times they had several. For example, Andrew's Day is now November 30, but in the old style it was May 9 and September 3, for the same reason. The same applies to others, and his consecration to the altar, February 5, used to be observed on the 12th of the month.

For present observation the following from the *British Almanac* for 1880 may be useful. Magnetic north is now 17° 15' from true north, and is in the United Kingdom, and is in the United Kingdom, reducing its distance from true north to 7° a year.

The variation west is now in 19° 22'; Plymouth, 18° 56'; Portsmouth, 18° 33'; Yarmouth, 16° 45'; Dover, 16° 33'; Liverpool, 15° 30'; Pembroke, 15° 15'; Dublin, 21° 2'; Edinburgh, 20° 25'; London, 19° 15'; and so on. The further guide to true north, the following notes of the whereabouts of the magnetic north, and the convenient hours in the evening of the day, and have the advantage of being correct enough for the purpose for several hundred years or so. The times given are for the first of each month, and become 4 min. less every day:—

	1½ deg. West.	1 deg. West.	True North
January	12° 30'	9° 45'	6° 30'
February	10° 30'	7° 45'	—
March	8° 30'	5° 45'	—
April	—	3° 45'	12° 30'
May	—	1° 45'	10° 30'
June	—	—	8° 30'
July	—	—	—
August	—	—	—
September	—	—	—
October	—	—	12° 30'
November	—	—	10° 30'
December	—	—	8° 30'

In conclusion, one word of warning, and proverbially modern sun-dials, and trustworthy evidence of the cardinal points, is remembered the sun, if used to find the time, is considered as a clock a very bad one, and he only tells correct mean time on the year, and is at certain periods exact. "Whitaker's Almanack" as much as a slow or 16 minutes fast.

THE ROYAL INSTITUTE OF ARCHITECTS AND THE SOCIETIES:

CONFERENCE AT LIVERPOOL.

ON Friday, the 21st inst., a conference of delegates from the Royal Institute of Architects, and from the various associations in the country, was held, at the Liverpool Association, at University Hall, Liverpool, for the purpose of considering a circular letter addressed by the Institute to allied associations in September last, dividing of the United Kingdom into districts for the purpose of promulgating a system of professional education.

In the unavoidable absence of Mr. H. R. President of the Liverpool Architectural Society, the chair was taken by Mr. Henry I. president; and there were present, Mr. H. R. President, Mr. Arthur C. Emerson, hon. sec., and Mr. Slater, Manchester Society, Mr. Salomons, the Leeds Society, Mr. Bulmer, Mr. H. Thorpe; for the Liverpool Society, Mr. Culshaw, V.P., Mr. Beckwith, hon. sec., Mr. Dodd, Mr. Grayson, Mr. Aldridge, Mr. Berrington, and others; for the Society, Mr. H. R. Lloyd, hon. sec., Mr. Sheffield Society, Mr. E. M. Gibbs, Mr. Bristol Society, Mr. W. E. Jones, Mr. V.P., for the Leicester Society, Mr. Perkins Pick, hon. sec.; and for the Society, Mr. Drew, President, and Mr. hon. sec.

The Chairman, in introducing the meeting, said they were assembled to consider the proposals contained in the letter from the Royal Institute, which was received by the Society last. The question of education is important one to the whole of the profession of architects, for they had too long neglected the scientific teaching of young architects, and the artistic sides of their pupils to evolve their art from inner-consciousness rather than from

It should be added that frequently, according to the present Church Calendar, one day only is associated with each saint, whereas in earlier times they had several. For example, St. Andrew's Day is now November 30, but his translation May 9 and September 3, for both days are given, and his consecration to the See of Patras, February 5, used to be observed.

For present observation the following, taken from the *British Almanac* for 1893, will be of use. Magnetic north is now 17° 12' west in London, and is in the United Kingdom reducing its distance from true north by about 7' a year.

The variation west is now in Falmouth, 19° 22'; Plymouth, 18° 56'; Portsmouth, 17° 40'; Dover, 16° 33'; Yarmouth, 16° 45'; Sunderland, 19° 7'; Liverpool, 19° 30'; Pembroke, 20° 25'; Dublin, 21° 2'; Edinburgh, 20° 25'; and as a further guide to true north, the following rough notes of the whereabouts of the Pole Star at convenient hours in the evening or night will be useful, and have the advantage of being correct enough for the purpose for the next few hundred years or so. The times given are for the first of each month, and become about 4 min. less every day:—

	1 deg. West.	1 deg. West.	True North.	1 deg. East.	1 deg. East.
January	12° 30'	9° 45'	6° 30'	—	—
February	10° 30'	7° 45'	—	—	—
March	8° 30'	11° 15'	—	—	—
April	—	9° 15'	12° 30'	—	—
May	—	7° 15'	10° 30'	—	—
June	—	—	8° 30'	11° 45'	—
July	—	—	—	9° 45'	12° 30'
August	—	—	—	7° 45'	10° 30'
September	—	—	—	11° 15'	8° 30'
October	—	—	12° 30'	9° 15'	—
November	—	—	10° 30'	7° 15'	—
December	—	—	8° 30'	5° 15'	—

In conclusion, one word of warning: Vanes and proverbially modern sun-dials are most untrustworthy evidence of the cardinal points, and be it remembered the sun, if used to find true south, is considered as a clock a very bad time-keeper; he only tells correct mean time on four days in the year, and is at certain periods easily found in "Whitaker's Almanack" as much as 14 minutes slow or 16 minutes fast.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS AND THE ALLIED SOCIETIES:

CONFERENCE AT LIVERPOOL.

ON Friday, the 21st inst., a conference of delegates from the Royal Institute of British Architects, and from the various allied associations in the country, was held, at the invitation of the Liverpool Association, at University College, Liverpool, for the purpose of considering the circular letter addressed by the Institute to the allied associations in September last, as to the dividing of the United Kingdom into provinces, for the purpose of promulgating an improved system of professional education.

In the unavoidable absence of Mr. Harrison, the President of the Liverpool Architectural Society, the chair was taken by Mr. Henry Hartley, vice-president; and there were present, on behalf of the Royal Institute, Mr. Arthur Cates, V.P., Mr. Emerson, hon. sec., and Mr. Slater; for the Manchester Society, Mr. Salomons, President; the Leeds Society, Mr. Bulmer, President, and Mr. Thorpe; for the Liverpool Society, Mr. Culshaw, V.P., Mr. Beckwith, hon. sec., Mr. Dodd, Mr. Grayson, Mr. Aldridge, Mr. Keefe, Mr. Berrington, and others; for the Birmingham Society, Mr. H. R. Lloyd, hon. sec.; for the Sheffield Society, Mr. E. M. Gibbs, V.P.; for the Bristol Society, Mr. W. E. Jones, hon. sec.; for the Nottingham Society, Mr. A. Hazell, V.P.; for the Leicester Society, Mr. S. S. Perkins Pick, hon. sec.; and for the Dublin Society, Mr. Drew, President, and Mr. Murray, hon. sec.

The Chairman, in introducing the business of the meeting, said they were assembled to discuss the proposals contained in the letter from the Royal Institute, which was received on September 1 last. The question of education was a most important one to the whole of the rising generation of architects, for they had too long neglected the practical teaching of young architects. On the scientific and the artistic sides they had left their pupils to evolve their art from their own inner-consciousness rather than giving them lines

by which they should be educated and upon which they could formulate their practice in the future. He asked them to give the subject their fullest and most earnest attention, so that this meeting might not be a futile one, but that they might return to their several duties feeling that they had at least set the ball rolling; that there would come a practical issue out of their consideration; and that they might be able to assist the Royal Institute in formulating a scheme which would be not only for their own benefit, but for the benefit of the rising generation—a benefit which would accrue to the whole of the people of England by bringing into being a better type—a better educated class—of architect.

Mr. Beckwith, Secretary of the Liverpool Society, having read the letter which the Chairman had referred to, and which has already been published,

Mr. Salomons, of Manchester, moved the following resolution:—

"That this Conference of delegates from the provincial architectural societies in alliance with the Royal Institute of British Architects has heard with great satisfaction the proposal to divide the United Kingdom into architectural provinces, which, if successfully carried out, will materially advance the interests of the profession throughout the country."

Mr. Salomons observed that it was self-evident in every way that such a course as that proposed was desirable in the interests of the profession at large, and even publicly. The want had been felt, and was growing, as they all knew. The seniors, looking back to the past time, knew how they had had to pick up their knowledge by self-education, and what difficulties they had had to contend with. Those difficulties, of course, would be obviated by the system of education now devised, and which would be so materially increased and improved by this centralising movement. He would be very much surprised if any opinion contrary to what he had stated were expressed in that conference. As to the division of the country into districts, his idea, as representing Manchester, was that they had not the slightest wish to take more than their fair share. They wished to be simply one spoke in the wheel to complete the intention of the conference, and to make the thing work pleasantly. But one point had been overlooked as to the advantages of the movement. One great advantage was the assistance that they would be able to render to their members. Constant disputes with builders and others were cropping up, and it would be a great advantage to have a centre to which those disputes could be referred.

Mr. Culshaw seconded the motion, and in reply to a question,

Mr. Cates said that so far as he could estimate at present there would probably be from fifteen to sixteen provinces or districts in all. London would take the whole of the southern part of England which had not been claimed by any existing professional societies, but if at any future time centres such as Oxford or Cambridge or Southampton formed societies of sufficient strength, it would be very easy to carve out districts for them.

Mr. Beckwith expressed the view that it would be a mistake for any society to attempt to cover too large an area.

The Chairman thought that these were matters of detail, and that they were now discussing rather the general principle.

The resolution was then put to the vote and agreed to unanimously.

Mr. Bulmer then moved the following resolution, which he said was entirely in accord with his own views, and he submitted it with a feeling of confidence that it would meet with the unanimous support of the Conference:—

"By the establishment of such architectural provinces, the Architectural Society of each district will have its local centre, and in time, by absorbing within its centre all the architects of reputation, bring into harmonious action the scattered and unorganised members of the profession; strengthen the position of all local practitioners both professionally and socially; and enable arrangements to be made for extending throughout the country the advantages of the Progressive Examinations now established by the Royal Institute of British Architects, and by promoting a systematic organisation for educational purposes, and utilising and developing such means of instruction as may be available in connexion with such centre, raise the standard of architectural education in all parts."

Mr. Murray seconded the motion.

A discussion followed as to the present means and systems of professional education in Leeds, Manchester, Birmingham, Bristol, Sheffield, and other centres.

The Chairman stated that in Liverpool, for three or four years past, they had had lectures by a professor of art on architecture, and also by a professor on hygiene, to assist in the education of architectural students and pupils. They had also an Engineering School which students might

attend, but further than that, within the last two or three months, they had approached the Senate of the University, and had had a meeting with the Senate, asking them to establish in Liverpool a Chair of Architecture. The scheme was rather a large one; but if they could accomplish what they had in view, he believed that they would formulate a very large educational centre for architectural students in the Northern district; they would embrace practical architecture, and would lecture on and teach all the subjects that were embraced in the Royal Institute of British Architects' Examination scheme: the history of architecture, materials, and so on. They also proposed to have a Drawing School and a Studio for Modelling, which, added to the Engineering School, which was already an accomplished fact, would, he thought, place them in a very strong position, and enable them to give an exceptional education to architectural students.

Mr. Drew, of Dublin, suggested that it would greatly assist the local societies if the Institute would give a short statement of what was being done in other places in fighting the battle with various public bodies, and so enable them to get something done. He did not think that the drawing-up of such a statement would be imposing any great task on the Institute, whilst it would be of incalculable advantage to the allied societies.

Mr. Emerson said he thought the suggestion was a good one, and he would be pleased to lay it before the Institute.

Mr. Murray suggested another difficulty, and that was the one of money. He thought that the country members paid a very heavy subscription to the Institute in proportion to the gain they had from belonging to it, and he thought that in return the Institute might do something to assist in promoting the educational efforts of the poorer districts.

Mr. Emerson replied that the Institute was poor, and, in fact, was bound to cast about to see where it could save money.

Mr. Murray still thought that something should be done. He lived in Dublin, and he paid four guineas a year. It was true that he got a guinea back as contribution to his own local society, but still the Institute kept three guineas. The members in London got all the printed matter issued by the Institute, and, in addition, they had the use of its palatial rooms. Even the clubs in London made a reduction to country members, and he thought, if the Institute did the same they would get a large accession of new members.

The Chairman thought this was going rather beyond the area of the discussion.

The motion was then put to the meeting, and carried unanimously.

Mr. A. Heazell moved—

"That so far as the constitution of the Royal Institute of British Architects and of each society may permit, it is desirable that the President, for the time being, of each society, shall have a seat on the Council of the Institute; and that this Conference do represent to the Council the desirability of steps being taken to obtain such modification of the Bye-law No. 25 as will enable this to be done."

Mr. Pick seconded the motion.

Mr. Cates expressed himself strongly in favour of the proposition, seeing that if the scheme now promulgated were carried out, the presidents of the societies would be the authorised representatives of the whole of the architects of the provinces, and it was extremely important that each local centre should be represented on the Council, and he hoped that no difficulty would arise either in the Council or in the general body which would prevent the bye-law being amended, as suggested.

The Chairman having also expressed himself strongly in favour of the proposition as being likely to weld the profession still more closely together, it was put and carried unanimously.

Mr. E. Jones then moved—

"That the secretaries of the several provincial societies be requested to confer together to consider the boundaries of each province proposed to be attached to the respective centres for the purpose of provisionally defining the same, and then communicating the same to the Royal Institute."

He remarked that at Bristol the principle of the proposals of the Institute has been most cordially adopted, and though there might be some little difficulty in arranging the various districts, he thought they were such as might easily be overcome; and the whole thing put into satisfactory working order. He asked whether the Institute desired to receive suggestions as to the details, or whether, with its much greater experience, the Institute would suggest something to the districts.

Mr. Cates said it was extremely desirable that, in the first instance, the resolution now proposed should be carried out, and that the proposed Conference should communicate to the Institute

the result of its provisional arrangements. He thought it was extremely desirable for the successful carrying out of the details that each society should communicate to the Institute its own views and the result of their personal experiences, and the manner in which they proposed to organise their respective districts. In each particular case there must be peculiar circumstances which would render any one cast-iron scheme of organisation undesirable.

Considerable discussion followed, and after further explanations of the proposals of the Institute,

Mr. Gibbs said that it was a serious question whether, all things considered, the Examinations should not all be conducted in London. There might occasionally be some difficulty in some centres in obtaining competent examiners, whereas no such difficulty could possibly arise if it were arranged that all the Examinations should take place in London.

The Chairman thought the discussion was getting rather wide of the resolution. Before that they had already dealt with the question of education, and the present resolution referred simply to the boundaries of the proposed provinces. He repeated that it was impossible for them on this occasion to satisfactorily deal with questions of detail, and he thought they had better confine themselves to the broad principles.

The resolution was then put and carried *nom. vot.*

The Chairman said he presumed they would now form themselves into a committee to discuss the subject-matter of the last resolution. He thought it would facilitate matters if the secretaries first conferred on the questions.

Mr. Emerson, before the formal proceedings closed, asked the delegates to join him in a vote of thanks to the Chairman for the very admirable way in which he had conducted their business, and he also asked them to couple with the vote their thanks to the Liverpool Society for having brought forward this very important question, and organised this meeting of the allied societies, and for their very kind hospitality. He believed that very great good would result from the movement which had now been taken up, and it would very largely promote the interests of the architectural profession in the future.

Mr. Drew said he had very great pleasure in seconding the motion.

The Chairman briefly expressed his thanks on his own behalf, and on that of the Liverpool Society; and cordially reciprocated the expression of Mr. Emerson as to the probable result to the profession of the present movement.

THE SURVEYORS' INSTITUTION:

PROFESSIONAL EXAMINATIONS.

The following Student Candidates have passed the Examination for the Professional Associateship:

Andrews, W. E.	Lancaster, J. R.
Bannister, T. H. C.	Maddox, H. E.
Bradshaw, H. G.	Mann, F. C. T.
Debenham, F. K.	*Martin, A. J.
*Eason, E. W.	Martin, S.
Fletcher, H. P.	Neighbour, C. E.
Gray, F. W.	Pain, G. L.
Green, F. A.	Punchard, C. B.
Hawes, F. K.	Sly, J. T.
Holiday, P. C.	Stapledon, E. A.
Irvine, A. W.	Thompson, F. H.
King, W. N.	

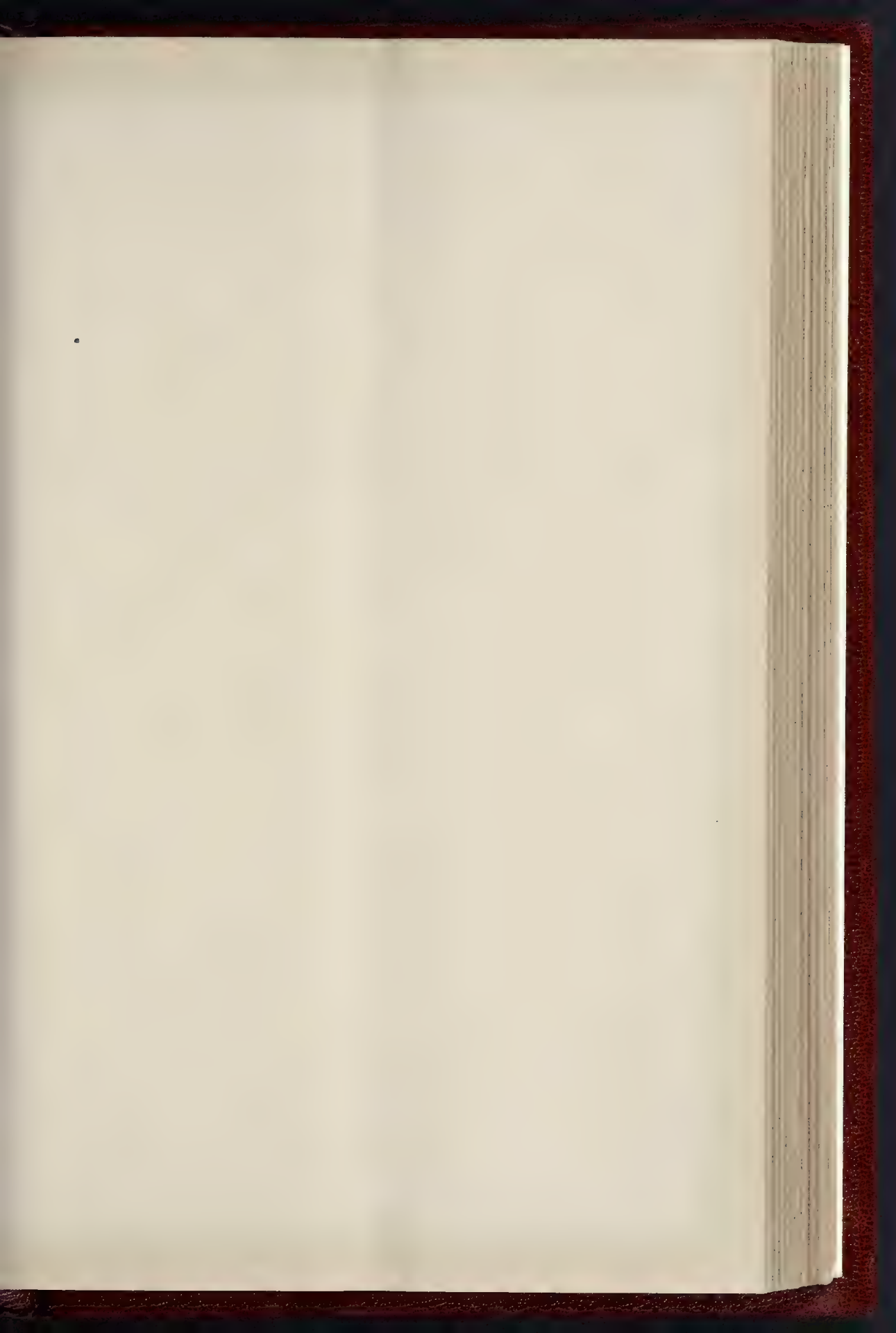
* Institution Prizeman, 1892. † Special Prize, 1893.

The following Non-Student Candidates have also passed the Examination for the Professional Associateship:—

Almond, W. J., jun.	Monson, H.
Bailey, L. H.	Morrison, D.
Barnwell, J. E.	Morris, G. D.
Birley, J. H.	Norman, J. N.
Birch, R. E.	Parson, H.
Bodger, P. M.	Pearce, F. W.
*Bost, W. L. T.	Peggs, J. I.
Cox, R. J.	Pyke-Nott, J. M.
Champion, G. E.	Roney-Dougal, J. D.
Cooper, A. W.	Sale, A. R.
Darbishire, H. V.	Salter, S.
David, G. W.	Seddon, G. F.
Davies, C. F.	Smith, F. B.
Delamare, F.	Sowels, W. C.
*Easton, W. J.	Staley, A. H.
Edmonds, J.	Tee, S. C.
Fitt, H. B.	Tyler, W. B.
Hewett, G. T.	Waldram, R. E.
Jeffrey, S.	Watson, W. J.
*Jenkinson, J.	West, C. H. E.
Kennett, C. A.	Willis, E.
Laird, C. E.	Winnacott, E. W. M.
Marriott, C. W.	Wrightson, R. G.
Mathews, L. O.	Wyles, J. W.
Mellor, J. F.	

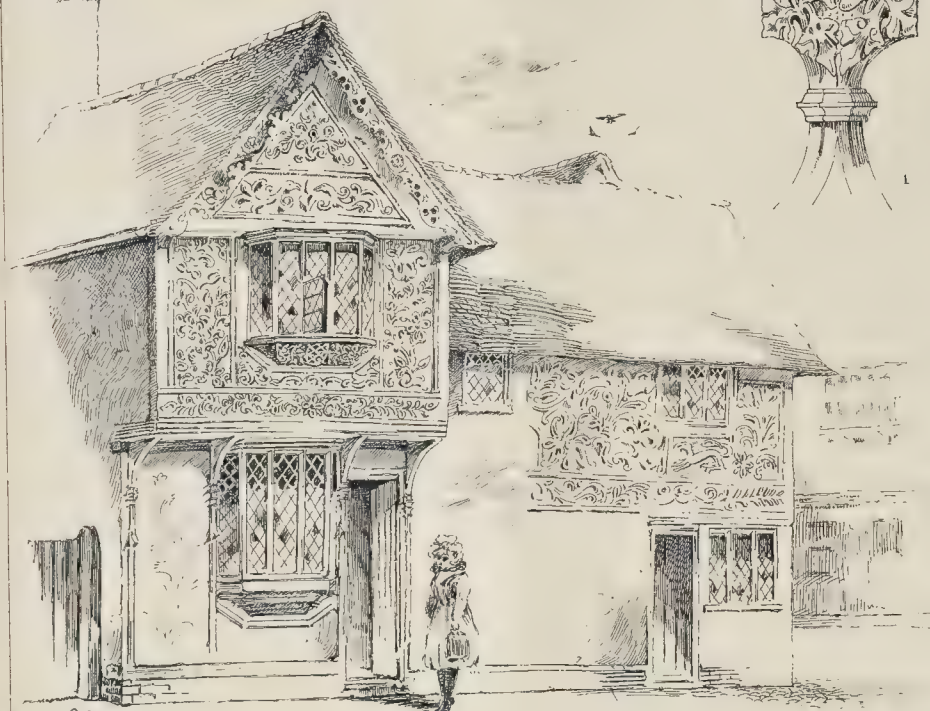
‡ Driver Prize, 1893.

§ Consolation Prize given by President.



Wayside Notes in East Anglia

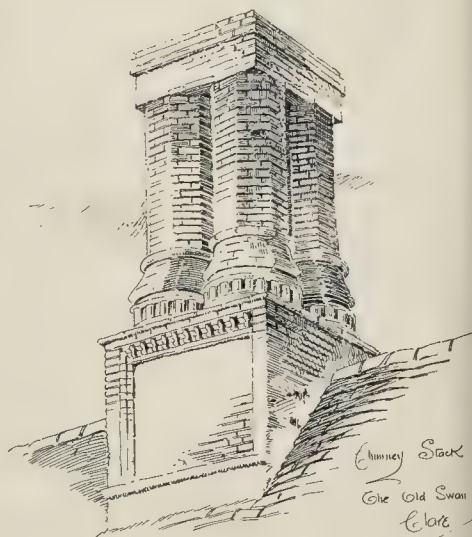
by
John · Shewell · Corder



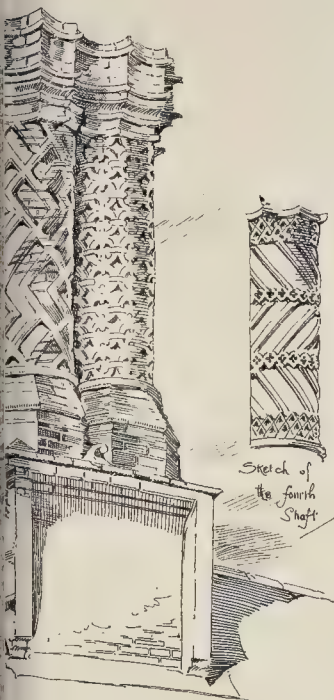
Old · House · Clare · Suffolk



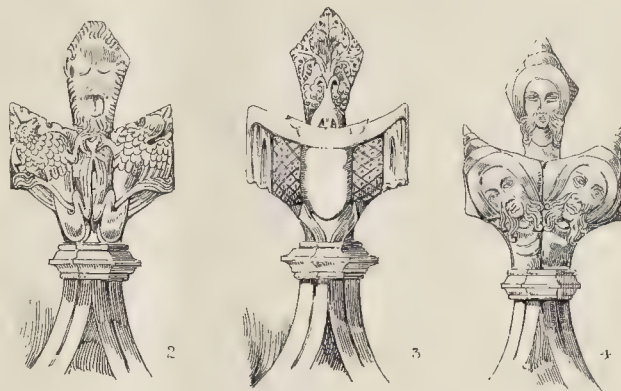
Old Chapel House
Clare



Chimney Stack
Old Swan
Clare
Suffolk



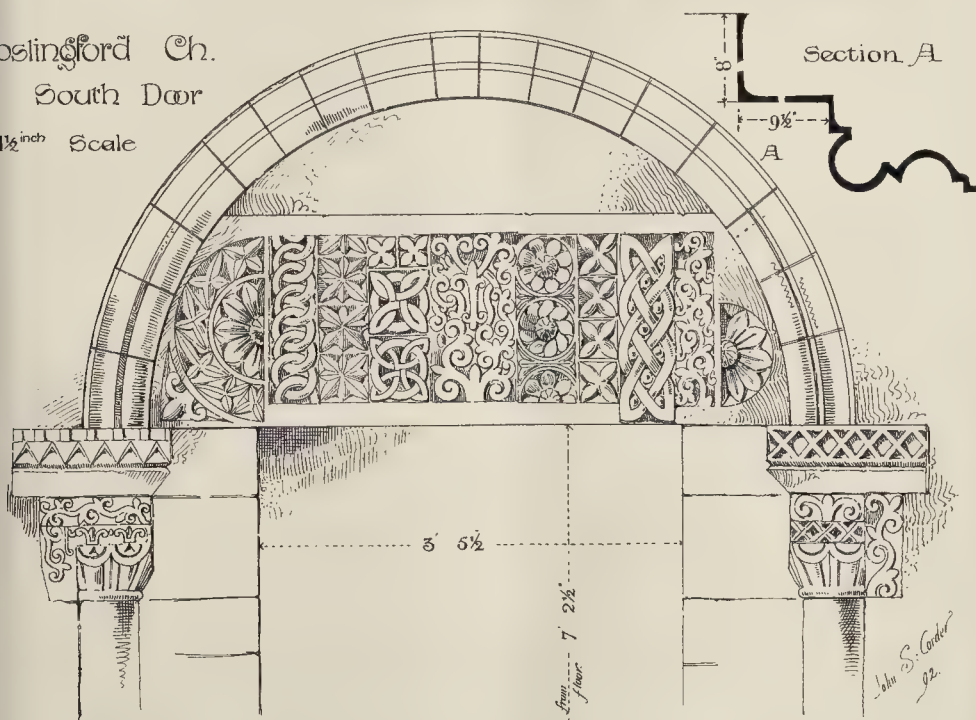
Carved base of Bay Window
Swan Inn Clare



Four Poppy heads Hawkeston Church

Poslingford Ch.
South Door

1 1/2 inch Scale



THE FELLOWSHIP EXAMINATION.

The following Professional Associates have passed the Fellowship Examination in Division IV. —

Abrams, B. P. Debenham, F. B.
[Amos, F. Debenham, H. B.
Bancroft, F. H. Franklin, B. B.
Beard, F. M. Gaddard, A.
Bellingham, A. T. Galloway, F. W.
Beven, S. Leaning, H. J.
Body, A. Lee, J. W.
Brady, R. H. Mellenfield, J. H.
Brown, A. H. Robinson, H. H.
Brown, A. M. Tord, J. E.
Buckland, S. C. Tuckett, P. F.
Cobham, G. W. Tyler, J. W.
Crier, J. T.

["Crawter" Prize, 1893.

The following candidate has passed the Direct Fellowship Examination in Division V. —
Blackbourn, Henry, Queen Anne's-gate, S.W.

EXAMINATIONS FOR MUNICIPAL ENGINEERS.

THE Incorporated Association of Municipal and County Engineers report that the following nine gentlemen, having satisfied the examiners at the examination held in London on April 7 and 8, have been granted the Association's Certificate: —

H. E. Anderson, Norwood. F. J. Finglah, Walsall.
J. E. Birch, Norwood. W. H. Killick, Southampton.
W. G. Brunell, London. W. E. Farman, Leeds.
A. E. Chasemore, Putney. Hy. Vidéan, West Ham.
C. H. Colson, Portsmouth.

The next examination will be held in Liverpool in October.

THE ART UNION OF LONDON:

ANNUAL MEETING AND PRIZE DISTRIBUTION.

The fifty-seventh annual meeting of the Art Union of London was held on Tuesday last at noon, in the hall of the Society of Arts, Adelphi, Mr. John Mackrell in the chair.

The Chairman, in opening the proceedings, expressed his great regret at the death of the President, of the society, the Earl of Derby, who, for the last eight years had filled that position, and had given valuable counsel with regard to the management of the society. The meeting would have been postponed had it been possible, but the Council had come to the conclusion, very reluctantly, that its postponement at such short notice was not possible.

The annual report, read by Mr. Harrison, the Secretary, after expressing the acknowledgments of the Council to the honorary local secretaries at home and abroad, recalled the fact that in the last report reference had been to the general commercial depression, which prejudicially affected the prosperity of the society, and on all hands complaints of the same character continued to be heard, especially in connexion with the business of the art world. The effect of that state of affairs was especially apparent in the returns from the Australian colonies, where, for some time past, the financial position had been critical. The reports from the society's representatives in those colonies referred almost without exception to great stagnation of business. Another factor which exercised a deterrent influence on would-be subscribers in the Colonies and in the United States was the wide adoption of protective duties on works of art. We make the following extracts from the report: —

"For the coming year the Council have been fortunate enough to secure the copyright of an important picture, entitled 'Summer Time,' by Mr. H. W. B. Davis, R.A., a work in which the artist's genius, as a landscape and animal painter, has found full expression. All members of the society who visited the Royal Academy Exhibition last year will remember this charming picture, with its exquisite drawing of the animals in the foreground, and the bright essentially English landscape in the full light of a June day.

With the concurrence of the painter the Council have placed the commission for etching the work in the hands of Mr. Robert Macbeth, A.R.A., whose eminence in this department of art ensures for the members of the society a work of rare excellence.

By way of addition to the works reserved for those subscribers who elect not to take the annual engravings, the Council have commissioned Mr. Tinsworth to execute two original panels in terra-cotta, in high relief, of religious subjects, 'The Finding of Moses,' and 'The Finding of Christ.' This is a new departure for the society, and Mr. Tinsworth's works are so justly celebrated that the Council feel assured it will find favour among the subscribers.

Reference was made in the last report to the loan of Macbeth's original painting of 'The Death of Nelson' to the Naval Exhibition, held last year in Liverpool, and the Council have gratification in reporting that the Corporation of that city have acquired the picture for their permanent collection in the Walker Art Gallery. The Council have also contributed to the recent exhibition of the works of the Royal Female School of Art, and have lately despatched a representative selection of the society's works to the great Chicago Exhibition.

The Council have to regret the loss of the services of Dr.

Samuel Smiles, a valued member of their body, who, after many years' association with the society, has been compelled by advancing years and ill-health to resign.

To fill vacancies on the Council there have been elected — Mr. W. Cosmo Monkhouse, Mr. Henry Kimber, M.P., and Mr. William Anderson, F.R.C.S.

The amount of subscriptions for the year now ending, entered up to the time of the closing of the list, will enable the Council, after applying 1,382. 10s. for the various works of art presented to the society, to appropriate 1,000. 0s. for the purchase in prizes of works of art to be selected by or on behalf of subscribers, drawn for to-day, making, with the prizes already given to members unsuccessful, a total number of 295 prizes.

The impressions taken from the fine mezzotint plate after Sir John Millais, acquired last year, have been restricted to signed proofs, and the Council have pleasure in again including twenty-five of the first state of the plate, suitably framed, amongst the works of art to be given as prizes about to be distributed.

In the general art world the growth of public interest in pictorial art, as evidenced by the increased demand for public and private, and by the continued demand for the special literature of the subject, is one of the noteworthy features of the day; and although the present widespread variety of artistic attractions tends to withdraw attention from the work of the society, it must at the same time be a source of gratification to those who have been long associated with that work, that the present widespread interest in the fine arts has been largely stimulated by the past action of the Art Union of London, a fact which is apt to be overlooked at the present time.

The report then went on to enumerate the various art exhibitions of the past year, and continued: —

"The National Gallery has received many important additions during the year, — an admirable George Morland, a fine Hogarth in the 'Portraits of Hogarth's Servants,' two fine studies of lions by Sir Edwin Landseer, and 'Lady Cockburn and her Children,' one of the greatest masterpieces of Sir Joshua Reynolds, in remarkably fine condition.

It is to be hoped that the opportunity afforded by the new barracks accommodation at Millbank will facilitate the removal of the barracks adjoining the National Gallery, which are a standing source of danger by fire to the National Collection.

In this connexion the Council may give expression to the general satisfaction that the generous offer by Mr. Henry Tate of his collection of modern paintings, referred to in their last report, has been renewed and accepted, and that these representative works will shortly become a national possession.

Another notable gift for public purposes is that made by Mr. Charles D. Fortnum, who has presented his valuable collection of bronzes and treasures of ceramic art to the Ashmolean Museum at Oxford, coupled with the donation of a large sum of money for the erection of a new building for the Museum. More recently Sir John Gilbert, R.A., has been generously distributing his works in his possession between the Galleries of the Corporations of London, Liverpool, Birmingham, and Manchester."

In conclusion, the report gave a summary of the art obituary of the past year.

The Chairman, in moving the adoption of the report, said that, as therein stated, the Council had decided to appropriate a sum of 1,000. 0s. for the purchase of works of art by the prize winners. That sum would be distributed as follows: — One prize value 100. 0s.; two at 50. 0s. each; three at 35. 0s. each; four at 25. 0s. each; five at 20. 0s. each; fifteen at 15. 0s. each; ten at 10. 0s. each, and there would be, in addition, two small water-colour drawings by Clarkson Stanfield, and a number of vases and ewers made specially for the Art Union by Messrs. Doulton & Co.

Mr. T. Buxton Morrish, Hon. Sec., seconded the motion for the adoption of the report, which was unanimously agreed to.

On the motion of Mr. Bennett Powell, seconded by Mr. T. Olinthus Donaldson, a vote of thanks was given to the Honorary Secretaries, Mr. John Sparkes and Mr. T. Buxton Morrish, who, with the Vice-Presidents and Council, were re-elected.

A vote of thanks was given to the Society of Arts for granting the use of the lecture hall for the meeting.

The drawing for the prizes was then proceeded with, the first prize, value 100. 0s. falling to Mr. F. J. Becker, of Old Bond-street.

SHIP CANAL OR RAILWAY FROM THE ATLANTIC TO THE MEDITERRANEAN. — The rival schemes for forming a short cut across France — from the Atlantic to the Mediterranean — by a canal or railway capable of transporting ocean vessels of the largest size, are again being brought forward. According to a recent report of the British Consul at Bordeaux, the latter project is more favourably considered by the public of the district, the Departmental Council of the Gironde having passed a resolution recommending the project to the French Government. The proposed Canal de Deux Mers is 328 miles long, 143 ft. wide, 27½ ft. deep, and has twenty-two double locks. There are to be "gare" 200 yards wide for the passage of vessels, as in the Suez Canal. The terminal point on the Atlantic will be near Bordeaux. The canal will run for 53 miles across the level plain parallel with the Garonne, then traverse that river and fall on the right bank to Toulouse, and proceed by way of Moux, Montredon, and Carcassonne. A company has been formed for constructing the portion of the ship railway from the Atlantic to Bordeaux, and in the event of this part proving successful, continuing the same to the Mediterranean.

CRYSTAL PALACE SCHOOL OF ENGINEERING:

PRESENTATION OF PRIZES.

THE new lecture-hall of this school, situate at the base of the south tower of the Crystal Palace, was well filled on Saturday afternoon last, on the occasion of the distribution of prizes gained by the students during Easter term. The school, which is now in its thirty-third session, occupies five floors in the south tower, and these floors are appropriated as lair and tool shops, pattern-shops, drawing offices, &c.

In the absence, through illness, of Mr. F. K. J. Shenton, Director of the Crystal Palace Company's School of Art, Science, and Literature (he has since died, we regret to observe), Mr. Gardiner, the Secretary to the Company, read the Examiners' Report, Easter Term, 1893. The Examiners reported that in the first year's course, (Mechanical Engineering Section), Lecture Examination on "Steam and the Steam Engine," the number of students who had attended was 53; number eligible for examination, 49; number who had satisfactorily passed, 28; highest number of marks attainable, 288. The ten highest were W. C. Gravely with 259 marks; I. Braby, 241 marks; R. C. Hall, 237 marks; H. A. Bailey, 232 marks; V. Collett, 225 marks; C. L. Weller, 223 marks; F. E. Skipwith, 221 marks; C. Rickard, 215 marks; A. A. Maxwell, 212 marks; and A. J. Barnett, 204 marks. In the Drawing Office, the first four students, in order of merit, were E. B. Berthon, E. F. Ievers, and R. C. Hall and N. Maughan (bracketed equal). In the Pattern Shop the first three were W. Collett, F. E. Skipwith, and F. W. Volz. In the Fitting Shop the first four were F. E. Kenyon, R. H. Pocklington, and W. C. Gravely and D. Seth Smith (bracketed equal). In the second year's course (Civil Engineering, first term) the first three were O. S. Barrow, and T. A. S. Dyer and N. Harker (bracketed equal). Second term: First, A. W. Bumpus. Third term: First, C. R. Hewitt and A. H. C. Olley (bracketed equal). Fourth term: First, C. D. Bury. Electrical Section: first term, I. R. H. Hayne; 2, P. E. Kern; 3, A. J. Barnett. Second term: 1, G. J. F. Lemmens; 2, C. H. Savory (Special Certificate). Marine Section: R. L. Bennett. Mining Section: H. T. Creasy. Colonial Section (first year): 2nd grade, F. H. Middleton, jun. Second year: 1st grade, M. G. Bradford. Certificate of Honour, Second Class, for School Course: C. R. Hewitt.

Mr. Griffith, one of the examiners, reported that, as an old student of this school, it had been an especial pleasure to him to examine the work done by the students in the drawing office, pattern shop, and fitting shop. In all departments he was struck by the excellent character of the work done — a complete set of patterns for a small steam-engine, executed by one of the students, being particularly noticeable. The instruction had evidently been extremely thorough in every particular, and the work of several of the students in each department could hardly be excelled by that of practised workmen. The Principal might be heartily congratulated upon the proficiency attained by the students under his charge. Mr. A. E. Preston, another of the examiners, reported that, after an interval of five years, it had given him great pleasure to again examine the students in the Civil Engineering department of this school. The work done and the answers given appeared to him to be of a higher average than before, and he was of opinion that the course of instruction was one that would make a very efficient groundwork for the future progress of young engineers in their profession. Both these examiners added that, as Mr. A. H. C. Olley, student, had fulfilled the conditions entitling him to a bronze medal of the School of Art, Science, and Literature, they recommended him for that distinction, he having obtained during his course through the school the necessary nine certificates, none of which were below third in order of merit. Mr. Olley was accordingly presented with the medal, amidst the hearty plaudits of his fellow-students.

Sir Charles Douglas Fox, M. Inst. C.E., presided, and before presenting the prizes, addressed some interesting observations to the meeting. It was now, he said, just twenty years ago since he and his friend Mr. Imray acted as examiners of the students' work at the end of the first term of the School. It was then, comparatively speaking, a very small duty which the examiners had to perform, but those who had to perform the same duty now had a far more arduous task imposed upon them, owing to the growth of the School.

He, in common with the engineering profession at large, had watched with great interest the progress and growth of the School. Its success was no doubt largely due to the fact that from the first it had filled a very great want in the profession. But no small part of its success was due to the excellent way in which it had been conducted by the Principal, Mr. J. W. Wilson. He was glad to see from the report of the examiners that they expressed great satisfaction with the work done in the School, and from his own personal observation he was convinced that the work done now was of a much higher character than that done at the time when he last acted as examiner. Proceeding to make some observations specially addressed to the students, the chairman said that the profession upon which they had resolved to enter was one which was characterised by great *esprit de corps*, and the members were all bound together very closely by it. It was a remarkable fact, because they were competing with each other, although it was competition in a scientific race. Such competition was compatible not only with the most friendly feeling, but with the most cordial co-operation. Looking back over the past twenty years he could not help feeling that the task which lay before the young engineer just entering upon the profession was very much more serious than that which those who were now the older men of the profession had to cope with at the outset of their professional careers. Engineering had been greatly widened in its scope, and the knowledge which was now necessary to practise successfully in the profession had been not only widened, but deepened. When he (the chairman) was a young man the English engineer was *facile princeps* wherever he went; neither in Germany nor in France could men anything like his equal be found. But now things were changed. The German engineer had made great strides, both in theory and practice. In France there was an excellent *corps* of civil engineers, with whom it was as much as we could do to keep abreast. In America—well, everybody knew what the American engineers could do. There was one Section which had made its appearance of late years in the curriculum of the School, and that was the Electrical Section. Now there was a great charm about the very name of Electricity, and the electrical engineer had no doubt a great future before him; but in spite of the attractions of electrical engineering, he advised his hearers not to too rashly take up that or any other special branch of engineering. Let them first of all get themselves well grounded in civil and mechanical engineering, for without that groundwork they would not succeed as specialists. The field of engineering was now so large that sooner or later they would all tend to become more or less of specialists, but if they attempted that too soon they would narrow their minds and fail to obtain a broad and comprehensive view of the mission of the engineer.

The Chairman then proceeded to distribute the certificates to the successful students, and addresses were subsequently given by two of the Examiners (Mr. John Inray, M.Inst.C.E., and Mr. Percy Griffith, Assoc.M.Inst.C.E.), and by the Principal, Mr. J. W. Wilson, M.Inst.C.E.

COMPETITIONS.

GARDEN PAVILION, BOURNEMOUTH.—The Bournemouth Town Council met on the 18th inst., when the report of the assessor in the Garden Pavilion competition, Mr. Barry, was read. He placed the competitions in the following order:—1st, No. 15, Messrs. Hawker & Mitchell, Bournemouth; 2nd, No. 5, Mr. J. Johnson, London; 3rd, No. 6, Mr. H. A. Cheers, Twickenham; 4th, No. 14, Mr. J. Donkin, Bournemouth; 5th, No. 13, Mr. Charles Bell, London; 6th, No. 11, Messrs. Treadwell & Martin, London. Mr. Barry expressed himself doubtful whether the most meritorious design could be carried out for the 16,800*l.* allotted to the work in the specifications.

THE ENGLISH IRON TRADE.—The condition of the English iron market shows little change since last week. In the majority of districts crude iron is very quiet, and in some cases, such as in Cleveland and in the North West of England, rates are easier. For finished iron there is little inquiry, and in the North of England quotations have been further reduced. Tinplates, however, continue to display activity, although prices remain unchanged. In steel matters are still rather dull. Shipbuilders and engineers report no improvement. The coal trade is still quiet.—*Iron.*

Illustrations.

DECORATION FOR SMOKING-ROOM.

THIS is intended to give an Oriental character to the room. The constructive wood-work and furniture are of Italian walnut, inlaid with bone and ivory. The wall panels are rich brown leather, the surrounding border in embossed leather, richly coloured cream (ground blue), red, brown, and a little green, framed by fine mouldings in walnut, enriched with carving. The plain centre panels are to have trophies of armour or other Eastern curios. Glass frame and overmantel in walnut, inlaid with ivory, enclosing richly-painted ceramic panels; the recesses at sides in old gold, also plain panels underneath; the chimney-piece in soft rose marble, with arrangement for plants; brass stove with border of Persian tiles; dado rail in ivory inlay, and glass mosaic dado, silver ground, toned over with deep blue. T. W. H.

COUNTY OFFICES, WAKEFIELD.

THE first premiated design for these offices, by Messrs. Gibson & Russell, was described at length in our last issue, but the following additional notes will show the methods and materials to be employed by the architects in the erection of the buildings.

The style adopted is Renaissance, with English characteristics and details, and stone from the Huddersfield district will be employed for the exterior, with red tiles for the roofs; while Hopton Wood stone, enriched by marbles or terracotta, will be used for such portions of the interior as the halls, staircases, ante-room, and council chamber. The halls, corridors, &c., will be paved with mosaic, and the floors of the principal rooms covered with oak flooring in narrow widths.

Faience will probably be used for the luncheon and smoking-rooms. The walls of corridors will be panelled, and the dados, doors, &c., in the Council Chamber, committee-rooms, and other like apartments, will be executed in hard wood, with their ceilings in enriched plaster.

The construction will be fire-resisting throughout.

WAYSIDE NOTES IN EAST ANGLIA: CLARE.

THE ancient town of Clare, from which the Lords of Clare and Dukes of Clarence first obtained their titles, is situated on the banks of the River Stour, fifteen miles S.S.West of Bury St. Edmunds and eight miles east of Haverhill.

The place teems with interest historically, and from an archeologic point of view there are many remains well worthy of careful inspection.

The Great Eastern Railway just as it enters the station runs through the outer bailey of the once magnificent castle, the area of which exceeded 20 acres.

This castle was the feudal stronghold of the Earls of Clare, and dates its foundation from Saxon times. Even as early as the tenth century, Earl Alric, son of Withgar, held the fortress, and founded in its precincts a church dedicated to John the Baptist, endowing it with seven prebends, and in 1090 this Church was given by Gilbert de Clare to the monks of Bec in Normandy.

The area of the castle is easily discernible, in spite of much mutilation. The fosse and mound, the outer and inner baileys, the latter enclosed by a wall, and inside which is a vast artificial mound nearly 60 ft. in height, on the top of which was built the keep—a strong, circular flint structure with angular buttresses. This hill was called by the French antiquaries "La motte."

The ramparts were formed after the Saxon manner by throwing the contents of the ditch inwards, and were probably surmounted by a wood palisade. A wide ditch separates the outer from the inner bailey; the entrance to the latter being near the middle of the south side of the former, where it appears to have been defended by a barbacan of two demi-bastions of earth, around which the ditch was continued, and there probably was the causeway and drawbridge leading to a corresponding opening in the enceinte of the inner court, defended by two towers, one on each side of the entrance, and protected from within by two demi-bastions projecting inwards.

The wall surrounding the inner bailey was between 20 and 30 ft. high, defended by bastions and demibastions, and continued up the motte on two sides to the donjon or keep.

Portions of this wall remain on the N. and S.

ramparts, and its foundations are traceable on the S.E. sides.

The motte is situated on the N.W. side of the inner bailey, and is 850 ft. circumference, at the base of which 600 ft. are outside the enclosure of the outer bailey; the height of the mound is 53 ft., and goes at an angle of 27 deg.

The keep is 52 ft. diameter inside, and the walls 6 ft. thick, the foundations being 5 ft. below ground, and 10½ ft. thick at the base. The wall is 25 ft. high above ground, and is battlemented on top. No subterranean chambers exist, and the probability is that this keep was never a place of great strength. There are no remains showing how the keep was reached, but it was no doubt approached by a stair from the inner bailey.

William the Conqueror gave Clare, with other large possessions, to his kinsman, Richard Fitz-Gilbert, son of Gilbert, Earl of Briant, in Normandy, and he gave the lordship to his son Gilbert, who took the name De Clare, and was afterwards created Earl of Hertford; the younger Gilbert was probably the builder of Clare Castle. In 1307, Edward II., and most of the nobility of England were present at the funeral of Joanna of Acre, daughter of Edward I., who was buried in the church of the priory. In 1412 it was in good repair, and well-stocked with furniture, when Edmund Mortimer, Earl of March, came into possession. In 1425 the Castle, town, and Barony were inherited by his nephew Richard, Duke of York, father of Edward IV., by whose accession to the throne they became vested in the Crown, and remained so during the reigns of Edward IV., V., and Richard III. By an Act of Parliament in the 11th of Henry VII. they were confirmed to the king, and not alienated till the 6th of Edward VI., who granted them to his tutor, Sir John Cheeke, but they were resumed by Queen Mary in the first of her reign, and the honour of Clare was annexed by her to the Duchy of Lancaster.

The castle and bailey became vested in the Barnardiston family, then they passed to Sir Gervas Ewes, in whose family they remained till 1825, when they were purchased by the late John Barker, and his heirs still possess them.

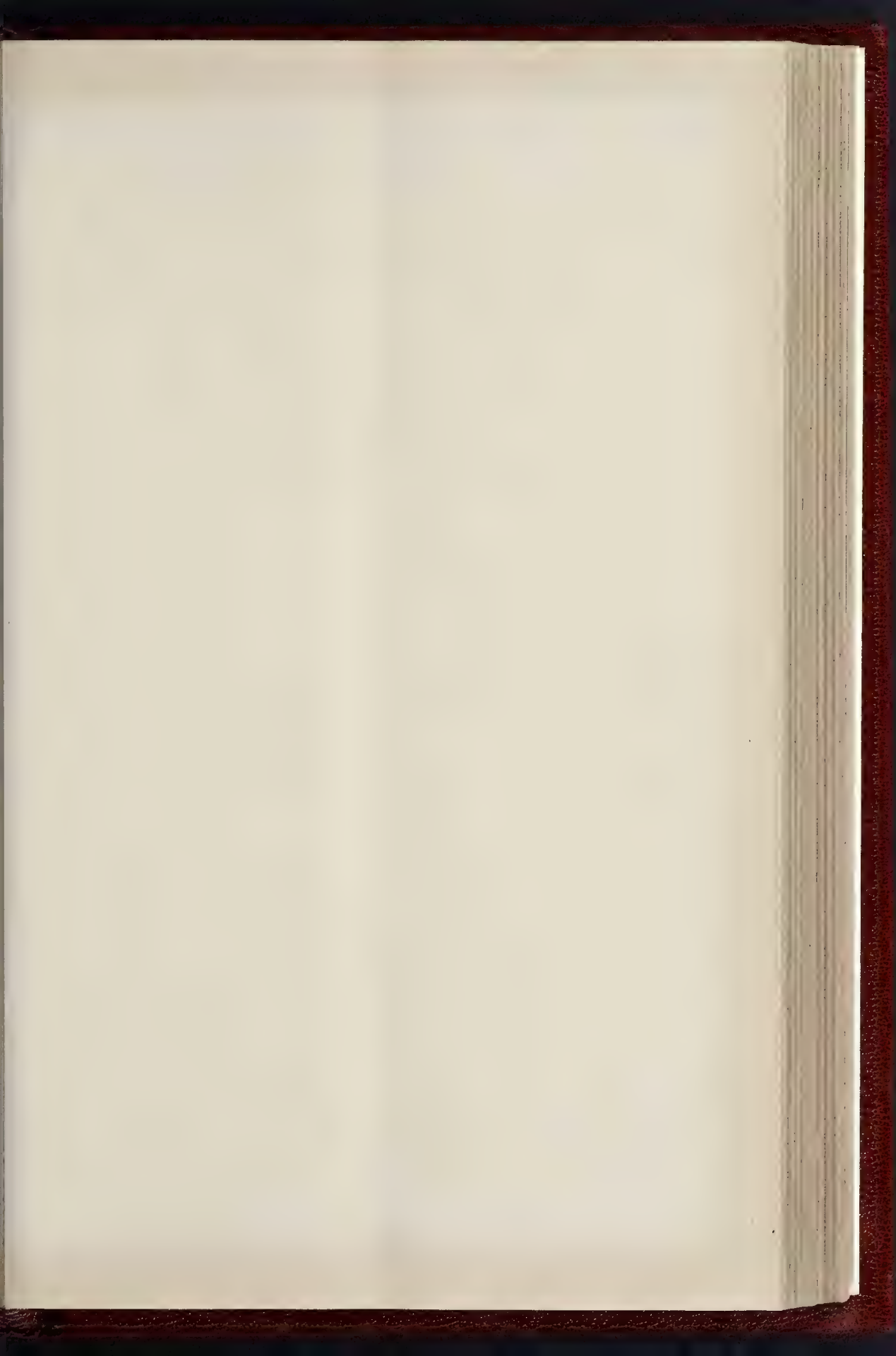
The remains of Clare Priory, founded in 1248 by Richard de Clare, Earl of Clare, Gloucester, and Hertford, for Augustine Canons still exists on the S.W. of the town, near to the castle and the priory church in which Joanna of Acre was buried is now a playroom and storeroom. The priory itself has been much altered and repaired, but contains some good panelwork and interesting details.

The church, dedicated to St. Peter and Paul, is a very interesting building, chiefly in the Decorated and Perpendicular styles, but with some good Early English work in the tower, and also the west door. The south door under the porch is a beautiful specimen, the woodwork being ornate and having a strong Flemish feeling. The font is Perpendicular, and the church was once rich in brasses.

There is also a fine screen and old brass eagle lectern. The church plate is well worthy inspection, especially the chalice.

Just outside the churchyard walls, on the south side, is a fine fifteenth-century half-timbered house, shown in my sketch, plastered over in Jacobean times; the date is 1473, and the plastering is in very high relief, some of the ornaments rising 2 in. from the face, but the details are somewhat crude. Beneath the oriel bay on first floor is a carving, much undercut, of two figures, supporting a shield charged with the arms of Verdon: or, a fret gules. Theobald de Verdon was second husband to Elizabeth de Clare, who died circa 1361, and the house probably belonged to one of their descendants. On the west face the plastering has been restored, and the date and arms of Clare: or, three chevrons gules, affixed in stucco. The whole house is an interesting study of mediæval architecture, being very perfect.

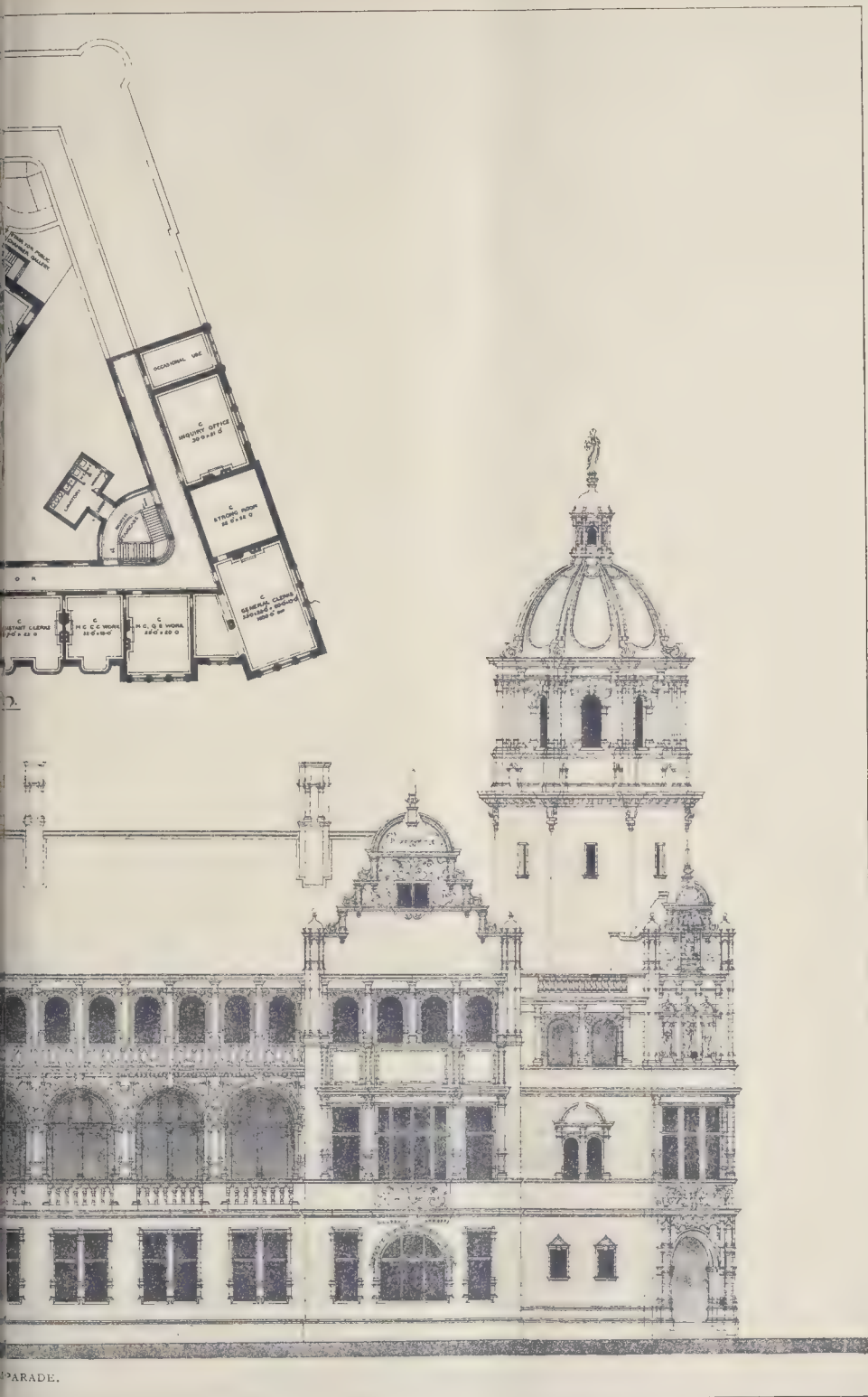
Against the front wall of the "Swan Inn" is affixed the carved base of an old bay window. It is not in its original position, not being on a level with the other windows, and it may be questioned whether it belongs to the house, though the latter is evidently a very old building. In size it is 9 ft. 8 in. long, and 2 ft. 4 in. in depth, and the carving is in very high relief, and coloured. It belongs to the middle of the fifteenth century, and has in the centre a swan proper, gorged and chained to a tree. This was one of the cognizances of Henry IV. and Henry V. From the tree depend two suns, and in front of the swan is a crescent and star, also a Royal device; behind the swan grows a vine with leaves and grapes. On the return cant of the bay are two shields, the dexter bearing quarterly France

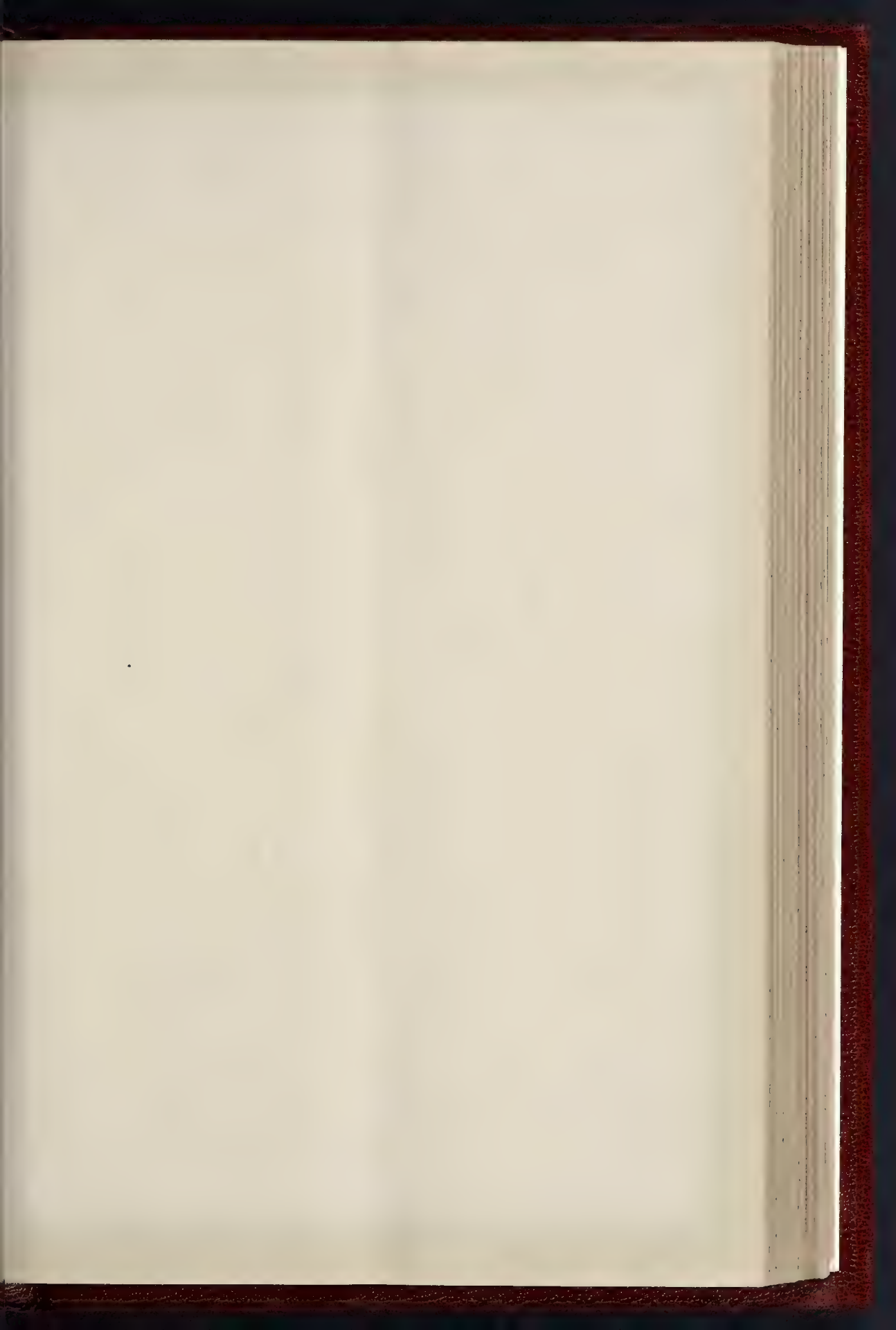


First:



ELEVAT



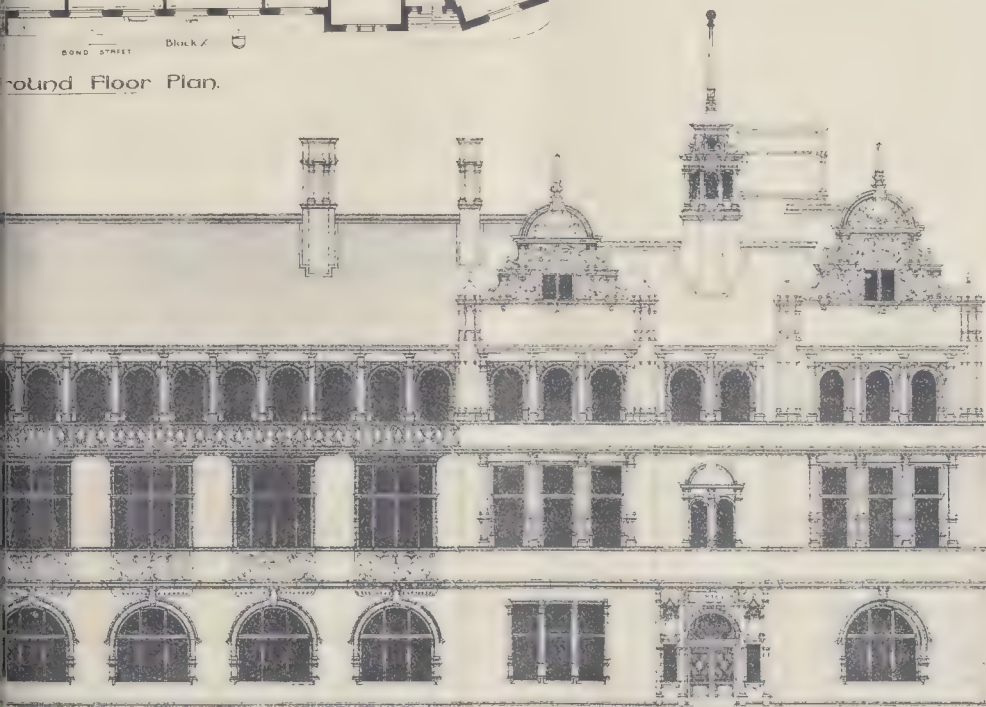




SELECTED DESIGN FOR THE WEST RIDING COUNTY C



Ground Floor Plan.



ELEVATION TO BOND STREET.

and England with a label of three points, and the sinister shield is quarterly, Mortimer first and fourth Barry of six or and sable, and in escutcheon argent on a chief of the first, two pallets between two gyronny cantons of the second for Mortimer; second and third or, a cross gules for De Burgh or Ulster. These two shields are supposed to represent the paternal and maternal coats of Richard, Duke of York. It is conjectured that this was done during a period of harmony between the houses of York and Lancaster, as both parties are represented in the composition.

On the "Swan" Inn is a very fine stack of chimneys, consisting of four octagonal shafts, but the top has been rebuilt and mutilated.

Another very fine stack of chimneys (belonging to late sixteenth century) is to be found on a house called Clifton, formerly the residence of the Barnardistons, but now alienated from that family.

The shafts are all different, and on the base of the chimney in the street face is a large panel that may at one time have been ornamented. The house itself has been completely modernised.

Beneath a toy shop in the market-place is a curious underground chapel, groined over in stone from a centre octagonal shaft; information inspecting it is scanty.

About a mile from Clare is a small, ruined chapel, now turned into cottages. It has a curious Norman door on the north side, shown in my sketch, and a fine block of octagonal chimneys. After its desecration it was converted into a private residence, and during the Civil Wars was used as a powder magazine. Its external width is 20 ft. 6 in. and length 50 ft. It is built with flint, with freestone dressings, and has two Norman windows on the east side, and one Early English on the north side. Postford and Hawkdon both lie in the vicinity: at the former is a very curious Norman door of most unusual type, and the latter place is chiefly interesting for the number and quaintness of its few ends, of which there are now forty, all different and of a distinct character.

At the latter place is a very interesting old hall, called Thurston Hall, dated 1607, which may appear in a subsequent series of sketches: it is little known, but well worth a visit, as it shows complete and unrestored an old timber-house brick-jointed with all its peculiar finishings and decorations, all *in situ*.

JOHN SHEWELL CORDER.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—On the 22nd inst., the members of the Edinburgh Architectural Association visited Leuchars Church and Earlsall, under the leadership of Mr. R. S. Lorimer, A.R.I.B.A. Rather special interest attached to this visit, says the *Scotsman*, as, owing to the courtesy of Mr. R. W. R. Mackenzie, an opportunity was afforded to members of inspecting Earlsall, which is in many ways a unique example of a Scottish mansion of the end of the sixteenth and beginning of the seventeenth centuries. The house had for a period of over seventy years been abandoned, and was fast falling into ruins when it passed a few years ago into the hands of the present proprietor, and has since been restored under the direction of Mr. R. S. Lorimer, architect. Leuchars Church having been first examined, the party passed on to Earlsall, which lies about a mile distant. Mr. Lorimer, in his description of the house, mentioned that the plan is a development of what is called the L-plan—that is, two buildings at right angles to each other, with the main staircase in a tower in the internal angle—and in this case there is also a large tower at the north-east corner. In continuation of the western front there is a high enclosing wall connecting the main house with some smaller buildings, the whole forming a courtyard, in which the old draw well is placed, and enclosed on the east side by a low wall and balustrade, and this side of the courtyard opens directly into the garden. Although not large, the house contains several notable rooms, the most interesting of which is the gallery on the second floor, measuring 50 ft. by 18, and some 13 ft. high, and containing a painted ceiling of very curious design. This is a wooden boarded ceiling taking the form of a flat semi-ellipse, and comes down on to the walls without any cornice or moulding. The upper part of the wall is divided into compartments by arched mouldings of painted pilasters and flat arches. In each compartment was a motto. Most of these have long since disappeared; but one of the few

remaining informs the reader that "A nice wyf and a back doore oft maketh a rich man poore." The ceiling itself is divided into upwards of 300 panels, alternately square and circular, and joined by scrollwork. The circular panels are filled in with heraldic devices, the arms of Bruce of Earlsall being depicted in the centre. Immediately around are grouped shields, bearing the cognisances of the families with which the Bruces were allied matrimonially; and to the west, the arms of many of the noble families of Scotland. The square panels are filled in with representations of animals, which, there is little doubt, were copied out of some medieval "bestiary," of which examples still exist in the Bodleian at Oxford and elsewhere. The decoration, which is in black and white distemper, is a piece of seventeenth century fancy work quite unique in its kind. Its preservation was a task of some difficulty, owing to the deplorable condition that the roof of the house had been allowed to get into. The ceiling in a bedroom shows decoration of a similar character. This is a flat ceiling formed of massive beams with plain boarding, the space between the beams being divided into panels by scrollwork, with a picture of an animal in each alternate panel. It is curious, in a house of this date, to find that it does not contain any enriched plaster work, a form of decoration in which some of the old Fife houses are very rich. The "cat-hole" is to be seen cut through the lower panels of many of the doors. This seems to have been a common custom, and sometimes the hole was provided with a little sliding shutter on the room side of the door, the use of these holes apparently being to enable the cat to hunt the house from attic to basement whenever the humour seized her. The fireplace in the stone hall is also worthy of note, as it has a granite lintel 11 ft. by nearly 2 ft. deep, and all in the one piece.

NOTTINGHAM ARCHITECTURAL SOCIETY.—The annual general meeting of this Society was held on the 24th inst., Mr. Robt. Evans, President, in the chair. The following officers and Council were elected:—Mr. W. A. Heazell, President; Mr. J. Howitt, Vice-President; and Messrs. Bromley, R. Booker, Marshall, Goodall, and F. Lewis as Council; Mr. A. Ernest Heazell, Hon. Sec. and Treasurer. Mr. W. A. Heazell having attended the Non-Metropolitan Conference at Liverpool (elsewhere reported in this week's *Builder*), explained what took place, and a vote of thanks was passed for his attending. The question of the division of the country into architectural provinces, and the summer excursion were referred to the Council for further consideration. Four new members were proposed, and votes of thanks to the retiring officers were passed.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon last at Spring Gardens, the Chairman, Mr. John Hutton, presiding.

Sale and Letting of the Council's Land and other Property.—The Corporate Property Committee brought up a long report on this subject, containing the following passages:—

"We have had under our consideration the question of the Council's failure not merely to find purchasers, but even to secure bidders for its property at recent auctions. Our attention has been drawn to suggestions made by persons in the sale-room at the auctions. We have received reports from the Solicitor, Architect, and Valuer, and discussed with them the subject in all its bearings, and we have had the advantage of two special memoranda on the points, one from the Chairman of the Council, who was present at the auction held on Monday, June 13 last, and another from the Vice-Chairman of the Council. The questions considered by us related chiefly to the conduct of the auctions, the conditions of sale, and letting, the nature of the property to be dealt with, and the general management of the Council's leasehold property. The property of the Council dealt with may be conveniently divided into three classes, freehold to be sold, leasehold to be demised, and property to be dealt with under the Artizans Dwellings Acts."

Dealing with the conditions of sale, we find that they are the same as those used by the late Metropolitan Board of Works, with only such modifications as the properties to be dealt with rendered necessary. With regard to the conditions affecting freeholds, subject to no special obligations, we are unable to recommend any substantial alterations other than that they should be compiled in as condensed a form as possible. We are not disposed to recommend the Council to vary the practice of requiring the purchaser to accept the Council's title without investigation, and we do not think such a condition

injuriously affects the sale, since it is well known that before the acquisition of the land the Council has had a thorough investigation of title, and the builders of London are satisfied that the Conveyancing department of the Council is managed by experienced officers who would certainly detect any defect, and require it to be remedied before the Council acquired the property.

With reference to leasehold property, it has been asserted that the Council has acquired a character amongst purchasers of this class of property for delay in approving plans and granting leases, and for undue and unnecessary strictness in enforcing conditions against its tenants, and that therefore unless the land is of an exceptionally tempting character, the bidders are few. We think that there is some force in the complaint of the delay in approving plans, arising from the view taken by the Architect of his duty in respect to such alterations, he feeling bound to submit any alterations of however small a character, to us for our approval; whereas in the case of other ground landlords, tenants are left to settle small matters with the landlord's architect. It is alleged that there are serious delays in granting leases, which is a disadvantage to tenants who have contracted to sell their property or to grant underleases, or who need to raise money upon them. It appears from the conditions generally that the tenant is entitled to his lease when a building is completed as regards its carcass and roofing; in such cases leases are sealed by the Council only on a recommendation by this Committee, and it has been our practice to require from the Architect a certificate framed under an order made by us in April, 1890, with a view to a thorough system of survey before granting leases. To meet these difficulties so far as we can safely do so we think that when alterations in approved plans are proposed, while buildings are in course of construction, the Architect may, if the alterations are altogether unobjectionable, approve them and mark the necessary alterations on the approved drawings, initialling the same, and reporting the fact to us at our next meeting.

There can be no doubt that some of the property now held by the Council and unsold or unleased is in the nature of a residuum, and is not such as can be advantageously dealt with. We are, however, of opinion that such property as is isolated or not of a particularly attractive character, or is held by the Council jointly with another authority, would be more likely to be disposed of if the Council would give the option of purchase of the reversion to the lessees, and include such option in the agreement for leasing. There is little doubt that the power of turning leasehold property into freehold within a period of say five years would be a considerable addition to the selling value of the property, and induce persons to bid who now hold aloof. Such option would enable lessees to obtain money on loan at a reduced rate, and would induce adjoining freeholders to bid who would otherwise abstain from having anything to do with the property; and, in some cases, might enable trustees and public bodies to secure leases who would be otherwise precluded. If this option were granted it would be necessary that the duty of fixing a price should devolve upon one or other of your Committees, and we think that such duty should be entrusted jointly to us and the Finance Committee, such price being dependent upon a number of years to be fixed in each case, and to be determined subject to the approval of the Council.

There is, however, a financial point to be considered in connexion with this subject. All purchase moneys, when received by the Council, are carried to the Consolidated Loans Fund, which is the sinking fund for the redemption of debt, and owing to the growth of this fund, and to the limited powers of investing it to advantage, the late Board sought in 1884 and obtained powers to postpone the sale of their ground rents until the time for redemption of Metropolitan Stock (1929 and 1941), and they acted on this power as financially advantageous, and the Council have followed their practice and refused to sell ground rents, except at very advantageous prices such as would enable them to buy in the market stock of an amount to produce dividends at least equal to the ground rents sold. This results in asking a minimum of about thirty-eight or thirty-nine years' purchase. An option to buy at such a rate would not probably operate as a temptation to bidders, and probably twenty-five to thirty years' purchase would be more likely to prove attractive. It is necessary, therefore, for the Council to consider the bearing of this financial question on the advisableness of giving lessees the option of purchase, and we were of opinion that this point should be considered by the Finance Committee. A further modification, we think, would make the leasehold property more attractive to purchasers, and that is, that instead of granting all leases for a period of eighty years, as has been the custom of the Council and its predecessors, a clause in the conditions should provide for a term being not less, say, than thirty years, and not more than ninety-nine years, such term being fixed jointly by this Committee and the Finance Committee in each case prior to the issue of the conditions, having due regard to the position of the properties, the terms of building leases in the locality, and other matters. These modifications, combined with the proposed condensation of the

conditions, we believe will tend to bring forward bidders who have previously been kept back. We have not referred to the proposed intended powers of leasing which have been introduced in the Council's General Powers Bill, as they can be dealt with so far as may be needful, when the power has been granted to the Council. We have also communicated the above proposals to the Finance Committee, who have transmitted to us a memorandum to the following effect—(1) That they agree to leases being granted for ninety-nine years in place of eight years for isolated and outlying plots of land in neighbourhoods where such a term is customary. (2) That the option should be allowed to lessees to purchase, within a period of five years, the freehold of their holdings in such isolated plots, at not less than twenty-five years' purchase.

As to artisans' dwellings sites, it will be admitted that the difficulty in obtaining substantial offers for land restricted to such a purpose is rapidly increasing, especially as the Council has itself resolved to erect buildings. We are satisfied that this will render it more difficult for persons to take land upon which to erect artisans' dwellings so as to secure for themselves a satisfactory rate of interest. The delay in approving plans under this class of property is even greater than that in the case of leasehold property, inasmuch as the Public Health and Housing Committee, the Home Secretary, and ourselves have to be satisfied in all respects as to the dwellings and their sanitary appliances. The necessity for the approval of the Home Secretary does not arise out of any provision in the Housing Act, 1890, but from the provisions of the schemes made under that Act and the Acts repealed by it, and it is a question of some moment whether it would not be desirable to get rid of the necessity when new schemes are framed. This necessity does not exist where artisans' dwellings have to be provided under Street Improvement Acts, and there seems no good reason why the approval of the Home Secretary should be necessary in the one case more than in the other. We think that if the stringent conditions as to the granting of conveyances or leases and approving of plans were modified, and that a clause were inserted requiring the building to be constructed with good and suitable material and workmanship to the satisfaction of the Architect, the houses would be properly constructed, and much good would result as to sale. About three weeks since we informed the Public Health and Housing Committee of our intended recommendation in the matter of the sales of artisans' sites; but as the matter requires to be dealt with before the recess, we have brought up this report. And we now recommend—

(a) That we be authorised to amend the conditions as to letting property on lease in the following particulars (i) by inserting clauses giving the option to purchase the reversion at a price to be fixed jointly by the Corporate Property and Finance Committees, not being less than twenty-five years' purchase; such option being exercised within five years, and only in cases to be approved by this Committee and the Finance Committee, and where the buildings to be erected have been duly completed in accordance with the contract for letting and to the satisfaction of the Architect. (a) The term of the lease to be for periods of not less than eighty years, and not more than ninety-nine years, the exact period being fixed in each case by this Committee and the Finance Committee before the publication of the conditions of sale.

(b) That, subject to any modifications to be approved by the Public Health and Housing and Corporate Property Committees, the conditions as to sale of artisans' sites be amended so as to provide for buildings being constructed with good and suitable material and workmanship to the satisfaction of the Architect.

We have also considered the question whether the difficulty of sale has been increased by the fact that an officer of the Council acts as auctioneer, and the possibility that better results might have been obtained if an outside auctioneer had been employed who would have his own clients, and whose personal influence and technical experience might induce buyers to come forward. We are unable to find sufficient evidence on one side or the other to justify us in coming to a conclusion as to how far the present system operates to prevent sales or letting, and we therefore abstain from recommending any experiment in the nature of placing the property in the hands of outside agents or auctioneers to be paid by a commission.

As an alternative to the mode of sale by auction, and as a less costly procedure than another auction, we have considered the advisableness in certain cases of offering land by public tender. Repeated unsuccessful auctions are expensive, and abortive auctions damage the reputation of the property; further, we are advised that there are advantages attending sale or letting by tender which cannot be obtained at auctions. In the following list of properties, which we ask the Council to give us leave thus to endeavour to deal with, there are some which have been more than once unsuccessfully offered for sale by auction, and those which have not been so offered are of so small a character that we think it would be well for the Council not to incur the expense of an auction for them only, but to invite tenders for all that are specified in the list.

The list of properties to be offered for sale or letting included land and buildings at Cheyne-walk, Coldharbour-lane, Holly-hill, Hampstead; Rosebery-avenue, York-road, Battersea; Battersea Bridge, Church-street, Fulham; Culvert-place, Battersea; Deptford Bridge; Brook-green-road, Hammersmith; and Southwark-street.

We have communicated our proposals to the Finance Committee, and we recommend—

(c) That all the above-named properties be offered for letting or sale respectively by public tender, the Council suspending, in the case of those marked with an asterisk, the standing order which requires that in the first instance all properties shall be submitted to public auction, and that the officers be instructed to make the necessary arrangements for tenders, and that such tenders be opened by the Council and referred to this Committee.

A long discussion arose out of this report and its recommendations, two or three members of the Council roundly declaring that the restrictions and red-tape of the Council militated against the letting of the Council's land. On the other hand, some members expressed themselves as strongly opposed to any relaxation of necessary conditions, as to construction and material, in regard to the buildings to be erected on the Council's land. Something further than the limited control of the Building Act, they urged, was necessary, in the interests of the public as well as of the Council. Eventually the recommendations of the Committee were substantially agreed to, the words "in the case of isolated and outlying plots of land" being inserted after the word "option" in the first clause of recommendation a.

Limit of Height of Buildings, whether on Old or New Foundations.—The following special report of the Building Act Committee, dated April 19, was on the agenda, but its consideration was postponed—

"The Council, on December 8, 1891, passed the following resolution—

"That be referred to the Building Act Committee to consider and report whether, with a view to preventing the increase of insanitary areas in London, it is desirable that effect should be given to the recommendations made in 1885 by the Royal Commissioners on the Housing of the Working Classes, with regard to limiting the height of dwelling houses according to the space about them, whether built on old or new foundations, and what amendments of the Building Acts are practicable in this direction."

The matter had for some time previously engaged our attention, but owing to the great difficulties in which the subject is involved, we did not see our way to deal with the matter except by more stringent regulations as to the space at rear, which we framed in such a way as to deal with buildings upon old foundations. These and other suggested amendments of the Building Acts were approved by the Council, and forwarded to the Local Government Board.

The Public Health and Housing Committee brought up to the Council on April 12, 1892, the following recommendation:—

"That the Council do pass the following resolution—That, in the opinion of the Council it is desirable that a clause should be introduced into the London Building Law (Consolidation) Bill, controlling the height of buildings, whether built on old or new foundations, in relation to the street or open space in front of them, and that it be referred to the Parliamentary Committee to give effect to this resolution."

This was ultimately ruled out of order, the Chairman stating that it referred to a question which would properly come before and be considered by the Building Act Committee under the terms of the reference made to them by the Council.

Although no formal reference was made, we thought it desirable that we should reconsider the subject, which we have done on several occasions, with the great advantage of the assistance of certain members of the Public Health and Housing Committee.

It is admitted on all hands that the present state of the law, whereby buildings erected upon sites previously occupied by buildings are exempt from the provisions of the Metropolitan Local Management Acts which relate to the setting back of houses, and whereby the provision of the said Acts restricting, in streets of less width than 50 ft., the height of buildings (save with the consent of the Council) are not applicable to streets laid out before 1862, is most unsatisfactory.

The Council is compelled by statute to clear away slum property at immense cost to the ratepayers, but at the same time is without adequate means to prevent the creation of slums under its very eyes.

As the law now stands it is possible to reconstruct slum property, putting lofty buildings in the place of low cottages, so as to reproduce and even greatly intensify the evils resulting from deficient light and air, and as a matter of fact such faulty reconstructions are of daily occurrence.

At the same time, it is difficult without gross injustice to frame clauses of an Act of Parliament which would in effect deprive people of their property without compensation.

To lay down a general law compelling the setting back of all new buildings in old streets subject to compensation by the Council would entail enormous cost upon the ratepayers.

It must, however, be admitted that as a set-off against the advantages of living in large communities, all must submit to restrictions upon perfect freedom of action, and the question to be answered here, as in so many cases, is in what way can the ends desired by the community be attained with the minimum of interference with the rights of the individual.

The principle adopted by the Committee is the same as that laid down in reference to space at rear of buildings in the suggested amendments adopted by the Council last year. It may be shortly described as this:—

To leave the individual in the undisturbed possession of those rights which he has up to this time actually enjoyed, but to assert that the actual enjoyment of certain rights in the present or the past is not to confer upon him any longer (as it does now) the power to do things which another owner who has not already exercised similar rights is prevented from doing. To make the point clearer we will state a special case: A and B bought, fifty years ago, two pieces of land abutting upon a street 20 ft. in width. Upon his plot A erected a two-storey cottage 18 ft. in height abutting upon the street. B erected a mansion set 50 ft. back from street. They now both desire to pull down and rebuild. There is nothing to prevent A from putting up buildings 40, 50, or even 60 ft. in height, nothing, that is, except possible proceedings by neighbours in respect to ancient lights. B on the contrary cannot, without the consent of the Council, bring his new building further forward than 10 ft. from the street (i.e., 20 ft. from the centre). Why should these two men be differently treated?

We have framed the following clauses to carry out this principle, and feeling that the new powers would have to be exercised with some discretion, having due regard to the very different character of different parts of London, we propose that the Council should ask for power to make by-laws to enable it to lay down from time to time principles for the guidance of the Council and its officers, more especially in such cases as to the whole or in part of limited areas in which it might prove to be undesirable, difficult, or impossible to carry out the clauses in their entirety.

That the Council do approve the draft clauses herewith submitted—

I.—If an old building be raised or extended in any direction, or if a building be rebuilt so as to be higher in any part, or extended further in any direction than it previously did, or if a building be erected wholly or in part upon the site of a building existing within ten years previously so as to be higher in any part, or to extend further in any direction than such previously existing building, a portion of such building that is higher or that extends further in any direction than the old or previously existing building, shall be subject in all respects to the provisions of the Building Acts and Local Management Acts, just as if such portions of the said building were new buildings situated in new streets, any provisions in the Acts to the contrary notwithstanding.

II.—After the passing of this Act it shall not be lawful to raise any existing building, or to erect a building upon the site of any existing or previously existing building, exceeding it in height so that the height of such building, measured from the level of the centre of the street, immediately opposite the building up to the parapet eaves of such building shall exceed the distance of the front wall of such building from the opposite side of the street, passage, or way immediately adjacent to such building, or in case two streets, passages or ways be adjacent, then the widest of them shall regulate the height of the said building.

III.—The Council may from time to time (subject to the approval of the Local Government Board) make, alter, or repeal by-laws as to the exercise of the powers conferred by the sections of this Act relating to the open spaces about buildings and the setting back of buildings for the following purposes, viz:—

(a) To provide for the mode of procedure.
(b) To relax or adapt the provisions in their application to special or exceptional cases.
(c) To exempt wholly or in part from the operations of the said sections any areas, streets, or parts of streets.

After transacting other business, the Council adjourned at half-past seven.

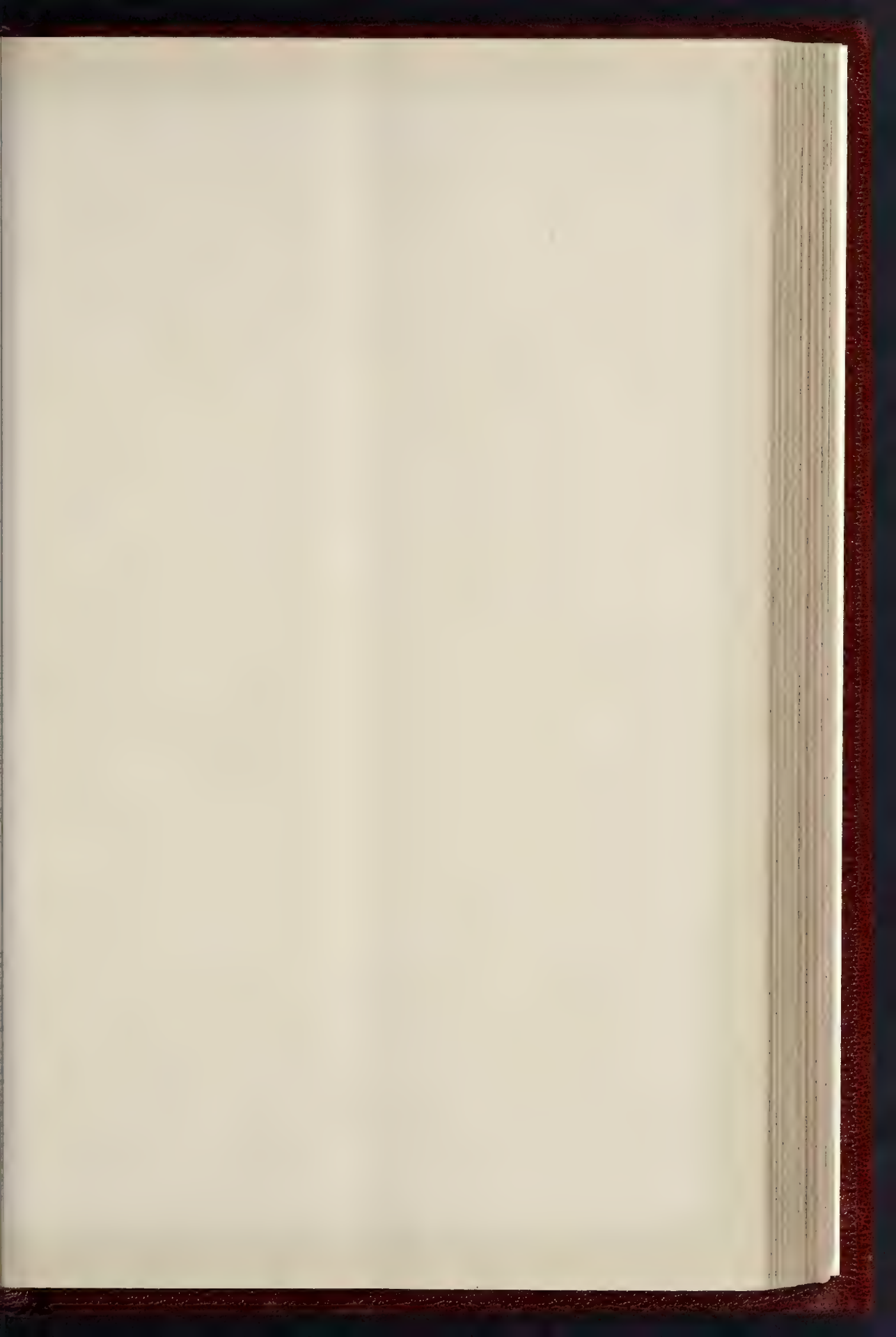
Correspondence.

To the Editor of THE BUILDER.

"SHOULD BRICKLAYERS TILE?"

SIR,—I am glad to see this question raised in your paper. My own decided feeling is against their being employed for work of this kind, because I think that mortar should never be used in tiling. Tiling laid in mortar cannot be easily (if at all, really) repaired; it keeps the roof in damp condition, and the timbers suffer by decay. It is time that the question should be settled if possible.

The old way of tiling certainly had its defects, but a great deal may be learnt from it. It was unwisely laid on laths, short and weak, and broken by nailing, upon which the tiles were hung by wood nails, which, like the laths, decayed. In the case of our country church the tiling was generally in a very bad state when church restoration began more than sixty years ago. It was very much kept together by repairs, in mortar, made from time to time under direction of the churchwardens. This repairing with help of mortar was to supplement the laths and pins which had largely failed. There was nothing else for it. The generation of architects has now wellnigh gone which can recall the state of a





DECORATION FOR SMOKING ROOM



tiling when the village bricklayer, under direction of the churchwarden, had taken possession of the field as a rough repairer.

It must be remembered, however, that the old tiles had an important special character which we have neglected to continue. They curved sufficiently from top to bottom to form a throat which allowed the rain which might be driven up under them to run back again. Of late years it has been difficult, but not impossible, to get the makers to produce tiles of this curved form, as unfortunately it is their view that a tile should be as flat as a slate, which we all know sucks up water by help of its close joint. The modern flat tile is the old curved one degraded, practically and artistically.

I believe that much of the old tiling was laid in the simplest manner, tile upon tile, but the better class of it was laid with the addition of hay judiciously placed near the pins. This kept out snow, and gave warmth in winter and coolness in summer. Some tiling so laid was removed not long since from a tower of Windsor Castle.

For a considerable time past I have been accustomed to use batens and stout galvanised iron blunt pins (not nails) from 2 in. to 2½ in. long, in place of the old laths and wood pins. I endeavour to get a curved tile, and I then use some hay for warmth and dryness, well above any open joints. But this hay must be applied by some one accustomed to the work, or it will be packed too heavily so as to lift the tile off its bed. Perhaps the largest area which I have covered with tiles so laid is that of the buildings for the Gordon Boys' Home, near Basingstoke. This work was executed for me by Mr. Norris, builder, of Sunningdale, who has strong belief as I have in this system of tiling, and from whom I have frequently borrowed a trained tiler for other builders who have been working for me. I have used this form of tiling very largely in churches, &c. W. BUTTERFIELD.

SIR,—Your excellent correspondent who signs himself "Common-Sense" has put so much reason and good-humour in his letter, that it seems nearly a pity to disturb it by reply; but there are several points that certainly call for correction, if nothing else. The first, with your permission, that I would deal with is, where he says that bricklayers were the only recognised tilers when slated roofs were unknown. In reply to this I assert that both slates and tiles, and slaters and tilers, as two separate trades were known long enough before either bricks or bricklayers. Of course, the slates and tiles of those days were not to be compared with the slates and tiles of to-day. The bricklayer came into existence just in the same way as other trades are blossoming forth to-day; as bricks became common, necessity for him stepped in. It is quite true that both slating and tiling have been done, and are being done, in different parts of the country by different trades. This is accounted for by the fact that it is only in the larger towns that men who do nothing else are to be found, and in the smaller places other trades sometimes swallow it up amongst them. The question is which makes the best coverer, those that are always at it, or those who lend a hand occasionally. Why bricklayers should charge more than any other masons or plasterers I, for one, cannot understand. To slate is to cover with slates or tiles; to tile is to cover with tiles or slates; the word slater means one who covers with slates or tiles. This, in itself, should settle the question as to whom covering with tiles really belongs. Further on, our candid friend says that for every capable slater-tiler hundreds of capable bricklayer-tilers are to be found. If this is meant as a challenge he had better begin finding them, and I, on my part, will bring such a regiment of slater-capables that will astonish him. Not hundreds, but many thousands of bricklayer-capables will be required to make good such a statement. It is quite true that in some parts of the provinces tiled roofs are the rule—I have seen them myself; but in order to find the men who executed the most of that tiling a visit to the grave-yards will be necessary. Methodical bedding is next spoken of, and here he seems to be unaware of the fact that five out of six roofs to-day are not bedded, being simply nailed; but when bedded a bricklayer's trowel, unless it is a heavy-duty one, is not the best tool for methodical work. Some bricklayers do use them, with the result that they succeed in bedding them not wisely but too much. Cutting tiles with a trowel is the last thing I should think of; the gnawing process is much better, and it is, as a rule, the bricklayers themselves that do the gnawing; slaters, generally use a hammer. If being master of the tool, a slater is to decide the matter, then, as bedding is fast dying out and nailing is becoming the rule, carpenters ought certainly to have a finger in this roof-tiling pie. Slaters and tilers say that as they are complete masters of the hammer and sufficiently acquainted with the necessary trowel, slating is naturally their work. Still they are not green; for they ask is that bricklayers and others will imitate them by trying to keep strictly to

their own trade. Let us alone, let the proprietor, architect, or builder order or employ whoever he may think best to do the work, and then time and experience, which proves all things, will eventually prove who are the fittest for the work.

"LIVE AND LET LIVE."

THE SCENERY OF "BECKETT."

SIR,—Personally appealed to, I must say I am not yet prepared to endorse the conclusion at which you have arrived in your editorial comments upon my letter and work. But in these few concluding remarks I will be as brief as possible. I believe you are perfectly right in saying that the large columns that divided the transepts stood equidistant from the east and west walls. In my model first shown to Mr. Irving I so placed it, but, placed so, it hid the chief actor in the tragedy from one side of the house, in the most important situation of the play; so the column was removed slightly to the right. With respect also to the two broad steps, which cross the transept from right to left; for these, as you say, I have no authority. They were introduced afterwards by Mr. Irving's wish, and I think with advantage to the business of the scene, and not hurtful pictorially. The introduction of the iron-work between the arches is certainly excusable for many reasons. At Westminster and Canterbury, many of the arches at their springing are tied together with iron rods (I presume as a tonic for some structural weakness), and being there are added to and made use of for decorative purposes, as suggested in Stanley's "Memorials." Classic, the smaller lamp from a design by Edwin Long, R.A., for the Temple of Ephesus. Italian the larger one (neither designed for "Beckett"), but without taxing credulity too much, one might trace the interesting story of their progress to Canterbury; for was not the church and the shrine the receptacle for gifts from all quarters of the world? The blank space on the left in your reproduction is not a blank space in the sketch; the pier of Ernulf with the cluster of columns supporting the tower are faintly indicated, together with the beam which rested between them, upon which stood the crucifix and on either side St. Mary and St. John. The southern pier in the scene (the side facing the choir) I have decorated after the character of the painting in the Chapel of St. Gabriel.

To return to the question of the vaulting of the roof that covered the scene of the murder, I presume, of course, that Professor Willis interprets Gervase correctly; but in a work upon Canterbury Cathedral, which also quotes Willis with respect to the vault, I found the quotation given in my previous letter with respect to the flat ceiling of the transept. Perhaps this referred to the actual roof, and not the crypt-like lower portion of the transept. [Very likely.—Ed.] Between these apparently conflicting accounts I chose the one which, under the circumstances, appeared the most practicable.

The set-off in the wall, the N.W. corner of the N.W. transept, the only portion remaining unencased of Beckett's period, exists in fact, not in my imagination. The height of this set-off agrees with that of the blocked-up doorway in the S. transept. At Canterbury there is attached to the steps leading to the south choir aisle (the steps which have reproduced on the north side, as denoted in Willis's plan), an exact counterpart of my "area railing"—rust-ent and with remains of colour on it. I should think it was in existence at the time of the Roman Catholic occupation of the cathedral. Things equal to the same thing, &c. Things like the same thing are like one another.

W. TELBIN.

* * * Mr. Telbin has sent us a rough sketch of the plan of his scene as he laid it out; but we can assure him that, if he professes to be following Willis's restoration, his steps and his pier are not in the right place, either in regard to each other or to the main steps. The side stair was not side by side with the main stair; but eastward of it (see extract from Willis's plan, p. 307, ante); the pier extended westward of the side stair; Mr. Telbin puts it back eastward, half up the stair, in his sketch plan. Mr. Telbin seems very positive about the set-off on the interior of the transept wall; we can only say we looked carefully for it and could see nothing of the sort, except at a point far too high up to affect the question. The bars were not in true Gothic used across arches as originally built, they are after-insertions when the building required them, and their usefulness would certainly not be improved by all the filagree work introduced in the scene. The defence of the Classic lamps is ingenious, but looks rather like an afterthought. We have not looked closely at the iron stair-rail referred to, but we should think Mr. Telbin's belief in its Medieval date was a touching instance of faith.

We admit that the steps across the transept are a useful stage feature, but as they were inserted and the pillar moved out of its right place solely for stage effect, what becomes of Mr. Telbin's statement (in his former letter) that he never condoned alterations from architectural consistency and truth for the sake of stage effect?

Of course the scene does well enough for the general public, who are not critical in these matters; we only contend that from an architect's point of view it is an impossible one, and that it does not correctly follow the authority it professes to follow.—Ed.

STABILITY OF PIER OF ARCH.

SIR,—The problem of the conditions of stability of a corner-pier on which two arches rest at right-angles to each other can surely be solved in a simpler manner than that adopted by Mr. Gavin J. Burns, B.Sc. (the *Builder*, p. 308), by help of the elementary principle of the "resolution of forces." Suppose that two equal semi-circular arches rest on the angle-pier, the horizontal thrust of each being represented by the quantity N and acting at the "joint of rupture" [see "Mechanics of Architecture," p. 184], which in a semi-circle will be at a height equal to half the radius of the intrados above the springing. If h stands for the height of the pier and r for the radius of the arch, then the thrust N acts horizontally at a height equal to $h + \frac{r}{2}$ above the base of the pier. The two equal forces, N , at right-angles to each other, will have a "resultant" whose value is $\sqrt{2} N$, or $1.4142 N$, which represents the horizontal thrust of the two arches in the direction of the diagonal of the pier. The "moment" of this force about the bottom outer edge Z of the pier is,

$$1.4142 N \left(h + \frac{r}{2} \right) \dots\dots\dots (A.)$$

The forces to resist this tendency to overturn the pier are, the weight of the pier itself acting down its centre of gravity, and the weight of one half of each arch and surcharge acting vertically at the "joint of rupture" ["Mechanics of Architecture," p. 190]. The distance of this point from the outer edge of the pier is $t + \frac{1}{2} r$, where t is the thickness of the pier; and the distance from the angle of the pier is $\sqrt{\left(t + \frac{1}{2} r \right)^2 + \left(\frac{r}{2} \right)^2} = \sqrt{\frac{1}{4} (t^2 + 2rt + r^2 + r^2)} = \frac{1}{2} \sqrt{t^2 + 2rt + 2r^2}$; and the weight of each of the half-arches and surcharge is P .

Consequently, the moment of P about Z is $P \cdot P$. There is also the weight, Q , of the pier itself acting down the middle of the pier, the moment of which, about Z , is $Q \cdot q$; where $q = \sqrt{2} \times \frac{1}{2} r = .707r$.

Then the sum of the moments of resistance, taken about the foot Z of the angle pier, is

$$2 P \cdot P + Q \cdot q \dots\dots\dots (B.)$$

When the quantity (B) equals the quantity (A) the pier is just in a condition of equilibrium; when less, the pier will be overturned, and when greater, it will be in a condition of stability.

Let us apply this to an example in which $r = 5$ ft., $h = 10$ ft., and the height of the top of surcharge above soffit of arch at the crown is 4 ft.; so that the total height of the pier from base to top of surcharge is 19 ft.

Let $t = 2$ ft. Suppose the whole structure to be built of material having the same specific gravity. Then by the rules for the stability of arches, ["Mechanics of Architecture," p. 192], we find $P = 52$, $N = 23$, $Q = 66$, $r = 5$, $q = 1.4142$.

$$\text{For the value of (A) we have}$$

$$1.4142 N \left(h + \frac{r}{2} \right) = 1.4142 \times 23 \times 15 = 406.6.$$

$$\text{For the value of (B) we have}$$

$$2 P \cdot P + Q \cdot q = 104 \times 34 + 66 \times 1.4142 = 471.5.$$

And as the latter is considerably in excess of the former, we may consider the structure to be in a condition of stability.

If we make $h = 12.5$ ft. instead of 10 ft., we find the value of (A) to be 488, and that of (B) to be 486, consequently the structure would in this case be in a condition of instability.

E. W. T.

THE SYMBOL OF THE CROSS.

SIR,—To state that the Cross is the central emblem of Christian symbolism, and has been so from the Medieval period, is to state but a truism; and it is equally true that neither its form, nor the importance attached to it as a religious sign, arose with Christianity, but originated at a far earlier period; for it is admitted that in very many countries where archaeological researches have been made a pre-Christian cross, with certain religious and mystical meanings attached to it, has been found.

But it may be urged that no matter what was the origin of its form, it undoubtedly derives its present significance from the fact that it was used as the instrument of the crucifixion of our Saviour.

But that this is a well-ascertained fact may be questioned, for the Holy Scriptures nowhere assist us to determine that a cross-form was employed upon that occasion.

On the contrary, the Greek word, $\sigma\tau\alpha\upsilon\rho\omicron\varsigma$, used throughout the New Testament, and translated "cross" many centuries later, did not mean at the date of the Crucifixion a cross, necessarily of two pieces, but simply one upright piece—a pole or stake; and in this sense it was used by contemporary writers, and many have been put to death upon such stakes by nailing the two hands above the head with one nail, as the two feet are usually shown to be nailed upon a cross.

It is usual to divide the forms of the cross into the three classes denoted by the terms *crux immitis*, *crux commissa*, and *crux desinens*, but although these terms may convey the idea of mode of construction and shape, they cannot be regarded as grouping them satisfactorily as to meaning, for the equal-armed cross of St. George, and the unequal, armed Latin cross of very different signification

both fall in the same class, while the T-shaped cross, which is closely allied to the Latin cross, is placed under a different head.

In signification the three principal forms of the cross are as distinct from each other as are the letters A T Z in the English alphabet, and it is suggested that they might advantageously be arranged according to their symbolic values, which are very fairly represented by these three letters.

The letter A as the first letter of the alphabet corresponds in value, though not in shape, with the St. Andrew's cross X, the letter T

with the Latin cross shaped thus T, which is only another form, and the equivalent of the T-shaped cross; and the letter Z, as the last letter of the alphabet, with the St. George's cross +, for it must be remembered that these crosses derive, partly at least, their significance from being letters of an older alphabet.

The Scriptural title of Christ as the Alpha and the Omega, seems to be the key to the subject, for although these two Greek letters are not in themselves cross forms, they refer to the parallel expression of the Rabbins, "Ab Aleph usque ad Tau," which two Hebrew letters, the first and last of the Hebrew alphabet were crosses.

Tau means cross, but is not so formed in the later Hebrew square characters which are similar to Chaldee letters, although in Aleph the form of the St. Andrew's cross can be traced, but in the earlier coin letters the Tau is a cross also.

Therefore, it seems that there is a connexion between the St. Andrew's and St. George's crosses, the Aleph and the Tau, the Alpha and the Omega.

The other forms, the Latin T and allied T-shaped crosses were Pagan religious emblems long before the Christian era, and there is no contemporary evidence to connect either with the instrument of our Saviour's suffering, and as they do not appear to have been used as Christian signs in the Roman Catacombs until the fourth or fifth century of this era it seems reasonable to suppose that they were introduced as such at the period when, as is well known, the passage from Paganism to a nominal Christianity was made easy by giving Christian names to time-honoured pagan customs and symbols.

As the Tau or T of the Greek and Roman alphabets, the equivalent of the Latin cross, is not the last letter of those alphabets, it does not possess the significance which on that account is attached to the Hebrew Tau, and although it may have derived its name from the latter as well as its shape, by an elongation of the lower limb + becoming T, its importance as a Pagan symbol lies in the fact that it was the initial of the name of the Pagan saviour, Tammuz, even if it did not refer to that phase of religion, derived from nature, known as Phallic worship.

The conclusions suggested by a consideration of this subject are briefly these:—

1. That no cross of any kind was used as the instrument of our Saviour's death.

2. That the Latin and T-shaped crosses were pagan symbols unassociated with Christianity until the Medieval period.

3. That the St. Andrew's and St. George's crosses refer to the name of Christ, and so, irrespective of any particular language, may be regarded, when combined, as an Ideograph for all time.

That the fact that such ancient symbols are cross-shaped accounts for the world-wide importance attached to the cross, as a religious sign, prior to the Christian era, which the misconception with regard to the form of the instrument of the Crucifixion by no means lessens.

J. HOUGHTON SPENCER.

Taunton, April 15, 1893.

The Student's Column.

CHEMISTRY.—XVII.

Experiments. Group 10.

DETERMINE qualitatively the constituents of various clays and bricks. Grind the clay or brick to a *very fine powder*. The success of the subsequent analysis depends in a great measure upon the fineness of the powder employed. Now treat a small portion of the powder with dilute HCl and look for insoluble silicious matter, "soluble silica," iron, alumina, lime, magnesia and alkaline salts in exactly the same manner as when examining limestones and cements (see Paper XV.).

The insoluble silicious matter will consist principally of silicate of alumina and small quantities of other silicates. To estimate the silica in it, the insoluble residue, after being washed and dried, is mixed with about three or four times its bulk of "fusion mixture" consisting of a mixture of potassium and sodium carbonates and heated in a platinum basin having a platinum cover to a bright red heat. The mass melts and

the silicates decompose and form silicates of potash and soda, which are soluble in water and are decomposed by acids. The mass must be kept in a melted condition until no bubbles, due to the escape of CO₂ from the fusion mixture, can be seen in it. The fusion usually takes from five to ten minutes to become completed. The basin and contents must now be allowed to cool. HCl is then cautiously added, in small quantities at a time, until the whole mass is dissolved, the basin being covered with a glass cover to prevent loss by spitting. The solution in the basin consisting of silicic acid, potassium, sodium and aluminium chlorides, &c., is now evaporated to complete dryness. The silica being thus rendered insoluble, the mass is moistened with HCl and treated with hot water. The SiO₂ may now be filtered out, and the filtrate treated for alumina, iron, lime, and magnesia as in the examination of cements.

To Detect Sulphur in Clays, &c.

To detect sulphur present as sulphides add some HCl to the powder, and hold a lead test-paper (blotting-paper soaked in lead acetate solution) over it. If sulphides are present, it will be blackened by the liberated H₂S.

To obtain the *total sulphur* present, fuse some of the powdered material with fusion mixture as before, then dissolve the mass, when cold, in hot water with the aid of a little HCl, filter, boil the clear filtrate, and obtain the sulphur, as in the case of cements, by adding barium chloride solution to precipitate the sulphur as barium sulphate.

Quantitative Analysis.

The quantitative analysis may be made in a very similar manner, by taking a known quantity of the material, say, 2 grams, or 25 grains, in a very finely powdered condition; washing, drying, igniting, and weighing the various precipitates and employing pure chemicals.

Silicious Stones.

Granite is a rock consisting essentially of—

- (1) *Felspar*, a silicate of alumina, potash, and soda, &c.
- (2) *Quartz*, native silica, SiO₂ and
- (3) *Mica*, consisting of complex silicates of aluminium, potassium, and other elements.

It often contains in addition small quantities of other materials.

There are several varieties of felspar, but those of most common occurrence in granite are potash felspar (orthoclase) and lime and soda felspar (oligoclase). The following are analyses of the felspars:—

Analyst.	Abich	Damour
	Orthoclase.	Oligoclase.
SiO ₂	65.72	62.30
Al ₂ O ₃	18.57	22.00
Fe ₂ O ₃	—	0.04
K ₂ O	14.02	0.94
Na ₂ O	1.95	8.26
CaO	—	4.86
MgO	—	—
	100.00	100.00

The following are analyses of two of the various forms of mica found native. Muscovite is the mica which most commonly occurs in granite.

Analyst.	Remmelsberg.	Penfield.
	Muscovite.	Phlogopite.
SiO ₂	46.74	44.81
Al ₂ O ₃	35.10	10.87
Fe ₂ O ₃	4.00	—
FeO	1.53	0.31
MgO	0.80	28.90
K ₂ O	9.93	8.40
Na ₂ O	—	0.38
H ₂ O	1.05	0.08
Water	3.36	5.42
	102.21	99.17

As a rule, granite contains about 40 per cent. felspar, 30 to 40 per cent. of quartz, and from 10 to 20 per cent. mica. Mica occurs in semi-transparent glistening scales, which can easily be sliced with a knife.

The felspar in good granite is crystalline and lustrous. The grains are of different shapes and sizes, and its colour varies considerably.

The quartz in granite occurs chiefly in the form of very hard glassy grey or colourless lumps.

Syenite or *Syenitic granite* differs from ordinary granite only in having hornblende substituted for mica. There are many varieties of hornblende,

but they are mostly anhydrous silicates of lime, magnesia, and protoxide of iron (FeO).

Porphyritic granite has large independent crystals of felspar occurring irregularly throughout its mass.

The following analysis will give an idea of the chemical composition of granite:—

Locality.	Heidelberg.	Fox Rock.	Egyptian
Analyst.	Streng.	Haughton.	Delesse.
SiO ₂	72.11	73.00	70.21
Alumina	15.60	13.64	16.00
Oxide of iron	1.53	2.44	2.50
Oxide of manganese	0.26	—	—
Lime	1.26	1.84	1.60
Magnesia	0.34	0.11	—
Potash	5.00	4.21	9.00
Soda	2.27	3.53	—
Water	0.83	—	0.65
Loss	—	1.20	—
	99.20	99.97	100.00

* From a fragment of an antique in the collection of the Louvre, Paris.

Diorite is a *greenstone* composed chiefly of albite, oligoclase and hornblende. It is extremely hard and tough. The Pennmaenmawr stone of North Wales, which is so largely used for paving, is included among the greenstones. It is a crystalline, granular rock, and is easily split into layers from which blocks of a size and shape suitable for street paving may be cut.

Basalt somewhat resembles greenstone, and is composed of lime, felspar, augite, and titaniferous. Basalts occur (1) as vertical dykes, (2) as sheets or beds intruded among older rocks, and (3) as tabular sheets poured over the surface, and forming horizontal or inclined beds, often interstratified with volcanic ashes, agglomerates, and bands of bole (tuff).

Gneiss is a crystalline aggregate of quartz, felspar, and mica. It differs from granite in being foliated in texture through the mica it contains occurring more in layers. The rock is easily split into slabs. Gneiss often passes into foliated granite, or into mica-schist.

Mica-schist is grey or silver-grey in colour, and has a shiny surface. It is composed principally of mica and quartz, which usually occur in alternate laminae.

Slate.—The occurrence of slate has been considered under clays.

Serpentine consists of hydrated silicate of magnesia, usually containing, however, small quantities of other substances. It is mottled in appearance; the predominating colour is usually green or red, permeated with veins of white steatite. Serpentine is capable of taking a fine polish, is soft enough to be cut with a knife, and is very compact in texture. It is, however, only suitable for indoor use, because it weathers very badly when exposed to the influence of wind, rain, and frost.

The following are analyses of Serpentine:—

Analyst.	Haughton Bristow.	Delesse.	Hunt.
Locality.	Cornwall.	Galway.	Vooges.
	Recl.	Light Green.	Dark Green.
SiO ₂	38.29	40.10	40.83
Alumina	—	2.00	9.4
Prot. Iron	13.50	3.47	7.39
Manganese Oxide	—	—	trace.
Oxide of Nickel	—	—	—
Chromium Oxide	—	—	—
Lime	—	—	1.50
Magnesia	34.24	10.04	17.38
Water	12.09	13.45	10.70
	98.12	98.99	100.00

Sandstones, sometimes termed *freestones*, are composed of grains of quartz or sand cemented together by carbonates of lime, oxide of iron, or by silica in some other form than quartz; there can be little doubt, moreover, that sandstone was originally consolidated under great pressure, and possibly while at a very high temperature. Sandstones vary greatly in colour, the colour being usually due to oxide of iron, the variations being caused through the oxide being present sometimes as protoxide and sometimes as peroxide, sometimes anhydrous, and sometimes hydrated.

Flagstones are cut from sandstones, which can easily be cleaved into thin and even layers along the plane of bedding. The facility with which certain sandstones can be so cut is usually due to the presence of layers of mica in them. Hull gives the following analyses of well-known sandstones:—

	Conglith.	Darby Dale, Stafford.	Heddon.	Kenton.	Manfield, Lincs's Rd.
Silica	98.3	96.49	95.1	91.1	49.4
Carbonate of Lime	1.1	0.36	0.8	2.9	26.5
Carbonate of Magnesia	0.0	0.0	0.0	0.0	16.1
Iron Oxide and Alumina	0.6	1.3	2.3	4.4	3.2
Water and Loss	0.0	1.24	1.3	0.5	4.0
	100.0	100.00	100.0	100.0	100.0

The "Weathering" of Stones.

The air of towns always contains traces of sulphuric acid, and sometimes traces of hydrochloric and nitric acid. Each of these acids will decompose carbonates with the liberation of CO₂, hence all limestones decompose more or less rapidly and crumble to pieces in ordinary town air. Even in country air there is, as has been previously shown, a certain amount of carbonic acid, and this forming a solution with rain and being beaten on to the stone dissolves a portion of the carbonate of lime or magnesia, forming a solution of bicarbonate, which is washed away before it decomposes by evaporation and returns once more to CO₂ and insoluble carbonate of lime. But that the chemical composition alone does not determine the weathering value of a stone, is shown by comparing the almost pure carbonate of lime known as *marble* with the commoner soft limestones containing small quantities of impurities which have, if anything, superior weathering powers to carbonate of lime. The marble being very dense and compact, is acted upon only to a slight degree, while the soft limestone, on the other hand, allows the aqueous acid solution to soak into it, even if it does not actually draw it into itself by capillary attraction, and consequently the body of the soft stone becomes decomposed instead of merely the surface, as in the case of marble.

From the foregoing facts it is evident that certain stones will weather much better in country air than in town air, and much better in comparatively rainless districts than in very rainy localities. Wind affects the durability of stone in several ways. (1) In dry weather it dries it by absorbing the moisture, and thus tends to preserve the stone; (2) a strong wind wears the stone away by driving particles of gritty matter against it; and (3) in rainy weather, wind probably drives the rain into the stone to a considerably further depth than it would otherwise go.

To a certain extent, water, irrespective of any acid it may contain, has a wearing effect upon stone; but one of the greatest stone-destroying agents is water subjected to a freezing temperature, the force of the expansion of the water upon changing into ice being frequently sufficient to split the stone, or at least to form cracks in the mortar joints of a building.

Stones containing iron pyrites are liable to split through the oxidation of the sulphide into sulphate.

Some stones consist principally of grains of substances which weather well, but the material which cements the grains together being rapidly affected by exposure to the weather, the whole stone is rendered useless.

As a rule, stones having the closest and finest texture or grain are likely to weather best, because they will absorb water and gases less, and each individual grain is less exposed than in stones possessing coarse grains.

Experiments, Group II.

The following tests will give some idea of the weathering qualities of a stone:

1. Immerse a block of it, say, six cubic inches, in water for twenty-four hours, and note the weight of water which it has absorbed. Compare this increase in weight with the weight of water absorbed in the same time by the same volume of stones which are known to possess good weathering qualities. Usually the best stones absorb the least water.

2. *Acid Test.*—Soak a piece of the stone for a few days (1) in water containing 1 per cent. HCl, and (2) in water containing 1 per cent. H₂SO₄. Compare with effects produced by treating equal volumes of good stones in a similar manner.

3. *Smith's Test.*—Break off a few chippings about the size of a shilling with a chisel and a smart blow from a hammer; put them into a glass about one-third full of clear water; let them remain undisturbed at least half-an-hour. The water and specimens together should then be agitated by giving the glass a circular motion

with the hand. If the stone be highly crystalline, and the particles well cemented together, the water will remain clear and transparent, but if the specimens contain uncrystallised earthy powder, the water will present a turbid or milky appearance, in proportion to the quantity of loose matter contained in the stone. The stone should be damp, almost wet, when the fragments are chipped off."

OBITUARY.

MR. T. GLEDHILL.—According to the *Leeds Mercury*, Mr. T. Gledhill, Surveyor and Inspector to the Heckmondwike Local Board, died at his residence, Church-street, Heckmondwike, on the 2nd inst. Deceased was sixty-three years of age, and had held the appointment under the Board—originally as a working surveyor—for twenty-eight years. A few months ago he was elected an A.M. Inst. C.E., and under his direction the town's internal drainage scheme and sewage disposal works were being proceeded with.

GENERAL BUILDING NEWS.

NEW CATHOLIC HALL, MANCHESTER.—The new hall in connexion with the Church of the Holy Name, Manchester, was opened on the 19th inst. by Cardinal Vaughan. The hall is built on ground adjoining the church, and faces to Dover-street and Portsmouth-street. The cost has been about 7,000l. The hall, which has a lofty half-timbered roof, has sitting accommodation in the area for about 600 persons. At one end there is a gallery, and at the other a broad platform or stage. Connected with the hall are various smaller rooms, including a library, reading-rooms, and rooms for recreation, and under a separate roof there is a gymnasium. Several rooms are set apart for the use of young women as recreation and play rooms. The arrangements include a set of kitchens and other conveniences for social meetings. The architect of the building was Mr. Edmund Kirby, F.R.I.B.A., Liverpool, and the contract has been carried out by the executors of the late Mr. J. L. Ward.

CONGREGATIONAL CHURCH, SHAW, LANCA-SHIRE.—Four memorial stones of a new Congregational Church in course of erection in Rochdale-road, Shaw, were laid on the 15th inst. The new building will be 54 ft. long by 40 ft. wide. There will be in addition a vestry, and a vestry for the use of the pastor. There will be a small gallery over the vestibule, and two staircases will be erected at each end to lead to it. The building will seat 450 persons, and is estimated to cost 2,000l. The style adopted is Gothic, and the front will be built of faced stone, and the sides will be faced with brick and stone. Mr. Harold Cheetham, of Oldham, is the architect; and Mr. William Harrison, of Shaw, is the principal contractor.

MEMORIAL TOWER AT THE PARISH CHURCH, WALMER, KENT.—The dedication service of the memorial tower and peal of bells erected at the new parish church, Walmer, to the memory of the late Lord Granville, took place on the 13th inst. The spire and tower were erected from the design of Sir A. Blomfield, R.A. The memorial tablet, which was unveiled by Lady Herschell, bears a suitable inscription, and is surmounted by the Cinque Ports arms. It is of mosaic work, executed in Sicilian alabaster, and has been designed and constructed by Messrs. Powell, of Whitefriars, London.

UNDED PRESBYTERIAN CHURCH, CATHART, LANARKSHIRE.—The foundation-stone of Cathart U. P. Church was laid by Mr. Robert Gourlay on the 8th inst. The site adjoins the Couper Institute, with the principal frontage towards the main road. The church is planned as a nave, roofed in one span, with transepts, and a choir recess of considerable depth to accommodate an organ. All the arches of the interior are of polished stone, and the arcades separating the transepts from the interior are carried on polished stone columns with moulded shafts and bases. The walls of the interior are panelled with yellow pine lining to a height of about 7 ft. from the floor, and above that they are finished in plaster. The roofs are of half-oak timber work, the timber being dressed where exposed. The principal doorway opens into the main vestibule, which is 24 ft. wide. The span between the present hall and the new church will be roofed in, and the session-house, &c., placed there, with a corridor connecting front and back, and with through communication under cover to all parts of the complete group of buildings. The vestry is situated at the back, and, in addition to the small hall behind the large one, there will be a ladies' room and a kitchen. There are four exit doors provided, near the four corners of the church, besides the main doorway, which occupies the first stage of the main entrance gable in the front elevation facing the public road. The doorway is a double one, divided by a moulded stone shaft carrying the stone filling in the tympanum, with its recessed and pierced panels enriched with cusped work, all enclosed in a recessed arch of four orders, the members of which are mounted or carved. The hood mouldings spring from square shafts, panelled and enriched with simple canopy work surmounted by

carved terminals. The middle stage over the doorway is occupied by the large six-light window over the back gallery, lighting the nave, and filled with cusped tracery in two orders, the whole flanked by a group of buttresses on each side, plain in the lower stages, but treated with angle shaftings above, and having gable tops surmounted by stone terminals with carved crockets and finials. The upper stage of the gable is divided into panels with angle shafts starting from an embossed cornice, some of the panels being enriched with cusped sinkings, and the terminals carried above the skewes and finished after the manner of the shafts in the buttresses. The shaft in the centre is finished at the apex of the gable with a foliated stone cross. The side elevation towards the proposed new road is more simply treated. The nave of the church in its length being divided into five bays, two of these are taken up by the gable transepts, with two large four-light windows, and the next two bays by the three-light windows opening into the nave. The fifth bay is taken up by the gable of the staircase; the divisions are accentuated by buttresses gabled and weathered in several stages at the transepts, and finished with angle shafts gabled and carved, and the beads of the windows are filled with tracery. On the axis of the transept roof the main ventilator trunk pierces the ridge of the main roof, and a fleche covers the body of the ventilator. The choir is much narrower in span than the nave, and is roofed at a lower level, the upper stage of the gable being occupied by a large five-light window, filled with cusped tracery, and flanked by buttresses finished with gabled tops. All the roofs will be covered with Westmoreland slates, and finished with red tile ridges. The heating is effected by the hot-water low-pressure system. The gas-fittings will be specially designed of hammered iron. There is sitting accommodation for 895, including back gallery, choir, and elders' stalls, and the total cost is expected to be a little over 6,000l. The contractors are as follows:—Masons, Allan & Baxter; plumbers, Moyes & Son; gasfitters, D. & G. Graham; plasterers, W. & W. McKinnon; glaziers, Millar, Steele, and Kirk; painter, William Haddow; slaters, John McEwan & Son; heating, A. & J. Boyd & Son; carvers, Dawson & Sheriff; and wrought-iron plates, James Milne & Son, Limited. The architect is Mr. W. G. Rowan, of Glasgow.

CHAPEL, DONALDSON'S LODGE.—The foundation-stone of a new Primitive Methodist Chapel at Donaldson's Lodge, near Cornhill-on-Tweed, was laid on the 13th inst. The contractors for the building are Messrs. Elliot & Son, Berwick-on-Tweed, and they are carrying it out under the superintendence of the architect, Mr. George Reavell, jun., of Alnwick.

NEW POLICE BARRACKS AT GLASGOW.—The new police barracks which have been erected in Great Clyde-street, Glasgow, were on the 14th inst. opened by Councillor Gray. Built from plans by Mr. A. B. McDonald, the City Engineer, the barracks have a front elevation to the Clyde, are four stories in height, cover 720 square yards, and are estimated to cost about 10,000l. Accommodation has been made for the housing of eighty unmarried constables. The barracks have been erected in the central district of the city.

NEW CHURCH AT BLAENAVON, MON.—On the 13th inst. the memorial stone of a new church, Coteba, Blaenavon, was laid by Mr. R. W. Kennard (on a site presented by the Marquis of Abergavenny). The memorial stone was of Forest of Dean stone. The church is designed in the Early English style, and will seat about 250 persons in open pews. The walls are of local stone, with Forest of Dean stone dressings. The contract for the church has been entrusted to Mr. John Burgoyne, builder, of Blaenavon, who is carrying out the same from plans prepared by, and under the supervision of, Mr. E. A. Lansdowne, architect, Newport, Mon. Mr. Box, of Blaenavon, is acting as clerk of works.

NEW CHURCH AT COGAN, SOUTH WALES.—A new church is about to be built at Cogan, on a site adjoining the main road to Penarth, being by Lord Windsor, who has also given 500l. towards its erection. The total outlay, including fencing of site, will be about 2,500l. The contract has been let to Mr. W. Richards, contractor, Barry. The architects are Messrs. Kempton & Fowler, Landaff.

WESLEYAN CHURCH, GLILBERDYKE, YORKSHIRE.—Memorial stones of a new Wesleyan church and school were recently laid at Gilderdyke. The internal measurement and proportions are:—Church, 45 ft. by 27 ft. 6 in.; schoolroom, 37 ft. 3 in. by 17 ft. 9 in. The church is to accommodate 250, and the rostrum being moveable on wheels, additional room can be had to seat 250 more on special occasions. The style of architecture is Gothic. Mr. W. Stothard, of Manchester, is the architect; the builder being Mr. G. H. Walters, of Hull.

NEW CHURCH, CHARLTON, DOVER.—The new church of St. Peter and St. Paul at Charlton, Dover, was consecrated on the 19th inst. by the Bishop of Dover. Mr. James Brooks, of London, was the architect, and Mr. C. Wise, of Deal, the builder. In the *Builder* for May 30, 1891, we published a view of this church, together with elevations, plan and sections, and also a short description.

SANITARY AND ENGINEERING NEWS.

MAIDENHEAD SEWAGE DISPOSAL SCHEME.—On the 30th ult. Mr. Rienzi Walton, C.E., Local Government Board Inspector, held an inquiry at the Town Hall, Maidenhead, relative to the application of the Corporation for permission to borrow 30,000*l.* for drainage and sewage purification works. The Mayor, with the town clerk and most of the council, were in attendance; the Great Western Railway Company, who are very large ratepayers, were also represented. Mr. C. Nicholson Lailey, C.E., of Westminster, the engineer of the proposed scheme, gave information as to the size and length of the sewers—amounting to about fourteen miles—and stated he proposed to treat the sewage by the International Company's system of precipitation by ferrous and filtration through polarite beds. Dr. Angell, F.R.C., described the chemical aspect of the system, and said that the effluent would satisfy the Thames Conservancy. The sewage is at the present time disposed of by broad irrigation, but it is stated that the land treatment has proved unsatisfactory, and many complaints having been made by the Thames Conservancy as to the bad effluent coming from the land, the Conservancy at length called upon the authorities to comply with the Rivers Pollution Act. There was practically no opposition. Mr. Smith, on behalf of the Great Western Railway Company, expressed a wish that the tanks should be put as far from the station as possible, and this will, no doubt, be done. The site was afterwards visited by the Government Inspector.

HEATLEY (CHESHIRE), MAIN DRAINAGE SCHEME.—On the 13th inst. Colonel C. H. Luard, R.E., Inspector to the Local Government Board, held an inquiry at the Lynn Local Board office as to this scheme. The plans were presented and described by the Clerk and the consulting engineer, Mr. G. Herbert Bayley, A.M. Inst. C.E., who pointed out that on account of the very flat character of the district to be drained, he had advised the board to adopt the "Shone" system. There will be one central ejector station delivering the sewage under pressure into the existing system of sewers, and so on to the Statbam sewage farm, two miles down the river. The air compressors will be placed at the Authority's gas-works. Owing to the wet subsoil and proximity to the river Bollin, it has been decided to use Doulton's patent-joined stoneware pipes. The amount of the loan sought is 3,300*l.*, and there was no opposition. The Colonel subsequently inspected the whole of the district under consideration, and afterwards visited the Board's sewage farm.

GORTON SEWAGE SCHEME.—On the 18th inst., Mr. J. S. Smith, C.E., one of the Local Government Board Inspectors, held an inquiry into an application by the Gorton Local Board for sanction to borrow 30,000*l.* for works of sewerage and sewage disposal. Mr. Bidder, Q.C., and Mr. Sutton, instructed by Messrs. Hall, Son, & Lord, solicitors, appeared in support of the application, and Mr. J. Addison, Q.C., M.P. and Dr. Parkhurst, watched the proceedings on behalf of the Manchester Corporation. Mr. Bidder, after explaining the object of the inquiry, said the population of the district was 16,000, and it was already effectually sewered, but the sewage flowed totally untreated into the Gore and Corn Brooks. The area of the works was to be 8 or 9 acres, but owing to the high price of land in the district, and it being quite unsuitable for sewage treatment it was proposed to deal with the sewage first by chemical precipitation, and then by filtration through polarite beds. Three precipitation tanks, each of a capacity of 409,275 gallons were to be provided, and six polarite filters. The sludge they intended to press. Mr. Bidder stated that as a result of their observations they were confident of being able to obtain by the polarite system an effluent, which he might say had never yet been obtained by any other process. Dr. Burghardt, Analytical and Consulting Chemist at the Victoria University, Manchester, was called in support of the scheme, as also Mr. J. Carter Bell, Borough Analyst for Salford, who gave the results of analyses of effluents from Swinton, Pedlebury, and Royton, where the polarite system is in operation. These analyses were made for the Salford Corporation, and Mr. Bell stated they were of extremely high purity and satisfactory in every respect. The proceedings occupied the whole of the day, and were watched with great interest by the officials and members of the Corporation of Manchester, in view of steps which are about to be taken in connexion with the purification of the entire watershed of the River Irwell.

DOCK EXTENSIONS IN LIVERPOOL.—According to the *Liverpool Post*, the new branch of the Canada Dock will shortly be ready for steamship accommodation. The contract for excavation was let to Messrs. Eckersley, Godfrey, & Liddelow, of London, who commenced operations in November, 1890. They had to remove about 700,000 cubic yards, consisting largely of clay. The massive concrete walls of the dock are completed, but some important work has yet to be done in connecting the main dock with the branch, and when this is accomplished the water area will be increased from about eighteen to thirty acres. The depth of this new branch will be 16 ft. below the datum of the old dock sill, the deepest of any dock that has yet been completed in Liverpool. The new Canada dock will be 600 ft. long and 100 ft.

wide, with a sill 13 ft. below the datum. This entrance will, it is expected, be ready in the course of next year. The latest steamer added to the Atlantic trade, the *Campania*, will easily be accommodated at the new Canada branch. On the south side of this dock there will be double story sheds 1,400 ft. long and 95 ft. wide, to be fitted with Lyster's patent roof cranes. On the north quay of the dock, where there is more land, sheds of a single story, 1,100 ft. long by 125 ft. wide, will be erected. The estimated cost of the branch dock with its sheds is about 300,000*l.*

FOREIGN AND COLONIAL.

FRANCE.—There is a talk of instituting a School of Art for Young Girls in the part of the Pavillon de Flore which has for some years been occupied by the Prefecture of the Seine. This new building will be laid out on the model of the school in the Rue Bonaparte. The first five days' sale of the Spitzer collection has produced a sum total of 1,664,200 francs.—There is to be an exhibition in the Georges Petit Gallery of the works of the landscape painter, C. Delpey.—The Union Centrale des Art Décoratifs is preparing, at the Palais de l'Industrie, an exhibition of enamels of the painter, Claudius Popelin, who died about two years ago.—Next month an exhibition is to be opened, at the Ecole des Beaux-Arts, of portraits of authors of the century.—MM. Maxence, Mitreux, Deschenaux, Laré, Foreau, Thierol, Ronault, Charbonneau, Trigout, and Gaignier, are the students admitted by the jury of the Ecole des Beaux-Arts to enter for the first competition for the Prix de Rome, in the section of painting.—The marble statue of Lazare Carnot, by M. Cougny, has just been placed in the state-room of the Ministry of War.—The Carnaval Museum has just acquired a curious and interesting picture giving a general view of Paris in 1630, in the reign of Louis XIII.—On May the 21st a monument to Jules Grévy, by M. Falguère, will be inaugurated at Dôle (Jura). The former President of the Republic is represented standing, stretching his right hand towards a flag which is held out to him by a female figure symbolising France, standing below the pedestal and crowned with the Phrygian cap.—The Prefect of the Seine has commissioned M. Poussin, architect, to construct at Montesson (Seine-et-Oise) a penitentiary school intended to replace the prison for youthful criminals known as the "Petite Roquette." The works will commence shortly.—The Chamber of Commerce of Paris has opened a competition for the construction of a commercial school in Rues Condorcet and Bochar-de-Sarron.—The General Council of the Loire district has instituted a competition for the building of a Hôtel de Préfecture at St. Etienne.—The Society at Dunkerque "pour l'encouragement des lettres et des arts" is organising an art exhibition to be held at Dunkerque from July 14 to September 17.

—The General Council of the Côte d'Or district has voted the erection of a statue at Dijon to the memory of Pierre Joigneux, a French politician of some eminence, and formerly Senator for the Department.—A bronze statue of Joan of Arc is to be erected in the principal public place at Chinon; it is the work of the sculptor Roullien, and figured in the Salon des Champs Elysées last year. The pedestal will be executed from the designs and under the direction of M. Deglane, architect, and a former holder of the Prix de Rome.—The death is announced of the painter Germain Ribot, son of the more celebrated painter Théodule Ribot, who died two years ago. We also hear of the death of M. Etienne Dujardin, *né* Marie Pétiet, a painter of portraits and genre subjects which have been much remarked in the Salons from 1870 to 1890. Her husband is a painter of talent and now also a member of the Chamber of Deputies.—The Académie des Beaux-Arts has awarded the Due prize, given every five years to encourage the higher studies in architecture, to M. Émile Camut, architect, for his work on the enlargement and restoration of the thermal establishment at Mont-Dore.—In the Service d'Architecture of the Municipality of Paris four architects, MM. Ginain, Vaudremer, Train, and Varcollier, have been retired on the superannuated list, and their places are filled by MM. Calinaud, Dubernal, Durand, and Umanon.

BERLIN.—Emperor William's present to the King of Italy, on occasion of his silver wedding, is a statue representing "Italy," the body of which is of solid silver, and the ornamental work to a great extent in other precious metals and stones. The sculptor, Reinhold Begas, is responsible for the designs, and Herr G. Lind was the goldsmith.—The old houses on the "Schlossfreiheit" which have to make room for the proposed National Monument are now being pulled down.—At last the extension of the General Post Office is to be taken in hand. A large site in the Leipziger Strasse is being cleared, and the actual works will see their commencement next month.—Among the several important bridges in course of erection, the new Frederick Bridge, said to be a good example of bridge architecture. A model of the bridge has been sent to the Chicago Exhibition. Reg. Bm. Otto Stahn is the architect, and the City Engineer, Dr. Hobrecht, is responsible for the construction.—The official report on the experiments with "fire-proof" materials to which we alluded in a former

number has now been published. It consists of some forty pages of text of highly interesting reading, to which are added numerous reproductions of photographs and drawings. The editors are Chief Officer Stude, of Berlin Royal Police Fire Brigade, and "Brandinspector" Reichel, a senior officer of the same force.—We regret to announce the death of "Wirkl. Geh. Rath," Schneider, who was at the head of the Railway Department of the Prussian Ministry of Public Works. Herr Schneider, who died at the age of seventy-two, only retired from his important post some six months back. His retirement from office was considered a great loss to the country. He was one of the most highly-esteemed and popular officials in Prussia, whose name was also well known outside of his country.

SIGMARINGEN.—One of the finest works of the historical castle at Sigmaringen was destroyed by fire last week, the cause of the outbreak being negligence on the part of a workman who was fixing some wiring for the electric lighting of the block. Most of the art treasures for which the castle is famous were fortunately in the main block, which was cut off from the wing on fire by wooden doors well covered with sheet iron. The castle, which is situated on some high rocks on the banks of the Danube, has a long and interesting history. There has apparently not been a serious fire in the place since the middle of the seventeenth century. In 1885 a thorough renovation of the castle was commenced, and among the improvements suggested was the electric installation, which was to lessen risks of fire, but has not been the actual cause of one.

THE NEW EMPIRE THEATRE, NEW YORK.—The *New York World* recently gave a description of the new Empire Theatre, situate in Broadway and Fortieth-street. The seating capacity is 1,100. The theatre is to be heated "in much the same way as the new Broadway Theatre. Pipes will conduct the hot or cold air under the seats, and the supply will be regulated by the occupants of the seats. The theatre will have a perfect system of ventilation, and the scenery on the stage will be protected from fire by a patent sprinkling apparatus." The architect's name is not mentioned.

Y.M.C.A. BUILDING, SAN FRANCISCO.—The *San Francisco Chronicle* of February 20 reports that the contracts for the erection of the new building of the Young Men's Christian Association were signed on the previous day, the architect, Mr. A. Page Brown, awarding the work to Mahoney Brothers for 202,000 dols. The site of the new building is at the north-east corner of Mason and Ellis streets.

MISCELLANEOUS.

PRESENTATION TO MR. CHARLES FOWLER, F.R.I.B.A.—A dinner of the District Surveyors' Association took place at the Holborn Restaurant on the 20th inst., the special object being the presentation of an address to Mr. Charles Fowler on the occasion of his retirement from the office of District Surveyor. Mr. Fowler was for many years Honorary Secretary to the Association, and subsequently President and member of the committee, and his able and energetic services in those capacities have always been highly appreciated by his comrades. Professor T. Rogers Smith, the President, was in the chair. A large number of the District Surveyors and their friends attended, and among the invited guests were Dr. Longstaff, Chairman of the Building Act Committee of the London County Council, Mr. Blashill, Superintendent of the Architect, Professor Kerr, &c. The address, illuminated on vellum, was presented to Mr. Fowler, who made a suitable reply. The usual toasts were duly given and responded to by the President, the Vice-President (Mr. Douglas Mathews), the Hon. Secretary (Mr. B. Tabberer), Dr. Longstaff, Mr. Blashill, Prof. Kerr, Mr. H. H. Collins, Mr. Rickman, and Mr. R. Plumble. The proceedings were enlivened by music, and a very pleasant evening was passed.

ROMAIN REMAINS AT NEUSS.—According to the *Cologne Gazette*, the excavations at the ancient Roman Camp of Neuss (near Düsseldorf), which were taken in hand by the archaeologist Constantine Coenen, have been attended with surprising success. It has been found that several roads traverse the area of excavation, and the barracks of two cohorts on the thoroughfare between the *Prætorium* and the *Quæstorium*, have now been determined as well as another on the *via Principalis*, probably that of the *Prætorium* Cohort. These barracks are each about 80 metres long, every maniple having a breadth of 26 metres. A room of 34 by 5 metres was allocated to the *Centurio* (Centurion), and his ale and energetic services in those capacities have always been highly appreciated by his comrades. Professor T. Rogers Smith, the President, was in the chair. A large number of the District Surveyors and their friends attended, and among the invited guests were Dr. Longstaff, Chairman of the Building Act Committee of the London County Council, Mr. Blashill, Superintendent of the Architect, Professor Kerr, &c. The address, illuminated on vellum, was presented to Mr. Fowler, who made a suitable reply. The usual toasts were duly given and responded to by the President, the Vice-President (Mr. Douglas Mathews), the Hon. Secretary (Mr. B. Tabberer), Dr. Longstaff, Mr. Blashill, Prof. Kerr, Mr. H. H. Collins, Mr. Rickman, and Mr. R. Plumble. The proceedings were enlivened by music, and a very pleasant evening was passed.

the priests. A bath in the temple stood in direct connexion with an aqueduct from the Roman Canal, the course of which has been known for some time back. The supply of drinking water for the camp was naturally from the same source.

THE JUNIOR ENGINEERING SOCIETY.—At the last meeting of this Society, held at the Westminster Palace Hotel, Mr. Sidney Boulding, M. Inst. Mech. E., in the chair, a paper on "The Sanitary Engineering of Dwellings" was read by Mr. R. W. Newman, Student Inst. C.E., Mem. San. Inst. The author first showed how indispensable to satisfactory results efficient ventilation and disconnection were, and proceeded to deal with the appliances employed in their attainment. These included various forms of traps, disconnecting chambers, sink and bath wastes, and overflow and safe pipes. The connexion of branch and main drains, the method of laying pipes, and the reasons for the absolute necessity of maintaining the invert true in line and gradient were next considered. On the subject of the pan and hopper, valve, construction and working of the pan and hopper, valve, wash-out, flush-down, and long hopper closets, were passed in review. The characteristics of a good closet apparatus were:—Simplicity, power of self-cleansing, having no points where deposit could settle, when flushed out the whole surface to be scoured, and the material to be made of smooth and incorrodible material. In regard to the question of water supply, the necessity of placing cisterns in light and airy positions was mentioned, and their frequent cleansing insisted upon, reference being made to the Public Health (London) Act, 1892, which provides that "every local authority shall (not more) make provision for the proper cleansing of cisterns, and the subject of the paper was concluded with a brief summary of the most common defects met with in the drainage of houses. The paper was illustrated by numerous diagrams, and a collection of models of various sanitary engineering appliances were exhibited, lent by Messrs. Doulton & Co.

COLLAPSE OF BUILDINGS IN BIRMINGHAM.—On the 18th inst., the roof of a building, known as the Argyle Dancing Rooms, Loveday-street, Birmingham, collapsed, bringing down also five small houses in an adjoining court, and burying their occupants under a quantity of debris. The fire-brigade and police extricated three adults and four children, one of whom. They were all sufficiently injured to be admitted to the hospital.

THE FIRE IN DOCTOR'S COMMONS.—The fire at Messrs. Judd's premises, which broke out early on Good Friday morning, afforded a proof of the utility of fireproof floors. The ground floor of the main warehouse was constructed by Messrs. Homan & Rodgers, and not merely resisted the intense heat caused by the fire above, but below, but remained intact, sustaining the debris of the four upper floors, printing machinery, walls, &c., piled up to a height of some 30 ft.

BRITISH MINING STATISTICS FOR 1892.—The mining statistics of Great Britain for 1892, contained in the "Summaries of the Statistical Portion of the Reports of Her Majesty's Inspectors of Mines," have just been issued. We learn from them that the output of minerals last year reached a total of 191,954,908 tons, against 197,693,592 tons in 1891, which shows a decrease for 1892 of 5,738,684 tons, or 2.9 per cent. Of this output, 181,786,871 tons was coal, against 185,479,126 tons in 1891, a decrease of 3,692,255 tons, or nearly 2 per cent. The production of ironstone was only 5,644,486 tons, against 7,220,120 tons in the preceding year, which shows that it fell off by 1,575,634 tons, or nearly 22 per cent. The total number of persons employed in and about the mines, inclusive of those at work on private branch railways and tramways, and of those engaged in washing and coking coal on premises adjacent to or belonging to the mines, was 721,803, against 707,411 in 1891, which exhibits a decrease of 14,392, or 2 per cent. Exclusive of those employed in the two latter industries, the number of persons employed in mining was 702,466, which, compared with 1891, when 687,876 persons were employed, is an increase of 14,590, or 2.1 per cent. The total number of fatal accidents was 862, and of deaths 1,034, whereas there was a decrease of 99 in the former and of 4 in the latter category compared with 1891. There was one death for every 679 persons employed, against 668 in 1891. There was one death to every 195,473 tons of minerals raised, against 191,934 tons in 1891, and one fatal accident to 235,817 tons, against 217,007 tons in the preceding year. The latter ratio was thus more favourable, and the former more unfavourable, than in 1891.

BRITISH OUTPUT OF OPEN-HEARTH STEEL.—The statistics just issued by the British Iron Trade Association show that the quantity of open-hearth steel ingots produced in Great Britain last year amounted to 1,416,830 tons, against 1,514,538 tons in 1891. The decrease last year was consequently 97,708 tons, or 6.4 per cent. There was an almost general decline of production in all the districts making open-hearth steel, the only exception being Lancashire, where there was an increase of output. Of manufactured products in open-hearth steel, the largest quantity consisted of plates and angles, 77,597 tons being produced. The production of open-hearth steel manufactures included 231,510

tons of bars (almost wholly tinplate bars), tees, and forgings, 160,561 tons of blooms and billets, 79,264 tons of slabs, 24,075 tons of rails, and smaller quantities of castings, tyres and axles, sleepers, &c. Scotland produced the largest tonnage of open-hearth steel manufactures (417,016 tons), being followed by the north-east coast, Wales, Sheffield, and Leeds, Lancashire and Cumberland, and Staffordshire, which latter produced only 57,308 tons.

CAPITAL AND LABOUR.

STONEMASONS' STRIKE, CARDIFF.—On Monday evening a meeting of the Cardiff Master Builders' Association was held at the Angel Hotel, when the dispute with the stonemasons, who are still out on strike, was discussed, with the result that the hon. secretary (Mr. W. M. Shepherd) was instructed to write to Mr. F. G. Edmonds, of the Operative Masons' Society, informing him that the wages and code of rules which the master builders are prepared to offer are those now governing the carpenters and joiners, bricklayers, and plasterers, with the following additional rule:—"That no worked stone be brought into the town for the purpose of being used on contract work, except landings, steps, plain and chanted coping, and Yorkshire paving; also granite and marble." This leaves the position practically unchanged. —*Western Mail.*

THE BUILDING TRADE AT PONTYPRIDD.—A conference of representatives of employers and workmen engaged in the building trade was held on the 22nd inst. at the "New Inn" Hotel, Pontypridd, to consider the notices served by employers demanding a reduction in Wales of 1d. per hour on and after May 1 next. After consultation a compromise was effected by splitting the difference between the parties, so that from the date mentioned the wages will be reduced from 9d. to 8½d. per hour.

MEETINGS.

FRIDAY, APRIL 28.

Architectural Association.—Mr. P. Gordon Smith on "Hygiene in its Application to the Arrangement of Buildings." 7.30 p.m.
Association of Civil Engineers (Students' Meeting).—Mr. H. W. Handcock on "Fire-Risks of Electric Lighting." 7.30 p.m.

SATURDAY, APRIL 29.

Architectural Association.—Visit to the additions to the *Morning Post* premises, Wellington-street, Strand, by permission of the architect, Mr. H. O. Gresswell. 3 p.m.
Incorporated Association of Municipal and County Engineers.—Midland Counties District Meeting, to be held at Dudley.

Junior Engineering Society.—Visit to the Lea Bridge Pumping Station of the East London Water Works Company. 3 p.m.
St. Paul's Ecclesiastical Society.—Visit to the Churches of St. Philip, Stepney, at 3.30 p.m., and St. Augustine, Stepney, at 4.30 p.m.

MONDAY, MAY 1.

Royal Institute of British Architects.—Annual General Meeting, for Members only, to receive the Annual Report of the Council. 8 p.m.
Society of Arts (Lectures).—Mr. Lewis F. Day on "Some Masters of Ornament."—IV. 8 p.m.
Society of Engineers.—Mr. Edmund Burrows on "Blake's Bridge, Reading." 7.30 p.m.
Architectural Association.—Annual General Meeting: Closing Address by the President, Mr. T. Harnett Harrison. 6.30 p.m.

TUESDAY, MAY 2.

Institution of Civil Engineers.—Mr. M. B. Jamieson on Mining and Ore-treatment at Broken Hill, New South Wales. 8 p.m.
Society of Arts (Foreign and Colonial Section).—Mr. E. Delmar Morgan on "Russian Industrial Art." 8 p.m.
Society of Biblical Archaeology.—8 p.m.
Glasgow Architectural Association.—Mr. J. A. Macara on "Monuments and Memorials of the Dead." 8 p.m.

WEDNESDAY, MAY 3.

Institute of Builders.—Annual Dinner, to be held at the "Grand Hotel," Charing Cross. 6 p.m.
Society of Arts.—Professor Silvanus P. Thompson on "Practical Sociological Problems at Chicago." 8 p.m.
Society of Biblical Archaeology.—4.30 p.m.
Institution of Civil Engineers of Ireland (Dublin).—Meeting in the New Hall, 35, Dawson-street.

THURSDAY, MAY 4.

Institution of Civil Engineers.—The first James Forrest lecture will be delivered by Dr. William Anderson, entitled "The Interdependence of Abstract Science and Engineering." 8 p.m.
Society of Antiquaries.—8.30 p.m.

FRIDAY, MAY 5.

Junior Engineering Society.—Mr. A. H. Bromley on "Gold Mining Machinery." 8 p.m.

SATURDAY, MAY 6.

Edinburgh Architectural Association.—Visits to Numaw.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

5,694.—**FIRE-PLACES.** F. F. Bond.—This invention relates to improvements in open fire-places, stoves, and grates; its object being to obtain a greater amount of heat, less consumption of fuel, and the more perfect distribution of the heat throughout the room. This is effected by making, in open fire-places or stoves, the sides and backs of tiles, glazed bricks, or any other non-conducting material, preferably having a polished surface. The tiles, or other material, are arranged at a suitable angle to radiate the

heat into the room. The specification also provides for a detached fire-box, having openings on all its sides for the purpose of cleanliness.

7,583.—**VENTILATORS.** R. Muschel.—This invention has reference to improvements in the construction of ventilators of the hooded class, principally intended for use on board ship, but applicable also to ventilators for general purposes, and to chimney cowls, and has for its object increased efficiency by improving the draught through the greater velocity given to the air currents. It consists, principally, in fitting the ventilators with short conoidal rings, or nozzles, around the ordinary hoods, either inside or outside their mouths; also with rain or spray-collecting and discharging gutters, and drop-catches or books.

5,404.—**FLUSHING SYPHONS.** J. Merrill.—This invention is for improvements in automatic flushing syphons, and consists in constructing in the long leg a chamber containing a tipping bucket in combination with a trapped outlet.

23,490.—**METALLIC CEILINGS.** L. L. Sagedorff.—The primary object of this invention is to construct or form the corners of metallic ceiling plates (having raised marginal borders or mouldings) in such a manner as to obviate the necessity of cutting away the metal at the said corners as now commonly done. The improved ceiling plates have a continuous raised marginal border or moulding, these mouldings extending beyond their point of intersection forming projecting portions at the corners of the plate. There is also preferably an inner continuous raised bead or corrugation near the marginal raised portion, to add strength and rigidity to the plate to prevent buckling of the latter. In placing the plates in position on the ceiling the projecting portions will overlap the two marginal beads on adjacent plates the corners thus formed being covered with rosettes, each of which is provided with arms of a circular outline in cross-section, the latter fitting over the mouldings or beads, and overlapping the two projections on the top plate. The rosettes are retained in place by a single nail driven through each of them, and through the overlapped portions of the mouldings at their intersecting points.

NEW APPLICATIONS FOR LETTERS PATENT.

April 10.—7,283. F. Hess, Composition for Glueing Purposes.—7,306. G. Body, Metallic Double Rebrated and Tongued Sash Stile for the Pulley and Pivot Principle.—7,309. R. Cockcroft, Fastenings whereby Window-cords may be secured to the Stiles of Window-sashes.—7,312. T. Hall, Masons' and Builders' Scaffolding.—7,313. J. Mercer, Machine for Punching Pinholes in Hand-made Tiles.—7,315. E. Penn, Window-fasteners.—7,335. J. Korndorfer, Nail-driving Apparatus.

April 11.—3,997. C. Delaunay, Lever Window-fastener.—7,403. C. Loetscher, Mortising Machines.—7,425. F. Willis, Construction of Fireproof Floors.

April 12.—7,447. J. Sclairs, Applying Cement, &c., to Surfaces.—7,450. T. Whitaker, Brick Presses.—7,462. P. Spencer, Centres for Setting out Work.—7,473. J. Shaw, Ventilators.—7,475. F. F. Hinchmough, Sash Pulley.—7,484. J. Russell, Cooking-stoves or Ranges.—7,499. W. Sykes, Compositions suitable for Paving, Building, &c.—7,504. R. Astley, Construction of Fireproof Floors.—7,506. W. Gibson, Fireplaces.

April 13.—7,553. W. Parnall, Shop Fittings.—7,567. H. Jukes, Water-closet Bowls.

April 14.—7,580. W. Johnson, Machinery for Manufacturing and Pressing Bricks.—7,621. H. Worral, Window-fastener.—7,627. W. Monro, Bolt for Doors, Cupboards, &c.—7,635. J. Schult, Roofing.

PROVISIONAL SPECIFICATIONS ACCEPTED.

2,974. D. Taylor, Ranges and Grates.—3,551. E. Burt, Slide-rule for Cubing Timber, &c.—3,566. W. Gould, Locks and Latches for Doors.—3,589. J. Duckett & Son, Limited, and J. Ballcock, Smoke Consuming Apparatus.—3,594. Dixon, Chimney or Ventilating Shaft Tools.—4,478. R. Taylor, Drying Clay, &c.—4,479. W. Chapman, Smoke Cooking Stoves.—4,479. H. Houghton, Attaching Bells to Screw down Water Cocks to Lead Pipes.—4,512. B. Coulbourn and others, Sanitary Pipes.—5,193. E. Smith, Wood Cutting Tools.—5,437. F. Denyer, Manhole Covers.—5,466. J. F. & W. James, Drain Traps, &c.—5,562. M. Syer, Syphon Water-waste Preventers.—5,580. C. Darrah, Syphon Flushing-out Cistern for Water-closets.—5,581. G. Meccenno and G. Lenturi, Artificial Marbles.—5,597. W. Peyton, Stone or Fire-grate.—6,638. J. Fry, Wood Screws.—6,659. M. Clark, Stoves, Ranges, and other Fire-places.—6,713. J. Nicol, Window-sashes.—6,177. T. Pearson, Galvanised Corrugated Sheets for Roofing.—6,314. C. Brand and others, Scorla or Slag Blocks for Paving, Masonry, &c.—6,429. D. and J. Keith, Fittings for Windows.—6,547. H. Hansen and W. Walker, Ventilators.—6,559. D. Donald and J. Sime, Ventilators.—6,661. Craven, Durnhill & Co., and F. Smith, Tiles.—6,761. W. Anstey, Gas Brackets.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

7,226. C. Hobo and E. Lagrange, Sash Locks.—8,799. B. Powell, Boilers for Heating Public Buildings and Green-houses.—9,281. J. McGlashan, Ornamentation and Decoration of Walls, Ceilings, &c.—10,341. H. Sankey and others, Decorating Walls.—10,653. J. Day, Drains and other Socket-pieces to facilitate jointing.—11,022. T. Winter, Cowl.—11,215. F. Shuffrey, Window-sash Fastener.—395. G. Ayling, Step Ladders.—1,422. T. Avill and others, Miter Cramp.—2,944. W. Bate, Syphon Discharge-pipe.—2,945. W. Bate, Floats for Ballcocks.—5,165. G. Hardingham, Syphon Automatic Flushing Apparatus.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

April 12.—By W. J. Collman (at Islington): 101, Church-st., Islington, u.t. 45 yrs, g.r. 54, r. 434, 400l.; 175, Church-st., u.t. 47 yrs, g.r. 61, r. 604, 385l.; 115, Bemerton-st., u.t. 51 yrs, g.r. 61, r. 461, 165l.; 23, Valentine-st., Hackney, u.t. 52 yrs, g.r. 58, r. 364, 254l.; "Doors Warehouse and Bleaching Works," King Henry's Walk, Ball's Pond, f. 2,100l.
April 17.—By Wagslaw & Warran: 30 and 31, St. James's Walk, Clerkenwell, u.t. 13 yrs, g.r. 54, r. 601, 385l.; 1 g.r. of 100, William-st., Islington, u.t. 50 yrs, g.r. 61, r. 700l.—By J. Hubbard & Sons: 9 and 11, Balcony-st., Hackney, f. 370l.; 28 and 30, Arkim-st., Battersea, u.t. 64 yrs, g.r. 51, 345l.—By Carey & Lewis: 5, 6, and 7, Elm Bank, Crouch End, u.t. 88 yrs, g.r. 191, 125, 975l.; 10 to 13, Elm Bank, u.t. 88 yrs, g.r. 254, 185, 1,305l.; 1, Bergholm-cres., Stamford Hill, u.t. 92 yrs, g.r. 74, 705l.

T. B. M. R.			TIMBER (continued).		
Greenheart, 8 ft.	ton	6/10	Walnut, Italian ..	0/31	3/4
Teak, E. I., 8 ft.	ton	6/10	METALS.		
Yankee, U. S. Co.	2 1/2	3/0	Iron—Pig, in Scot-	2/8	0/0
Do, 10 ft.	2 1/2	3/0	land ..	2/8	0/0
Birch, do.	3/10	4/10	Do, 10 ft.	5/7 1/2	6/0
Elm, do.	3/10	4/10	London ..	5/7 1/2	6/0
Oak, do.	3/10	4/10	Do, 10 ft.	5/7 1/2	6/0
Do, 12 ft.	3/10	5/50	Do, 10 ft.	5/7 1/2	6/0
Pine, Canada, red	2 1/2	3/0	Do, Staffordshire,	6/0	6/0
Do, 10 ft.	2 1/2	3/0	COFFER—British,	7/10	4/0
Do, 12 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 14 ft.	2 1/2	3/0	Best selected ..	4/10	4/0
Do, 16 ft.	2 1/2	3/0	Sheet, strong ..	5/6	5/0
Do, 18 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 20 ft.	2 1/2	3/0	YELLOWMETALB.	4/10	4/0
Do, 22 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 24 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 26 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 28 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 30 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 32 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 34 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 36 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 38 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 40 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 42 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 44 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 46 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 48 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 50 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 52 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 54 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 56 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 58 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 60 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 62 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 64 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 66 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 68 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 70 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 72 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 74 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 76 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 78 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 80 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 82 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
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Do, 88 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
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Do, 92 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 94 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 96 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 98 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 100 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 102 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 104 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
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Do, 116 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 118 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 120 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 122 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 124 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
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Do, 140 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 142 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
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Do, 156 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 158 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 160 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 162 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 164 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 166 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 168 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
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Do, 178 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 180 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 182 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 184 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 186 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 188 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 190 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 192 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 194 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 196 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 198 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 200 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 202 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 204 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 206 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 208 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 210 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 212 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 214 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 216 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 218 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 220 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 222 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 224 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 226 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 228 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 230 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 232 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 234 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 236 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 238 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 240 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 242 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 244 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 246 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 248 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 250 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 252 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 254 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 256 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 258 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 260 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 262 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 264 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 266 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 268 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 270 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 272 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 274 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 276 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 278 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 280 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 282 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 284 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 286 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 288 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 290 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 292 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 294 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 296 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 298 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 300 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 302 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 304 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 306 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 308 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 310 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 312 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 314 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 316 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 318 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 320 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 322 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 324 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 326 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 328 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 330 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 332 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 334 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 336 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 338 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 340 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 342 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 344 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 346 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 348 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 350 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 352 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 354 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 356 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 358 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 360 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 362 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 364 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 366 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0
Do, 368 ft.	2 1/2	3/0	Do, 10 ft.	4/10	4/0</

ILLUSTRATIONS.

Tower and Spire of St. Mary-the-Virgin, Oxford: Proposed Re-construction of the Pinnacles.—Mr. T. G. Jackson, A.R.A., Architect...*Double-Page Ink-Photo.*
 Cathedrals of England and Wales: XXX., Carlisle.—Drawn by Mr. E. Ridsdale Tate...*Double-Page Ink-Photo.*
 Plan of Carlisle Cathedral.—Drawn by Mr. F. D. Bedford, A.R.I.B.A.*Double-Page Photo-Litho.*
 Carlisle Cathedral: View in Choir.—Drawn by Mr. F. D. Bedford*Double-Page Ink-Photo.*

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 View of Nave, Carlisle Cathedral.—Drawn by Mr. F. D. Bedford " 347
 Screen, Carlisle Cathedral.—Drawn by Mr. F. D. Bedford PAGE 340
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The Royal Academy Exhibition.



LET no one persuade you that it is not an interesting Academy," was the greeting of a distinguished visitor to a lady on Private View day; a sentiment in which we entirely concur, and which is a refreshing contrast to the *blasé* tone of depreciation of everything which is so commonly prevalent on Private View days. It is true that some leading Academicians are not at their best this year; in one or two cases, it is understood, because they have not been able to complete their most important works in hand in time for the opening: and it is true, of course, that there are a large number of pictures which, with whatever average merit of execution, are totally uninteresting and commonplace. This however is always the case, for the simple reason that to a large number of exhibitors art is principally a means of making a living, not an aspiration after any ideal, and their appeal is made to the commonplace ideas of the majority of the public—how commonplace anyone knows who listens to the remarks about the pictures made by the mass of the sightseers—and we doubt if any attempt to alter the standard of the exhibition, to admit only pictures which have an intellectual interest, would be advisable. The line would be difficult to draw in any case; and after all, the Academy Exhibition may be regarded as the representation of the existing condition of English art, its tastes and its standards, and it is better that we should have such an all-round representation once a year; those who do not care for the commonplace work can ignore it, and devote their attention to what is worth their study. The great complaint which we do make, and have repeatedly made, about the Royal Academy Exhibitions, is in regard to the immense preponderance given to painting, and the entire ignoring of the art of design as distinguished from that of pictorial representation. Architecture can only be said to be nominally represented in the small room devoted mainly to small pictures of buildings, which have little interest as pictures and do not illustrate the method of architectural

design; and decorative and handicraft art are practically ignored altogether. This is perhaps in part the fault of the public, who crowd to see pictures and are indifferent to design; if we can ever get up a public demand for the illustration of design at the Academy no doubt it would be met.

But we call it an interesting Academy because there are a good many works, a larger proportion than usual, which have a decided individual interest in regard to power of execution and a certain novelty of treatment or of aim. Some of the works which most especially exhibit these qualities do not belong to what are generally considered the highest and most ideal plane of painting. Three occur to us particularly at the moment as paintings which will not be readily forgotten; Mr. Nettleship's drinking tiger (17), Mr. Davis's landscape called "Elder-bush" (103), and Mr. Somerscales' remarkable sea-painting, "Corvette shortening sail to pick up a shipwrecked crew" (434). The tiger is one of the most remarkable portrayals of grand brute force that we have seen in painting; it is in itself worth a visit to the gallery; and is perhaps the best thing Mr. Nettleship has done, and is none the worse because he has been content with simply painting the animal and has avoided the temptation to sensational incident or to giving a semi-human interest of sentiment to brute life, which has sometimes tempted him to be more theatrical than truthful. Mr. Davis's exquisite little landscape stands (whether intentionally or not) as a kind of challenge to the view of landscape-painting as mainly the art of conveying the impression or sentiment of a scene in the language of painting, without realisation of details. The subject is only a country lane winding away into the distance, with an elder-bush and a hedge full of wild flowers in the foreground, but it is painted with an absolute truth of detail and of sunlight and shadow which almost cheats the eye, and which is effected without falling into realistic hardness and without losing the sentiment of the scene; in fact the picture affects us almost as if we saw the actual scene. Mr. Somerscales is a painter who has brought forward a new aspect and handling of that inexhaustible subject for painters, the open sea, the difficulties of which are such that each of our few great and successful sea-painters seems

to have only mastered one or two aspects of sea. Mr. Somerscales shows the open Atlantic on one of those bright, breezy days when the water is dark under a nearly cloudless sky; there is not wind enough to give crests to the waves; the unquiet tumble of the expanse of dark water is admirably conveyed, and the dull gleam in the hollows of the waves is rendered in a way we have never seen it before in painting. The corvette, with her spread of canvas and her light-coloured hull, stands out brilliantly in the clear air; the cast-away boat near the foreground serves to give scale to the waves; a little more attention to the figures of the men in her might have been desired. It is a satisfaction to us to note that it was an eminent English architect who was among the first to recognise the striking merits of this work by a new painter, and who has secured it as a possession.

To take things in more regular order, and consider the few works which rise above anecdote and incident and deal with ideal design, the President sends no less than five, besides his "Rizpah," which come under this category, of which the most effective in a pictorial point of view is the head entitled "Atalanta" (112), a splendid piece of colour and a fine head; the most interesting is the classic archery lesson, "Hit" (105), an admirably composed group of two nude figures, a man and a boy. "Farewell" (14), a figure under a classic portico turning the head after someone unseen, aims at a sentiment which unfortunately does not impress one as very genuine, and the sky is not at all happy. "Corinna" (224) we cannot admire. "The Frigidarium" (295) is a pleasing decorative study of a woman in semi-transparent red mantle standing above the bath and looking into the water, an architectural background—just, shows the sky above it. Sir F. Leighton's chief contribution, "Rizpah" (159) will be remembered for the characteristic and determined head of Rizpah, who, with a sickle in her hand, stands on guard against the beasts and birds; but the subject, with the partially draped, dead bodies hung in the foreground, is not a happy one for painting, and the picture will not be a favourite. Mr. Tadema's chief work, "Comparisons" (219), shows even less than his usual incident, and even more than usual perfection of execution; the two fine-looking Roman ladies comparing readings in two

books with ivory covers, the marble griffins which carry the table, the veiled light through the curtained window, with the outlines of flowers seen behind the curtain, the brilliant group of flowers in the bit of open window in one corner, and the blue sky and bit of white temple seen beyond—all these are perfect. The other work "In my studio" (113) is a beautifully painted small interior, a perfect study of light and colour in an interior, and equal to the finest work of this class that painting has ever produced. This is not in one sense imaginative work, but it is work which represents emphatically "L'Art pour l'Art," of which there is never too much in an English exhibition. Mr. Orchardson's "Music, When Soft Voices Die" (19), may come under the same heading; it seems as if painted mainly for the sake of the interesting old-fashioned form of upright piano, but the figure is a pretty one, and the picture a harmonious whole. Among more distinctly ideal paintings may be classed the two by Sir John Millais which form pendants in Gallery III.; "Pensive" and "Merry" (204, 217), the first a brunette girl with a pansy ("There's pansies, that's for thoughts"—Ophelia), the second a rosy-cheeked little thing with a canary; they are fine specimens of a class of work in which Sir J. Millais is the artistic descendant of or successor to Reynolds. Mr. Arthur Hughes's picture, "The Door of Mercy" (828), represents a penitent received into heaven by a beautiful benignant angel who leans over her as she kneels, other angels filling up the background, with faces rather hard and set; the foreground group is fine, but the work is not one of its author's best. Mr. J. W. Waterhouse's "Hamadryad" (98) is both a fine pictorial design and a poetic conception of the tree-goddess, standing within and seeming half-incorporated with the hollow trunk of a tree, while a little fawn plays to her outside; but surely she is very long in the leg. His "Belle Dame sans Merci" (149) does not rise to the Gothic power of the legend. Mrs. Corbet's "Goat-power" (27) is a noteworthy work, one of those figures which are more than a mere figure and seem to suggest a poem to the eye; it is a fine piece of colour too. Mr. Poynter sends a very elaborately worked out classic interior with a figure, "Chloe" (199),

"Dulces docta modos et citharæ sciens"—

a fine study of classic detail and ornamentation, as well as a finely-designed figure, but archaeologically it does not all seem quite in keeping; the lyre, and the bit of marble carving under the seat, are decidedly Greek, and the filling of the panels under the window is more of Roman or even Pompeian style. The figure of a woman by Mr. Harcourt (321), with no title but a quotation from Keats, is a thoughtful study and an unusual piece of colour. Something may be said for Mr. Bunny's oddly-conceived fancy, "Le Passant" (444)—it is not commonplace at all events. Mr. F. Hall's "Pixy-led" (868) is a pretty fancy and a clever study of effect; in a very different sense the same may be said of Mr. Clausen's "Evening Song" (923), a rustic girl lying in a cornfield in the full light of the evening sun. Mr. Hacker sends a very clever painting under the title "Circe" (928), with Ulysses and the hogs, but as an illustration of the Odyssey it is ridiculous; Circe was a goddess, though not a very respectable one: she had dignity to keep up, she was not a person to be found squatting naked on the floor like a slave girl. If painters go for subjects to the great Greek romances, they should at least try to idealise and not to vulgarise them. Mr. Hacker's other work, "The Sleep of the Gods" (375), is deficient in the same sense; it is merely a study of nude figures asleep on the grass; there is nothing in it to suggest the idea that "Pan is dead"; it is a prosaic study with an ideal title appended to it; that is all. Mr. Watts's charming little cupid, "Promises" (148), is an ideal work of another stamp, and moreover a beautiful piece of colour. Of his

"Endymion" (218), we would rather say nothing.

Among what may be classed as historical pictures is the principal work of Sir J. Millais, the child saint, Theresa (42), with her little brother, going out to seek martyrdom. The face of the girl is very beautiful, and accords with the spirit of the story; the contrast afforded by the little boy, more occupied with his orange than with martyrdom, is true to nature. The very decisive painting of a rather peculiar costume draws off attention from what is really the central motive of the picture, Theresa's expression; but the work, though not attractive at first sight, is one which we believe will gain as it is studied. Mr. John Collier's large work, "A glass of wine with Cæsar Borgia" (426), is a remarkably able one in execution, and he has given striking portraits of Alexander VI., and of Lucrezia Borgia; we should question whether, judging by some engravings from contemporary portraits, he has done full justice to the intellectual *finesse* of Cæsar Borgia's countenance. The telling of the incident is over-emphasised, as things are on the stage, to make sure that every one sees what is meant; no man in his senses would accept a glass of wine from that trio. Mr. Croft's "Charge of the Light Dragoons at Moodkee" (7) is merely a battle picture, with no central interest. Mr. Seymour Lucas has illustrated carefully and thoughtfully the account of Philip II.'s reception of the news of the Armada disaster, and the picture is an impressive one, though we doubt if Philip's feelings took so religious a turn as here represented. Mr. Dicksee's "Funeral of a Viking" (131) occupies an important position, but we cannot feel interested in it, nor in Mr. Riviere's large painting of "The King's Libation" (87), which is chiefly an opportunity for painting a heap of dead lions. Mr. A. C. Gow paints "The Duke in Spain" (193) with his staff, making inquiries of a native ("local information is the safeguard of the general"); we should question whether even staff horses, in full campaign, are kept as well-groomed as in Hyde Park, but we may thank Mr. Gow for reminding us, by this and another work, "A Spanish Highway, 1812" (767) that we were once a great military power. Mrs. Dicksee, in her picture of little Handel practising in the garret (279), has been fortunate enough to get hold of an incident which will interest everyone; as also Mr. Hillingford, whose large picture of that famous ball in the Rue de la Blanchisserie at Brussels (469) has the merit that one can see what it is at once without the catalogue, and is a spirited work of its class. Far superior to this, however, is Mr. Blake Wigram's "1793" (566), representing the brutal alternative offered during the Revolution in La Vendée to the Royalist women, to let their children perish with them, or give them up to the care of the Republicans. It may not be a great picture in a purely artistic sense, but the artist has realised the scene to an extent perhaps almost too painful.

From historical pictures we come to what we may call anecdote and incident pictures, of which, however, there are two very distinct varieties. There are the pictures which are painted mainly to tell a story or illustrate character, and those which are painted mainly as studies of artistic effect. In modern criticism it is the fashion to regard these latter as on a far higher level than what used to be called *genre* pictures; a conclusion we doubt the reasonableness of. There is surely more of intellectual interest in expressing character in a face and figure than in merely using it as the medium for a study of colour. Mr. Melton Fisher's "Music" (328) is an exceedingly clever study of the effect of figures seen on a terrace between artificial light and summer twilight, but the figures are of no interest, and it is a great deal of canvas to cover with such an experiment. So with Mr. La Thangue's study of three figures by lamplight, "Punch" (543), of little interest save as an effect. Mr. Cheval-

lier Taylor's "A Summer Dinner Party" (519), a very cleverly painted picture of the same class, is on a more reasonable scale, and there is more of individual character in the figures, which are obviously portraits. Mr. Wyllie's lifeboat picture (47) is spirited, though the relation between the action of the crowd of people pulling *up* the beach on the rope and the evident intended launch of the boat *down* the beach is not made intelligible, and in his desire to get the distressed ship into the picture the artist has got her so near that they might almost have slung the people on shore without the aid of the boat. Mr. Dendy Sadler is quite at his best in "The New Will—Everything to my Wife Absolutely" (83), which is an admirable study of character as well as a very careful piece of painting; "A Meeting of Creditors" (588) by the same hand is also very carefully painted, but it represents a sort of humour which has been worn rather threadbare. Mr. Marcus Stone's "A Honey-moon" (158) is as pretty as his lover's scenes usually are, and as superficial in its sentiment and interest. Mr. Joseph Clark's study of children the "Sweets of Life" (232) is another clever commonplace, as well as his "Unwelcome Guest" (473), which is better, but nothing like equal to the really delicate humour of some of his former productions. "Glass-blowing" (261), by Mr. Colley, is a good work of its class. In "The Lighthouse" (330), Mr. Stanhope Forbes devotes a very large canvas to a picture of a harbour-boat sculled through the sluggish green water, with the pier and a hill as a background; a very able piece of painting, but who cares for such a subject on such a scale? There is really nothing in it except to show how cleverly the artist can paint a dinghy and two men life-size. In "The Interval" (492) and "The Announcement" (605) which evidently belong to each other, though separated on the walls, Mr. J. H. F. Bacon has made a mark by painting with much force and realism two interiors, in the first of which a singularly vulgar type of middle-class woman apparently does the part of affectionate mother-in-law to the girl in the window and her child, while in the second the younger woman appears in deep mourning and the death of the son is announced to the old mother seated by the fire; so we read it. The painting of this second work is admirable in the management of artificial light and in all details, and the author has made a creditable effort at genuine pathos, which might have been more successful had his old woman been less disagreeable in style. Mr. Hall's "Homeward" (518) is a fine gloomy idyll. In "Evening" (863) Mr. Lorimer has shown how to treat the incident of a party of children round a table, and the effect of artificial light, without verging into commonplace; for the large number of children of nearly the same age he ingeniously accounts by the Indian nurse; it is a party where children from India are grouped with the home family.

In portraits the Academy may be said to be strong in the double sense of not having so many as there sometimes are, and including some very fine ones among those. Sir J. Millais' "Mr. John Hare" (18) is admirable. Mr. Sargent, in his portrait of "Lady Agnew" (30), has fortunately shown for once that he can give attractiveness and charm to a lady's portrait without losing the force and character which his often gratuitously eccentric portraits always display. In the same room is a most dignified portrait of a lady by Mr. Seymour Lucas (46), rather recalling Gainsborough in its feeling, and in the treatment of the landscape. Mr. Herkomer's portrait of the "Duke of Devonshire" (130), is a fine one, rather curious in the tone of the face; and we may class among portraits Mr. Kennington's large painting (rather on *Salon* than Academy scale), called "The Queen of Love" (132), of a lady in black seated on a lion-skin, the head of which grins by her side. Mr.

Oulless's portrait of "Mr. G. H. Pember" (154), is remarkable for breadth of execution, and a fine manly down-rightness of style; Mr. Shannon's "Mrs. Arthur and Her Son" (163) is a beautifully composed group, in every sense a picture as well as a portrait. Mr. Tadema has painted a half-length of Herr Joachim; Mr. Fildes's portrait of a lady (185) in Gallery III. we much prefer to the rather hard and staring portrait (247) in Gallery IV. Other noticeable examples are Mr. Seymour Lucas's portrait of an elderly lady (468) in Gallery VI.; Mr. Oulless's "Sir Charles Tennant," admirable and very characteristic both in colour and expression; Mr. Carter's "Miss Butler" (533), a funny little child on a white-egg stool amid artistically arranged draperies; Mr. Gibbs's "Meta: a Portrait" (538), a very interesting and expressive work; Mr. Kennington's "Mrs. Tennyson d'Eyncourt" (883), and Mr. Herkomer's "Sir Algernon E. West" (895), a model of simple and unaffected portraiture. It is perhaps among portrait groups that we should place Mr. Solomon's large dinner-table picture, "Your Health!" (892), at least that the figures are all we believe careful portraits is the only possible excuse for covering so large a canvas with such a subject. The portrait (a very good one) of the engineer of the Forth Bridge is conspicuous in the picture.

In landscape this year's exhibition is strong. Mr. Davis exhibits, besides the beautiful little work of which we have already spoken, "An Orchard in Picardy" (205), in which the same qualities are found on a larger scale, though not perhaps in such perfection, and a larger work, "Loch Maree" (537), as well as one or two smaller ones, in which landscape and cattle are combined, which will possibly be more generally attractive, though not equal in thoroughness of work to the two previously named. Mr. David Murray's two landscapes in Gallery I. (11 and 75), are rather disappointing; "Meadow Sweets" (11), seems too like a reversion to a system of concocting landscape, of a pleasing and facile type, which is inferior to some of his conscientious and original work of former years. On the other hand his large landscape, "Hampshire" (589), though having the air of a composed work rather than a real scene, is quite true to the general character of south Hampshire landscape, and is a grand and monumental work which must add to his reputation. Mr. Leader, in his principal work, "By Mead and Stream" (499), is at his best, and though he has not got rid entirely of that artificial hardness and glitter which is the weak point of his style, nevertheless fascinates us by a remarkable realistic truthfulness of effect in the representation of meadow scenery under bright summer light. Mr. Hook's one work (211) exhibits his usual quality and style, not perhaps quite at his best. Mr. G. Foster's "A Summer Pageant" (322) is a remarkable study of an unusual effect of light and colour on a sea-coast scene, which is one of the most original works of the year, and Mr. Corbet in his "Evening" (336), gives a fine effect of evening light on cornfields, treated in a broad and grand manner. Mr. Adrian Stokes's contribution is a twilight scene "On a Cornish cliff" (480), not quite equal to one or two of his works of previous years, but exhibiting the poetry of sentiment and breadth of treatment which always characterise his work. Among other works to be specially noted are Mr. Nowell's "Approach of Night" (114), a forest scene half pervaded by evening mist, which shows a good deal of originality of treatment; Mr. C. W. Wyllie's "Summer Flowers" (267), a bright summer-day scene on the banks of an estuary; Mr. T. C. Noble's "Twilight" (290); Mr. Bryan Hook's "Hart's Lock Woods" (357); Mr. R. Noble's "Evening" (440), conventional in style, but a fine effect; Mr. Olsson's "Receding Tide" (529); Mr. Joseph Knight's "Clouds Linger Yet" (856), Mr. East's "The Golden Valley" (837), a large


landscape showing a view over a rich undulating country, which, however, rather wants distinction of character; and Mr. John R. Reid's "Poor are the Friends of the Poor" (896), which may be regarded as a landscape with a group of buildings in the foreground, for the figures are of secondary importance, and which in power and freshness of open-air effect is not surpassed by anything in the exhibition.

Sea-pieces are less numerous than landscapes, but they are mostly exceedingly fine, and indeed there is no department of painting which English lovers of art may regard with such satisfaction as sea-painting, for in this at least our own artists may claim to be superior to any others in the world at present, as the French critics cordially acknowledged when they saw some of the work of our marine painters at the 1889 Exhibition. Mr. H. Moore is always, as it were, surpassing himself, and has never done anything finer than his "After a Breeze" (51); and "Hove-to for a Pilot" (246) is not far behind it. Mr. Brett sends one of those wide calm seas in which he delights, under the title "Pearly Summer" (153), in which the shipping are a little more prominent than usual; but he has also sent an important work, "Breakers among the Reefs" (417), in which he has shown the sea under a different colour and aspect, the greener water of a shallower sea, full of foam and movement, and almost, one might say, of the very sound of the sea. Mr. Shaw in his two contributions (592, 925) is perhaps rather too much repeating the same effect and treatment, a very truthful one as far as it goes, but this artist has never quite equalled one or two of the larger and more important works which first brought him into notice at the Academy as a painter who understood the sea, nor perhaps has Mr. Fraser, though his "Easterly Breeze" (369) like Mr. Shaw's two coast scenes, would pass as an exceptionally good sea picture in a gallery of any other nationality.

Among animal paintings is a very fine bold study of the head of a lion by Mr. C. E. Swan (520), and one or two very clever works by Mr. Wardle, who seems rather to aim at an imitation of Mr. Swan's treatment of animal subjects, especially in the two leopards painted under the title "Stealth" (100). We should mention also two or three noteworthy architectural pictures; one by Mr. Woods, "The Cloisters of the Friari Church, Venice" (102), an admirably clear and bright architectural painting, and two by Mr. Logsdail, "In the Piazzetta" (233) and "The Church of the Misericordia, Venice" (451); the latter, which is the smaller one, is the best; in the former, which is a painting on a pretty large scale of part of the ducal palace, the artist has failed to get the character of the columns in the upper story, which as Ruskin has truly remarked, hardly anyone who draws the building does get; they are too thick for their height, and the slight diminution of the shaft, so unusual and characteristic in connexion with the Gothic detail, is not shown.

To the contents of the Architectural Room itself, already commented on in general, we shall return more in detail, and may also have something to say as to the sculpture of the year.

THE LONDON COUNTY COUNCIL AND ITS LAND.

 ANY who are unfavourable to the general policy of the London County Council must have smiled with satisfaction at certain facts which were brought out at the meeting of the Council last week. It must be confessed that the County Council has largely contributed to the ill-feeling which exists against it, by the vain and boastful way in which it gave forth its intention to manage its affairs. On the occasion in question the subject of discussion was the report of the Corporate Property Committee on the sale and letting of the

Council's land and other property. The tale was a lamentable one; it was in fact a confession that the sale and letting of the Council's property is at a standstill: that the public lets the Council severely alone, and that it is politely boycotted. In these days such a result is the consequence of bad management in some form or another. Land in London can always be let or sold on market conditions and at a proper market rate. "We have had under our consideration," so runs the report, "the question of the Council's failure, not merely to find purchasers, but even to secure bidders for its property at recent auctions." One point which it is suggested is the cause of the want of competition is the fact that a purchaser is required to accept the title of the Council without investigation. The Committee, however, do not think that such a condition injuriously affects the sale. We have no doubt it does. The Council cannot give an indefeasible title any more than the Duke of Westminster or the Duke of Bedford; a purchaser who takes a title without investigation takes upon himself a certain risk. We doubt if any solicitor would advise a client to dispense with such an investigation; and it is quite certain that solicitors would not look favourably upon a purchase which would deprive them of some professional earnings. We do not for a moment say that a solicitor would on the latter ground urge a client not to purchase Council's property, but he certainly would not encourage him to do so. He would not go out of his way to give him information on the subject, and the practical result is that under such circumstances buyers do not come forward. Again, an officer of the Council acts as auctioneer, and this, again, is undoubtedly a powerful factor against competition. The great and active land-selling firms of the Metropolis can nearly always get bidders—it is part of their business—and men so shrewd and experienced can generally carry through such matters. Here, again, the Council have to fight against professional coldness. The land agents of London are not likely to help to sell the Council land when one of their profession is not employed to sell it. But apart from anything akin to wilful professional coldness, it has to be borne in mind that the regular auctioneer has often clients to whom he can recommend property entrusted to him for sale. A mere official is a voice calling in the wilderness. When to these facts are added others, such as the delay which occurs in the approval of plans and in the granting of leases, as well as a general suspicion in regard to the attitude of the Council towards property owners, there is no great reason to be surprised at the fact that the Council is unable to sell its property. The theorists of the Council propose to tax owners of property, and purchasers may well doubt whether, having got the land, they may not find it presently burdened with taxation which they never contemplated. The Council have frightened capital in London, and one result of this is a disinclination by the public to purchase the property of the Council.

In addition, there is also the fact that some part of the saleable property is "in the nature of a residuum, and is not such as can be advantageously dealt with." But if "a residuum," which means, we suppose, an inferior class of property, is on sale, a low price must be taken for it. Judging from the fact that on their own showing the Council are asking thirty-eight to thirty-nine years' purchase for ground rents instead of twenty-five to thirty, on which basis they should be saleable, it is probable that the reserve price for inferior property is too high. But it matters little what reserve is put on property if there are no bidders. On the other hand, persons will not take the trouble to attend an auction whether of land or goods and chattels if they know by experience that there is a reserve price which prevents the transaction of business. In fact the report of this

Committee shows that what has been waiting in this department of the Council's affairs is business capacity. The same capacity has been conspicuously absent in almost every department, and amateurs cannot successfully manage a great concern.

At the same meeting the Council discussed some draft clauses to insert in the London Building Law (Consolidation) Bill to prevent buildings being raised to an undue height. This rule, if it becomes law, will be important, but it will be time enough to point out these provisions when the Act has passed. The most satisfactory feature in regard to the proposals made on this subject is the indication of a desire to regulate the height of buildings in future in relation to the width of the street. It is in this direction that improved legislation is specially required.

NOTES.

A LARGE competition is on foot in the States for new Municipal Buildings for New York. The instructions were formulated about a month ago, but the drawings are not to be sent in till September 1 of this year. Six designs will be first selected by the Board of Commissioners, assisted by a committee to be nominated by the new York Chapter of the American Institute of Architects, and the Architectural League of New York, and the architect of the best design out of these will be commissioned to carry out the building, "provided that his professional standing is such as to guarantee a proper discharge of his duties," the other five receiving five equal premiums of 2,000 dollars each. The building is to stand in the City Hall Park, and is to be built of marble (how refreshing that sounds!) and to supply accommodation to the extent of 270,000 square feet, distributed over three stories, exclusive of basement and attic. One very sensible clause in the instructions is that "it is desirable that none of the courts that are provided for light and air shall be inclosed on more than three sides," a piece of sanitary common sense left on record by the builder of Caius College more than two centuries ago, but absurdly forgotten in some great modern English buildings. Nothing is said as to limit of cost. The architect appointed is to be paid on a scale of 5 per cent. on the first million dollars of cost, 4 per cent. on the second, and 3 per cent. on the remainder.

THE advocates of Imperial Penny Postage must, for the present, be content with the "moral support" and sympathy of Parliament, and wait until more favourable times for anything more substantial. In the debate on this subject last Friday, the present Government simply re-affirmed the decision of the last Administration in agreeing with the principle, but indefinitely deferring action. Apart from the anticipated loss of revenue which the proposed change would involve, it is held to be absolutely necessary before making it to obtain the unanimous consent of the parties to the Postal Union, or commit a breach of good faith. The latter obstacle is, of course, fatal to the immediate adoption of this desirable reform, as the concurrence of the countries interested is, at present, doubtful, and some time must elapse before there is another general conference. As the reform was advocated by members of each political party, so its impracticability was demonstrated from either side of the House; and Mr. Henniker Heaton and his supporters were fain to accept the assurance that the Government desired at the proper time, "when it might be done without reproach of conscience or honour," to carry out their wishes. Great things have already been accomplished in the way of postal reform, and there is certainly no cause for discouragement in the tone of the recent debate.

THE case of Haggerty v. Thompson, decided last week by the Queen's Bench Division on appeal from the County Court Judge of Leeds, is not of importance from a legal point of view, though it has practical value. It shows the great importance of careful superintendence where complicated machinery is used. The plaintiff was injured by a portion of a crane falling on him when engaged as a labourer carrying bricks on to a scaffold. The crane was safe so long as it was well managed, but was very dangerous if imperfectly worked. The cause of the imperfect working of the crane, whereby the plaintiff was injured, was the fact that the man who was working it was ignorant of the proper way to manage it, because the foreman had never given him proper instructions. The foreman being "a person in superintendence" within the meaning of the Employers' Liability Act, the defendants were liable for the injury caused to the plaintiff. This is one of the cases which shows the hardship of the Act so far as employers are concerned, though at the same time it would have been equally unfortunate if the injured man could not obtain compensation from someone. Workmen are not to use a common expression, "worth powder and shot," and so the law has made the master liable for their negligence, though he is quite guiltless of any personal carelessness.

IN the ceremony of opening the Chicago Exhibition the Americans seem to have shown their usual eye for sensational effect, in bringing within the reach of the President's hand an electric communicator, which enabled him, at the right moment, to start all the machinery in the exhibition at the culmination of his speech. This is a hint for effect at the future openings of great exhibitions which will no doubt be borne in mind. At the same time we cannot help thinking that if the American managers of the exhibition had thought less of such tricks of effect, and more of getting the exhibition in order for the opening day, they would have done even better for the credit of the undertaking. According to the *Times'* correspondent, the American section is still in a chaotic state, and it must be some weeks before it can be really in order. It is gratifying to read that the English section is one of the portions which has been practically finished and ready for the opening; but this section has been under unusually good and business-like management.

THE refusal of the House of Commons to accept Sir A. Rollit's amendment to the Railway Servants (Hours of Labour) Amendment Bill, requiring the railway companies to submit to the Board of Trade a classified schedule of the hours of attendance in signal-boxes, was in our opinion quite justified. The Board of Trade could not possibly act on the information without practically taking the responsibility of this department of railway management off the shoulders of the companies and on to their own, an idea which is perfectly Utopian and impracticable.

THE report of the coroner's inquest on the death of Filippa Vercellino, a poor little Italian infant who has succumbed, apparently, to the effect of the unhealthy conditions of her father's home in Edward-street (Wardour-street), shows that there is something very inefficient in the action of the sanitary authorities of the Westminster Union. The room, a cellar, was damp, "in fact quite wet," and had been condemned a year since by the sanitary authorities as unfit for habitation, but this unfortunate family had been living in it paying 3s. a week rent to a landlord who forbade them to have a light "for fear the authorities should find out that the place was inhabited." But surely the sanitary authorities ought to be able to keep their eyes open

sufficiently to prevent such disgraceful and inhuman tampering with their orders. The verdict was that the child's death was accelerated by the insanitary condition of the dwelling. It is to be hoped this melancholy and discreditable event may at least have the effect of putting the sanitary authorities of this and other districts on the alert to guard their flocks against being preyed upon in this way by scoundrels without heart or conscience.

THE *Dumbarton Herald* published last week the text of the memorial drawn up by the Council of the Society of Antiquaries of Scotland in regard to the condition of Stirling Castle, for consideration by Mr. Campbell-Bannerman, the Secretary of State for War. The Society laments greatly "the ruthless manner in which the buildings have been treated, to suit temporary purposes, in utter disregard to their historical or architectural interest, and the triumphal character of the new work," and urge at the same time that they are not so far destroyed but that they might be restored to something of their former condition if the military authorities were willing to give up the use of the castle. Mr. Campbell-Bannerman, in his reply, states that a special visit of inspection to the castle had convinced him that the existing disfigurements, made at a somewhat remote time, could not now be corrected "without such changes as would modernise the building according to the fancy of some modern architect." He thinks it better, therefore, to leave them alone, and to keep the exterior, especially the decorative work, in good repair; and where repairs are executed, to see that they are done by some competent person. If the interior is really in such a state that removing the more modern excrescences would mean what is generally called "restoration," we are inclined to think that Mr. Campbell-Bannerman is in the right, and that it is best to leave well alone now.

WE referred last week to some correspondence in the *Standard* complaining most unreasonably of the interference of the sanitary authorities at Folkestone in endeavouring to compel residents to adopt the best methods of sanitary appliances, drainage, &c. From a correspondence in the *Hylthe and Sandgate Advertiser*, of which a copy has been sent to us, it now appears that it is the proprietor of the *Standard*, who has a house at Folkestone, who has been resisting the action of the authorities, and that letters to the *Standard* by Dr. Louis Parkes and Mr. Arthur Baker have been suppressed in that journal so far as they were adverse to the position taken up by the proprietor of the *Standard*. Comment is unnecessary.

AS is reported in another column, Mr. Ernest Turner has made a formal appeal to the London County Council against the action of the Fulham Vestry, in demanding 6 in. drains for some small houses in their district, and has obtained a decision, which is unquestionably a right one, in favour of 4 in. pipes. This is a very useful action on the part of Mr. Turner, and may have an important effect in preventing unnecessary and mistaken requirements on the part of vestries in the matter of drainage.

IN the Fourth Annual Report of the Highways and General Purposes Committee of the Gloucestershire County Council are some remarks in regard to waste land by the side of main roads which are worthy of attention. The Report says that on this subject—

"Great misconception appears to prevail. In the first place it may be stated that the County Council simply inherits the rights and responsibilities of its predecessors, the Highway Authorities. These authorities have, in many parts of the county, ignored their duty in times past as regards waste lands. Those duties may be said to be to protect and safe-

guard the right of the public to the free use of the land from fence to fence, or hedge to hedge, whether the whole intervening space, or only part of it is metalled. Any obstruction placed within these limits is a public wrong, to which nothing short of an Act of Parliament can give a legal or valid existence. The owners of land adjoining main roads cannot, nor can their tenants, lawfully enclose any part of the strips of wastes which lie outside their fences or hedges; and even if the consent of a Highway or other Authority has been given, this consent is utterly immaterial, for it was unlawfully given, and no encroachment can bar the public, no lapse of time limit its rights.

It is the duty of the County Council to preserve the public right to the wastes, and the Council has no power to consent to an enclosure, even though any one should be willing to pay a rent for land so enclosed.

The public right, however, is simply the right of free passage over the surface of the land, and includes no claim to the freehold, or to anything that may grow on the waste.*

ONE or two correspondents in the *Manchester City News* draw attention to what seems an extraordinary anomaly in the procedure of the Manchester Corporation in regard to tenders for contracts. It appears from the correspondence that it is not the practice of the Council to publish the tenders, and that the ratepayers have no means of knowing whether the lowest tender is accepted or not. This is not only unfair to the ratepayers and inconvenient to the contractors, but it is bad policy for the Council, as a representative body. Publicity is the best means of securing confidence.

IT was announced last Saturday that the First Commissioner of Works has decided to throw open to the public on and from Whitson-Monday next, the Home Park between Hampton Court and Kingston Bridge. This return to a state of things which existed about forty years ago, follows upon a movement that some inhabitants of Kingston began in May, 1890, when the herds of deer had been removed, and the park given up to purposes of the royal stud, being let to the Crown Equerry for about 800*l.* per annum. A leading part in the movement was taken by Mr. Gould, Alderman of Kingston, who will be remembered for his share in the freeing from toll of some of the Thames bridges. Covering about 750 acres, and screened from the high road by an old brick wall, it forms part of the 2,000 acres which Cardinal Wolsey acquired when, in 1514, he became possessed of the Knights Hospitallers' Preceptory. Norden (*temp.* James I.), describes the parks appertaining to the Palace as being enclosed, save on the river-side, by high walls; one park being reserved for "deer," the other for "hares," and it is believed that the former corresponds with what is now called the Home Park. In a letter about his application for the mastership, in succession to Dr. Thomas Burnett, of the Charterhouse, Steele writes to Lord Chief-Justice Parker:—

"The matter of being elsewhere employed is nothing but that I have an income out of the playhouse as patentee, and am surveyor of the stables at Hampton Court, where I have nothing to do but to give in an estimate in case they want being repaired."

He had built for himself a little house, which he named "The Hovel," at Hampton Wick, whence he dated the dedication of his "Tatler," vol. IV. We read in the "Ambulator" for 1820, that by the exertions of Timothy Bennet, shoemaker, of Hampton Wick, who died in 1752, was secured a right of the foot-way through Bushey Park.*

A QUARTERLY antiquarian magazine is shortly to be issued under the title of *The Illustrated Archaeologist*, under the editorship of Mr. J. Romilly Allen. A well-illustrated periodical at a moderate price will be a useful addition to archaeological literature, and may perhaps do something to render this class of subject more popular

than at present. Mr. Romilly Allen's name as editor is a guarantee that the new magazine will be a well-informed one.

THE exhibition at the New Gallery, now open, is not one of the best that has been seen there. There are some fine portraits, notably the remarkable one by Mr. Sargent of a lady in a rose-coloured dress, which is one of the pictorial sensations of the year. More detailed notice we must defer to another occasion.

FROM a paragraph in the *Sheffield Telegraph* (quoted elsewhere in this issue), it appears that Lord Grimthorpe, in carrying out a new church near Doncaster, at his own cost, has this time elected to employ an architect, who is preparing the plans from sketches supplied by Lord Grimthorpe. We should fear the architect will be likely to have rather an uncomfortable time of it.

ONE conclusion we have come to very decidedly in regard to the Royal Academy exhibitions is, that the rooms are most inadequately ventilated, and that this is a matter which ought to be seen to. Everyone knows that a visit to the Academy during the crowded days of the earlier part of the season is one of the most fatiguing forms of recreation that one can be exposed to, and Academy head-ache and Academy back-ache are almost recognised forms of debilitation. Those who have the opportunity of comparing experiences when the rooms are comparatively empty, as on "Varnishing day" and "Press day," can bear witness that these disagreeable results do not arise from a visit to the Academy on those days. The debilitating effect so much complained of by the ordinary visitor is mainly the result of bad air—insufficient oxygen for the consumption of the crowd. There are several architects in the Academy: are they too much taken up with art to see that the rooms are properly ventilated?

LETTER FROM PARIS.

THE opening of the Salon rather throws into the background various special exhibitions opened last month, and which have not yet closed. That of the Pastellists, which will close to-morrow, has this year been inferior, both in quality and quantity, to those of preceding years. Among the 134 works exhibited, we may mention the curious experiments of M. Besnard, the fine studies by M. Roll, the portraits by M. Jas. Tissot, the Parisian scenes of M. Billotte, remarkably realistic in effect, and the vigorous landscape studies by M. Lhermitte. The remainder are worse than mediocre.

The exhibition of "Peintres-Graveurs" has opened for the fifth time. The works of M. Israël, "Le Vieux Pêcheur" and "La Femme du Pêcheur," show a powerful realism which recalls Millet. The landscapes of M. H. Rivière are good; the Parisian belles of M. Hellen have a special charm, and M. de la Touche has also done well. We may also mention the dry-point etchings by M. Goeneute, the military scenes of M. Jeannot, the engravings by M. Guérard after Manet, and the remarkable views of London by M. Pennell, which seem reflections of the talent of Whistler. It is to be regretted that among a remarkable collection there is only one insignificant example of the work of the master of French engraving, M. Bracquemond.

The second exhibition of the "Rose Croix" has this year been organised at the Champ de Mars, where among a number of eccentricities one is almost surprised to find the work of such real artists as MM. Desbouts, Arnaud Jean, Chabas, Léon, and Oshert. The last-named artist exhibits some decorative panels which are very interesting. One ought not to pass without mention the work of M. Khnopff, who reminds one partly of Mr. Burne Jones and partly of Mr. Tadmé. For the rest, the "Rose Croix" exhibition tends to become more and more absurd.

On the 10th the Champ de Mars Salon will open, where, as already mentioned, there is to be for the first time an architectural section. This innovation is due to MM. Baudot and Frantz Jourdain. It is announced that MM. Paul Gout (architect of the Lycée Racine), Vincent, Benon-

ville, and Calin will contribute to this portion of the exhibition, to which the last-named will send his design for the Casino de Biarritz. M. Baudot is to exhibit the plans, section, and elevations for the Hôtel which he has just built, and also drawings of the architectural details and of the chimneypieces and furniture executed from his designs by MM. Delaherche and Guérard.

Madame Meissonier, after the discussions which have taken place in regard to the interest of the children in their father's works, seems to have determined on a kind of opposition exhibition of the works of the master, a proceeding the wisdom of which may be questioned. No doubt, as a posthumous homage, the Ecole des Beaux-Arts, where this second exhibition is held, is a more important place than the Georges Petit Gallery. But the collection is hardly worthy of this solemn official locality, while that in the Rue de Sèvres, with its innumerable works from the most celebrated and highly-finished pictures to the slightest studies, formed a collection entirely out of the common run, and a far better and more representative illustration of the artist's genius. The new exhibition contains, on the other hand, very little of his most characteristic work. There are various models made for study—"Duroc," "Le Trompette Louis XIII.," &c., and some interesting works, such as "Les Prisonniers d'Etat," "Les Cavaliers dans la Forêt," "Les Ruines des Tuileries," and the sketch design for the decoration of the Panthéon. It should be added that all these works will belong eventually to the national museums, to which Madame Meissonier has promised to leave them.

The remarkable energy displayed by M. Guimet in the arrangement of his fine museum of Oriental work might be an example for the managers of the French National Museums, whose want of enterprise is almost proverbial. Hardly a season passes that he does not invite scholars and artists to see a new and useful collection. Not long since, he gave us a curious collection of Japanese engravings; and in the last few days there has been a new gallery opened of objects obtained during French explorations in Asia, which have been long hidden away in the cellars of the Trocadéro. We have not space to enumerate all the objects of interest in this last collection, but may mention especially the casts of details from Khmer obtained by MM. Delaport, Aymonier, and Fournereau; the objects brought by M. Saint-Paul Lias from Indo-China and Cambodia; those sent by M. Groot, which give a curious illustration of the religious and domestic ceremonies of China; and lastly the collection of M. Varat, which enables one to trace the relations existing between the art of Corea and that of Japan. These collections are of far more interest and value than that at the Louvre forming part of the "Musée de Marine," which, interesting enough in itself, is out of place there and moreover encroaches on space that ought to be devoted to paintings. The models and other objects which comprise the Musée de Marine would have their proper place in the Conservatoire des Arts et Métiers and in the Ethnographical Museum; and the Parisian press has been, not without reason, demanding this alteration, which would permit of the enlargement of the artistic collections, for which space is now wanting. It is to be hoped that the Government will eventually see its way to making this change and giving the whole space at the Louvre and in the Pavillon de Flore to works of art, which may then perhaps be all as well seen as the pictures in the National Gallery of London—the arrangement of which appears to French visitors to be admirable—instead of being in many cases hung at a height of eighteen or twenty feet from the floor for want of space elsewhere. This necessity for making the most of the space at the Louvre is the more pressing from the fact that the donations made to our national galleries are almost daily increasing. Among the latest are those of M. Destouches, among which figures the fine sketch made by Guérin for his picture of "Dido and Æneas," a splendid portrait by Ingres, and three fine drawings by Géricault. We may mention also that M. Uhde's fine painting of the "Last Supper," which attracted so much notice at the Salon of 1887, and at the 1889 exhibition, has been purchased by the State for the Luxembourg Museum.

The new Municipal Council of Paris, elected a few days ago, will have to occupy itself, among its first business for next session, with the completion of the Sorbonne, of which the portion facing the Rue des Ecoles alone is completed. It is true that the second portion of the work, abutting on Rue Cujas, will soon be completed. But the whole central portion remains to be carried

* See also Mr. E. Law's "History of Hampton Court Palace," vol. iii. (1891).

out, which will surround the ancient church in which is the marble tomb of Richelieu. The work still to be done will cost 7,200,000 francs. An astronomical tower, of a fine design in a decorative sense, will be erected in Rue St. Jacques, for the study of the management of that class of optical instruments which do not require the absolute stability of an observatory properly so called.

Among other important works on the left bank of the river may be mentioned the construction, to be shortly carried out, of the new terminal station of the Sceaux railway, which (contrary to the first intention) will not be placed between the Boulevard St. Michel and Rue Gay Lussac, but on the Boulevard St. Germain, where the Cluny Theatre now stands. There is talk of rebuilding this latter on the Place Saint Michel; and it is to be hoped that the architects will profit by this opportunity, and that of the Opéra Comique, to study thoroughly the problem of a truly commodious theatre, where the spectators, while conveniently placed, may at the same time find the exits, in case of accident, ample and easily reached. Paris is badly off in this respect, even in the theatres partially supported by the State funds, in which the least panic would be followed by a disaster as lamentable as that of the Opéra Comique. When a thoroughly satisfactory theatre is at last constructed, all the others will soon be obliged to follow suit in the reform which the public has so long demanded in vain.

The late Council, before it broke up, had formulated an opinion unfavourable to the scheme brought forward by the Paris, Lyons, and Mediterranean Railway Company for the enlargement of the Gare de Lyon, the deficiencies of which have long been a subject of public complaint. The Council, adopting the scheme drawn out by the City Engineers, has declared itself in favour of a station built in two stories, to which vehicles and foot-passengers could have access on the level, without the trouble of mounting up inclined planes and flights of steps.

The Académie des Beaux-Arts will shortly proceed to fill up the place left vacant by the death of the painter Cabat. The artists who have already come forward as candidates are MM. Joseph Blanc, Benjamin Constant, de Curzon, Harpignies, Maillart and Aimé Morot.

We have to record the death, at the age of seventy-two, of a distinguished engineer, M. François Eugène Gignon, honorary vice-president of the "Chambres Syndicales de l'Industrie et du Bâtiment," and honorary president of the "Chambre Syndicale des Entrepreneurs de Serrurerie et de Construction en Fer." The death is also announced of M. Murat, architect, of Paris, at the age of sixty-one, and that of M. Alfred Chapon, architect to the Suez Canal Company, at the age of sixty-eight. In 1867, since the Universal Exhibition, he had carried out numerous works at Tunis and Morocco, and was also architect of the buildings of the company at Suez, and of various country mansions in France and Spain. He was a pupil of the Ecole des Beaux-Arts and Chevalier of the Legion of Honour.

Lastly, we record the death, at the age of fifty-four, of M. Frank Géraldy, an "Ingénieur des Ponts et Chaussées" of great merit, who had specially devoted himself to electricity, and was director of an important Parisian company with which the house of Rothschild was connected. M. Géraldy was a scientific man of the first order, as well as an eloquent popular speaker on the subjects of his special study, as his lectures and speeches have often shown. His loss is much felt in the scientific world of Paris.

HYGIENE IN ITS APPLICATION TO THE ARRANGEMENT OF BUILDINGS.*

I HAVE chosen the subject of hygiene in its application to the arrangement of buildings because it has fallen to my lot during the last twenty-five years to pay particular attention to, among other matters, the condition of the occupiers of a variety of different residential buildings in so far as that condition has been affected by the arrangement of the buildings in which they have resided. And I have had the opportunity of criticising the plans of many such buildings and of additions and alterations to already existing buildings; and I have also in many instances been able to observe the result, years afterwards, of arranging buildings in particular fashion. I

have further had the benefit of association, on nearly all occasions, with medical colleagues who have assisted me with their special training and knowledge. Having had the advantage of such experience, it seemed to me, when I was invited to give a lecture before the Architectural Association, that I should best consult the wishes of the members if I endeavoured to lay before them some of the results of that experience.

It may be well at the outset that we should be reminded of some of the various ways in which a building may affect the health of those who have to occupy it, and in saying this I particularly wish to guard myself against being understood to imply that any of the defects to which I shall refer, are themselves either the *sole* cause or the *certain* cause of the injury to health with which they are connected. It is probable that such evil results as do occur are brought about by a combination of conditions tending, during a longer or shorter period, to induce a state of health rendering the individual peculiarly susceptible to the particular disease that ultimately develops, and thus prepares the system to serve as a favourable soil for the progress of the disease. The arrangement of the building is one, and probably one of the most important factors in the causes of damage to health.

There appear to be three distinct sets of defects in a building which tend, in different ways and with different degrees of expedition, to bring about damage to health, and to foster, if they do not directly produce, conditions favourable to the development of certain specific diseases; thus what are most commonly spoken of and popularly understood as "sanitary defects" are probably the quickest to produce visible effect upon health, and are those which have been so aptly described as "filthy diseases," and which convey, if they do not actually cause, enteric fever, cholera, diarrhoea, and other disorders of the bowels produced mainly by excrement-poisoned air and water.

A second series of sanitary defects, entirely different and slower in their operation on the human subject than the last referred to, is that which tends to disorders of the bronchial type and to rheumatic complaints, to pneumonia, and in a great measure to phthisis and lung disease. This series is concerned with insufficient protection from extremes of temperature and from the effects of dampness and wet subsoil.

A third series of sanitary defects, and probably slower than either of the last, though undoubtedly not less certain in its effect, is the cause of a large amount of phthisis and other pulmonary diseases, of typhus fever, and of ophthalmia, as well as affording a means of intensifying and spreading such zymotic diseases as smallpox, scarlet fever, &c., and likewise of encouraging depression and a tendency to mental complaints. These are more or less distinctly caused, or at any rate fostered, by insufficiency of air-space, over-crowding, excessive aggregation of persons in one enclosed atmosphere, deficiency of light and of sunshine.

It will be seen that the first of these three series of defects has to do mainly with drainage and water supply; the second relates chiefly to defective construction of walls, foundations, and roofs; and the third to arrangement of buildings with regard to air supply and ventilation, light, and distribution of occupiers.

It is this last-mentioned series of defects with which we are chiefly concerned on the present occasion. But I do not propose to occupy time by discussing the details of arrangement in regard to such matters as aspect, access, to sunlight, air supply, and ventilation.

That the influence which is exercised on the health of the inhabitants of a building by the particular arrangement of the building has, for upwards of thirty years, been recognised in regard to certain classes of building will readily be admitted when we bear in mind that an ordinary hospital for a considerable number of patients is now always subdivided into separate blocks or pavilions, instead of being constructed in one single block of huge dimensions, as was formerly the case.

The sick, above all, need the best hygienic arrangements in order to ensure and expedite their recovery, and wherever those arrangements do not exist, it is not difficult to detect the prejudicial effect upon the patients in the aggravation of their complaints, or the undue slowness of their recovery, and the tardiness of the healing of wounds, or possibly in graver indications of unwholesome conditions. We have all read, for example, of the difficulty of preserving the patients in a maternity hospital from the ravages of puerperal fever, and in surgical hospitals, from the incursions of erysipelas.

Ever since the disastrous arrangements for the treatment of the sick and wounded troops in the Crimean campaign, 1853-55, the pavilion system of hospital construction has been accepted as possessing vast advantages over the older plan of arranging an unlimited number of patients in wards piled up several stories in height, and often all round a quadrangle, as was the case in many old hospitals in all the countries of Europe. But even this pavilion system of construction, though undoubtedly right in principle, is now not infrequently terribly abused, as will presently be explained.

In hospitals for the reception of persons suffering from any of the infectious fevers, again, it is obvious that the hygienic arrangement of building has peculiar importance, since it is of the highest consequence that a patient admitted with any such infectious complaint must be so placed as not to risk contracting any other infectious disease during his stay in the hospital, and likewise so that a person sent there under erroneous diagnosis may be dealt with with reasonable safety to himself as well as to other patients in the hospital. These special conditions obviously necessitate a special arrangement of building.

But it is not the sick alone who need peculiar hygienic arrangement in the building they occupy. Those who are reputed to be in proper health, both of body and mind, equally need care in regard to the arrangement of the building they occupy if their health is to be properly maintained, and wherever considerable numbers have to occupy the same building, as in an institution, the arrangement of building becomes a matter of vital importance.

Let us consider, for example, the subject of military barracks. The occupiers of these buildings are usually men in the prime of life, more or less in robust health, and selected after medical examination with due regard to their health conditions. And yet experience in the past has shown that unhealthy and badly-planned barracks have, in time of peace, killed or incapacitated the soldier to an extent almost equalling that of the most sanguinary wars. In our own army it was only after the Crimean War that public attention was directed to the subject. In 1857 it was found that, while the death-rate of the male *civil* population between the ages of twenty and forty years was 9.8 per 1,000, the mortality among the troops was 17.11, or nearly double. Subsequently an improved system of barrack construction was introduced which led to a considerable reduction in both the mortality rate and the sickness of the troops; for whereas in 1857 the mortality among troops had been nearly double that of the male *civil* population of the same age, in 1876 the mortality among the troops had been reduced to nearly two per 1,000 less than that of the corresponding civil male population, and the hospital accommodation needed for troops has been diminished from 10 per cent. to 6 per cent.

In the French army, after the Franco-German war, similar improvements took place. Mons. Tollet writes that during the ten years ending 1882, France lost 40,000 men in the barracks, while some 60,000 men, who had entered the service in good health, were discharged on account of illness or infirmity. True, typhoid fever, consequent on bad drainage arrangements, was the cause of a large proportion (12,000) of the deaths, but that destructive lung disease phthisis, appears to have been the main cause of this terrible loss. The success which has attended the improvement of barrack construction in our own country has been noted in certain other countries. In France particularly large improvements are being made. Mons. Tollet and Mons. Emil Trelat have paid high tribute to the work done in this direction in England, and both of them have urged on their own Government the extreme necessity for similar reforms in France. This is being gradually, though slowly, carried out, and Mons. Tollet has constructed several barracks arranged on improved principles under which the buildings comprise a number of one-story detached blocks each to contain only a comparatively small number of men. In our own country the new barracks constructed under the Military Forces Localisation Act, 1872, comprise a number of wholly detached blocks, the residential blocks being restricted to two stories, and holding some 80 to 120 men.

As with barracks, so with many other classes of building intended to hold a number of human beings. If we look at the modern prison we find the same subdivision into blocks or pavilions is now regarded as essential as in the case of a hospital. Wormwood Scrubs Convict Prison is perhaps the best example of a recently-built prison in this country. It comprises four main

* A Paper by Mr. P. Gordon Smith, F.R.I.B.A., Architect to the Local Government Board, (read before the Architectural Association on Friday, April 23, 1893, at 8 o'clock, in the Lecture Hall.)

pavilions and numerous smaller blocks, all detached one from another, affording accommodation, including hospital, for nearly 1,500 prisoners, and a large staff of officers. A similar arrangement, but with greater subdivision, has been adopted in the new French prison at Nanterre, near Paris, which holds about 1,000 men and 500 women. These prisons afford a striking contrast, as regards arrangement, when compared with the prison of former days, such as Newgate and the Penitentiary at Millbank, or even the "model" prison at Pentonville, in all of which the aggregation of human beings in one block of buildings—in one enclosed atmosphere—was the common plan. In the still older prisons which John Howard has so graphically described, it is certain that ignorance of the laws of health caused many of the prisoners to die, and a still larger number to be seriously crippled for life. Howard reports that "many of those who survive their long confinement, are by it rendered incapable of working. Some of them by scurvy distempers, others by their toes mortified or quite rotted from their feet; many instances of which I have seen." Howard made some valuable recommendations for obviating the defects of old prisons when a new prison was to be erected; one of these recommendations being far in advance of his time. He says, "That part of the building which is detached from the (surrounding) walls and contains the men-felons' ward may be raised on arches that it may be more airy;" also "the infirm or sick wards should be raised on arches"—a plan which in recently-erected hospitals which I have seen both in France and Germany, and to some extent in England, has been adopted for hygienic reasons.

In large modern workhouses it is customary to subdivide the buildings, even those for inmates in health, into separate blocks or pavilions, and to limit the number of paupers in each block to some moderate number, according to the class for whom it is intended.

And so, too, with regard to lunatic asylums, which are no longer arranged in one huge block of building, as at St. Luke's and at Bethlehem Hospitals, at Hanwell, and Colney Hatch, but are invariably constructed in a series of more or less distinct blocks or pavilions, each to hold a certain moderate number of patients, and so that the sun in clear weather may shine between the blocks, and at some time during the twenty-four hours into all the rooms. For it has to be remembered that light and cheerfulness, which are so necessary for all, are specially useful in the treatment of all mental diseases.

Nor must it be supposed that the arrangement of building is of importance solely to buildings of the institution type. It will suffice here for me to point out that persons who reside in cottages arranged on the principle of what is known as back-to-back houses are peculiarly subject to prejudicial effect of the hygienic defects inherent to that system of house construction. This is very clearly shown by the following table, which has been adapted from a report upon back-to-back house construction, which Dr. F. W. Barry and I prepared for the Local Government Board in 1888:—

No. of Registration Districts.	Population (1881).	Percentage of back-to-back houses.	Mean Annual Death-rate per 1,000 of the Population for Five Years 1879-1883.				
			All Causes.	Principal Infectious Diseases.	Phthisis.	Other Primarily Infectious Diseases.	Diarrhoea.
9	8,713	0	27.5	4.5	2.8	6.6	1.42
13	11,749	23	20.3	4.8	3.3	7.8	1.55
13	11,463	35	30.5	6.5	3.6	7.9	2.12
1	892	100	38.4	8.7	5.2	7.9	3.36

The districts referred to are certain of the 1881 Census-enumeration districts, and it will be seen that as the percentage of back-to-back houses to total houses increases, so is there increase in the mortality rate from phthisis, in that from all causes, and likewise from certain other specified diseases. The importance of these rates is all the greater because, with the exception of the means of through ventilation, the back-to-back houses in the district in question, were, as a whole, in a better sanitary state than the through houses.

I have thus endeavoured to show that the health of the dwellers in sundry kinds of buildings depends to a great extent upon the arrangement of the building in which they live, or at any rate that the arrangement of building may influence their health conditions. In the case of general hospitals, as I have said, this is very generally recognised, since the conditions under which a patient may be maintained during his stay in

hospital may either expedite or retard his cure and discharge. But if it be admitted that certain good hygienic arrangements of building are really useful for the sick, it can scarcely be denied that those same arrangements are at least desirable for those who are reputed to be in health, and might be useful as auxiliary means of maintaining a certain degree of healthiness. The value of the hospital arrangement of building, or of some modification of it in the case of barracks, prisons, asylums and workhouses, as an agent for the prevention of disease, is, as I have shown, now very generally recognised; but I notice that very many residential institutions, intended to receive large numbers of persons reputed to be in health, are still frequently erected on an obsolete and defective plan. This is specially the case with charitable institutions of all kinds, and particularly so with institutions for the reception of children.

Nearly all institutions which depend for their very existence upon voluntary support are, more or less, crippled for want of funds, and their usefulness often leads those who have the management in their control to endeavour to do more than the available funds will permit to be done properly. Thus we find schemes are frequently promulgated for extending or rebuilding all sorts of institutions, such as orphanages, asylums for idiots, the blind, the deaf and dumb, waifs and strays, and all kinds of schools, in regard to which the chief aim of the promoters is to so enclose a building as to afford shelter to the largest possible number of individuals which the available money will permit.

Now for the class of institution to which I refer. There is, so far as I am aware, no code of rules for the guidance in a hygienic sense, of those concerned. Hospitals have been written about almost *ad nauseam*; barracks are designed and built more or less directly under Government control. Lunatic asylums to a great extent follow hospitals, and come in for the criticism of a responsible department of Government. So, too, do workhouse buildings of all kinds, and prisons are dealt with directly by Government. Public elementary schools again come in for official criticism, but residential schools (with the exception of those for pauper children) and charitable institutions of the kind generally, are subject to practically no superior control whatever in regard to the arrangement of building. Nor is there much literature upon the subject. Schools, so far as education is concerned—that is to say, so far as regards the school-rooms, class-rooms, and conveniences—have been written about by the architect to that department, and an official paper bearing on the subject is issued by the department. The Association of Medical Officers of Schools have dealt with certain questions of school hygiene as concerning their own responsibilities; but, viewed as a whole, there is very little to assist either the architect or his client in all that concerns the arrangement of these institutions, and especially the residential institution of the class.

As a result of this absence of any definite principle in the arrangement of such buildings, we find all sorts of plans are adopted—some good, some indifferent, and some bad—very bad.

We accordingly find colleges and institutions intended as residential places for numbers of young persons reputed to be in good bodily health, though in some instances they may be blind, or deaf and dumb, or of weak intellect, or more or less destitute or deprived of parental care, as orphanages, arranged upon all sorts of plans, the residential rooms being arranged sometimes even over the domestic offices, round the four sides of a quadrangle, or in buildings several stories high in the form, on plan, of the letter E or of the letter H, and of a size intended to hold hundreds of persons.

The institutions to which I refer, being commonly intended for young persons, have, I think, taught lessons which the architect, among others, would do well to study. Poor law institutions for children have needed, and have received, a very large amount of attention, and have been observed by many experts. The child may be regarded as a sensitive instrument which indicates very promptly and with much precision every variation of the health-conditions in which he is placed; and the experience of the large Poor Law schools is most instructive.

Some thirty or thirty-five years ago the objections to keeping the children in the workhouses, especially in the Metropolis, came to be recognised, and moreover the space they occupied began to be wanted for adults, and accordingly they were in many cases removed to separate school-buildings, residential of course, on large open sites outside the towns, and arranged on what was con-

sidered the best plan. Notwithstanding, however, all the advantages under which these new institutions were placed, the result, after long and often very careful trial, was far from encouraging. Ophthalmia, diseases of the skin and scalp, and other troublesome disorders prevailed in these schools to an extraordinary extent, and in some instances seemed irremediable. Specialists were called in, enormous expense was incurred in medical advice and treatment, but with only partial or temporarily successful results. As regards ophthalmia, Mr. Nettleship, the eminent oculist, who was consulted in regard to all the Metropolitan pauper schools, numbering many thousand children, has asserted that this disease "is the touchstone of the general healthiness of an institution," and he further remarks that "where many persons are herded together, their eyelids show sooner and more certainly than any other part, if the conditions of vigorous health are not complied with." Dr. Mouat, again, who had wide experience in this class of institution, says "the stunted, impaired general health and feeble bodily powers of too many of these children are not removed or corrected by massing them together in large buildings or groups," and he points out that "there is a large and possibly increasing factor of imbecility, idiocy, and nervous disorder generally, and some of the more immediate results of scrofula at the critical periods of life, which may be due to the insanitary conditions" inherent in the aggregation of large numbers of children in huge buildings.

It is this aggregation of human beings in vast buildings to which I wish to direct special attention. The evil results, due in a great measure to it, have been particularly noticed in Poor Law institutions, but those same evil results are not by any means unknown in other institutions. Ophthalmia has been found in them, though perhaps in a less aggravated form, and tendency to other disease is commonly experienced in them, but its severity is less, by reason probably of a variety of circumstances, such as the superior condition under which the children in those other institutions are reared before being sent to school, the periodical change the children enjoy in the three usual annual vacations, and so forth. These large institutions, with vast aggregations of children under the one roof and in the one atmosphere, have come to be regarded as a failure on hygienic grounds, and as with hospitals, subdivision of building with comparatively small groups of human beings is recognised as one of the chief means of maintaining a proper standard of health among the occupants of the institution. So important is this arrangement of building regarded that it was determined a few years ago to cut up the huge main block of the Central London Schools at Hanwell. That building, originally designed to be partly three and partly four stories high, with a length of frontage of some 650 ft., was, under the superintendence of Messrs. Henry Jarvis & Sons, the architects, subdivided into five distinct blocks. Gaps 16 ft. wide, and open from the ground upwards, were cut through the building in four places, so that the number of children accommodated in it was not only reduced, but the children were completely subdivided into comparatively small groups, and the whole arrangement became more assimilated, in principle, to that now commonly adopted in the construction of large hospitals.

This principle of subdivision of the children into small groups is by no means new. In Switzerland, the family system of schools was introduced by Pestalozzi as long ago as about 1760, and the reformatory school at Mettray in Belgium, on a similar system, has been in operation for about fifty years. In England there are several examples of the system which have been in existence for a long period, and the condition of the children in them has been carefully observed and noted. Some fifteen years ago the suitability of the home or cottage system of training and educating the children of the poor was the subject of an investigation by my then colleagues, Dr. Mouat and Captain Bowly, R.E., and their report, which was subsequently published, shows that, while the system was generally adopted with the primary object of securing greater individual attention to the children for purposes of moral training and education, the hygienic advantages were very considerable indeed. And since the date of that report, as indeed before it in several instances (chiefly in South Wales) a considerable number of Poor Law schools on the cottage-home system have been built, and the result, so far as health is concerned, has been highly satisfactory. There are, as may be expected, many varieties of what is known

as the cottage-home arrangement of school. Some would be more correctly described as on the separate block system, since the number of children in each "home" is large, there being in one or two instances as many as fifty children in each house, and in one, the Philanthropic Society's Farm School, near Redhill, even sixty, but the cottages at that institution are scattered over a very large estate of some 300 acres, and the school is a reformatory for boys who are all of an age greater than that of the children in ordinary schools and orphanages. The houses of the London Orphan Asylum at Watford hold fifty children each, as do also the "homes" in a few of the larger Poor Law schools on this system. The houses of the Little Boys' Homes at Farningham hold thirty children each, and so do those of the Birmingham Poor Law Cottage Homes and some others; the Leicester Guardians adopted the excellent plan of building cottages for their pauper children on different scales, some holding sixteen children, some twenty, and some twenty-four children. In South Wales there are several Poor Law schools on this system, where the imitation of the natural family is approached more closely, the number of children in each cottage being only ten or twelve; a plan which obtains also in some excellent charitable institutions of the kind, such as Dr. Barnardo's Village Homes at Ilford, and the Princess Mary's Cottage Homes for Girls at Addlestone, and others. This system of *segregation*, as distinguished from the common one of *aggregation*, is of the utmost hygienic importance where children are concerned. At some cottage home schools a marked improvement in the health of the children has been noticed on their removal to them; thus in Dr. Barnardo's thirty cottages it is reported in 1878, "A great improvement in the general health and appearance of the children has taken place during the last twelve months, and this is attributed by the Governor entirely to their removal from the building where they were formerly all housed together to the new cottages." And I am inclined to attach importance to it, not only in the domicile of the children as a whole, but in the individual rooms where they are assembled, in the dormitories, in their day and play rooms, and especially in their school and class rooms. The question of the number of children who may properly be assembled together for several hours in a schoolroom seems to have never been considered in its hygienic aspect, the main point recommended for attention in planning a schoolroom being (to quote from an official document) "to seat the children in the best manner for being taught." Mr. Nettleship, in noticing this tendency to aggregation of unlimited numbers of children in a large school where there was prevalence of ophthalmia observes that hardly any attempt had been made to treat the children otherwise than collectively. In the official document already referred to, it is pointed out generally that the observance of sanitary laws is as important in a school as in a hospital, hence it would seem reasonable to assume that children cannot be aggregated in a school-room with impunity any more than sick persons can safely be aggregated in a hospital ward. The comparatively short space of time at a stretch that children are kept in a school-room may cause the prejudicial effects to be less readily observed than in the case of patients continuously occupying a sick ward for several weeks; but that evil results ensue from massing large numbers together in school-rooms must, I think, be admitted; and those evil results will be demonstrated with more or less rapidity, and will be intensified or diminished, according to a variety of circumstances, such as the general health-condition of the children, the amount of floor-space and cubic-space allotted to each child, and the efficiency of the ventilation and the warming of the room.

In view of these considerations, I look with no small anxiety at the enormous aggregation of children in many of our public elementary schools where they assemble, not only in large numbers in their several school and class rooms, but where those rooms are piled up in several stories, and arranged so that, in many instances, the vitiated air is equally diffused throughout the entire building by means of the staircases and corridors. I cannot but think that in time to come these huge school buildings will be the subject of condemnation on account of their arrangement being found to be defective on hygienic grounds. Already the large increase of diphtheria that has taken place in England since elementary education became compulsory in 1870, is attributed in some measure to the association of

children in vast numbers in the public elementary schools, and over and over again it has been ascertained that the village school or the Board School has played the chief part in fostering and encouraging local epidemics.*

Hence if the aggregation of children is a source of evil in those day-schools where the children assemble for a few hours only at a time, how much greater is likely to be the evil from similar aggregation where the children pass the whole twenty-four hours of every day in schools and orphanages of the residential type?

I referred at the commencement of my lecture to the way in which the pavilion system of hospital construction is occasionally abused. That system was introduced mainly, no doubt, to secure improved ventilation in the wards; but it also possessed the advantage of allowing the subdivision of the patients and of the more effectual classification of them, the surgical from the medical, and of grouping them with greater comfort to themselves and with greater efficiency, convenience, and economy of nursing and administration. That the subdivision of the patients in a large hospital is of value as an important factor in the health conditions of the institution will be admitted by everyone who carefully studies the statistics and mortality rates of hospitals. The late Dr. William Farr, of the statistical branch of the Registrar-General's Department, says, "The collection of a number of persons exceeding those of an ordinary family, under one roof, has hitherto had a tendency to increase the dangers of disease; for several diseases are, like fire and ferments, diffusible. The danger is increased when all the patients are sick, for their breath and excretions spread through the wards. The dangers, too, are likely to increase in a faster ratio than the numbers."† I wish to lay special stress upon this assertion of Dr. Farr's that the dangers of aggregation are likely to increase in a faster ratio than the numbers of patients. As bearing on the same feature, I may remind you of what is said by Mr. Lawson Tait, the eminent surgeon, where, in his work on "Hospital Mortality," he contends that his statistics prove "that after the number of beds in a hospital exceeds 100, the risk to life becomes so much increased that it is questionable whether any hospital should be of larger size than this. If circumstances make it necessary that the hospital should be larger, most undoubtedly special arrangements and precautions should be taken to obviate the extra risk which is involved."

In view of these grave assertions of men whose experience and position entitle their opinions to much weight, it is indispensable to arrange a pavilion hospital in such a manner that the several pavilions shall be absolutely detached one from another, and so that the wards in every block should not intercommunicate with each other so as practically to have one atmosphere common to all of them, a point of importance, be it remembered, in a cottage hospital (where surgical and medical cases are received for treatment) as well as in other hospitals. This arrangement of complete separation of the several blocks or pavilions of a hospital is well understood by our friends in France, Germany, and some other countries, where the pavilions in certain modern hospitals are placed at a distance apart without any other means of communication with each other and with the administrative offices than an open path or roadway; and moreover, the blocks are often only one story high, and consequently contain only a very restricted number of patients. Now, if we look at the arrangement of our hospitals at home, we find a condition very different from what our foreign friends consider desirable. Which hospital shall we choose for examination? St. Thomas's Hospital is one of our most modern, erected at great cost, in a position where it claims the attention of foreigners, and competes in magni-

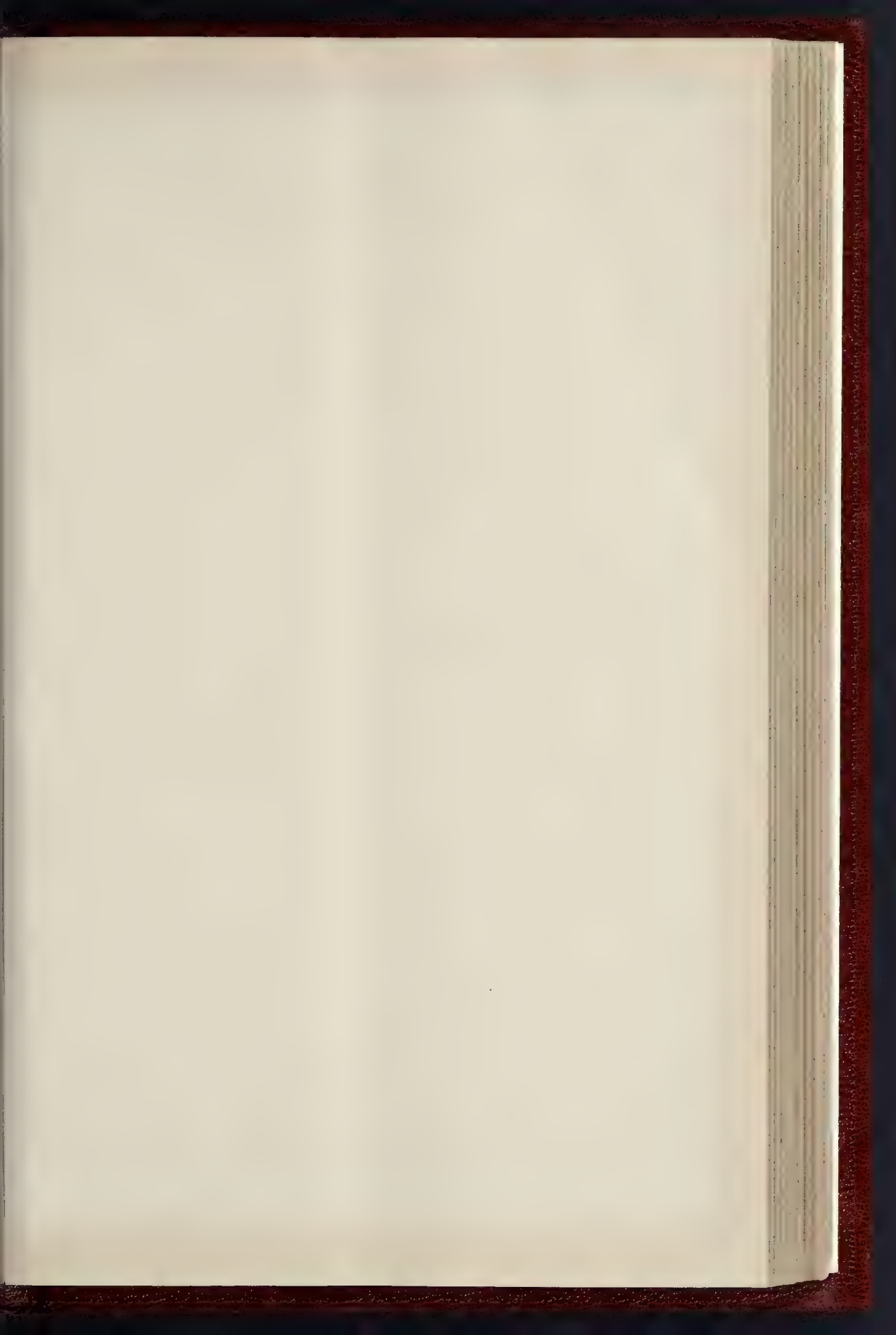
ficence with the Palace of Legislature opposite to it. At this hospital we find huge wards piled up one upon another in four stories, with a basement for stores, &c., beneath them, and dormitories for nurses and servants in an attic above them. Not only are these wards intimately connected with each other by spacious staircases from basement to attic, lifts for patients, lifts for coals, food, &c., and shoots for ashes and soiled linen, but, as if there had been a distinct intention to assimilate the air throughout the interior of the whole institution as much as possible and to counteract the effect of the "pavilion" system, the several pavilions, each holding some 112 patients, are connected together by enclosed corridors in the basement story, in the ground story, and in the one-pair story. So, too, at some of our best Poor Law infirmaries, the pavilions are joined together, end to end, instead of being kept separate and merely connected with the staircase by means of a short corridor. These arrangements are directly the reverse of what is aimed at in the best examples of modern hospital construction in France and Germany. At the great Friderichshain Hospital at Berlin and at the Moabit Hospital, also at Berlin, at the Eppendorf Hospital at Hamburg, at the St. Denis Hospital near Paris, and others, the ward blocks are absolutely detached, and at some, as the University Hospital at Heidelberg, the ward blocks are connected by a mere covered way open at the sides. No difficulty whatever is experienced in the administration of these hospitals, consequent upon the distance to be travelled in the open air from the nurses' quarters and kitchen offices to the several ward blocks and the hygienic advantage of complete separation of the patients into small groups is appreciated by the medical staff of those hospitals. This segregation of patients is carried to much greater length in the best modern foreign hospitals than in England, for, as a general rule, the ward-blocks rarely exceed one story in height, and practically are never more than two stories high, while the number of patients under one roof, or in one ward, is much less than is the case in our English and Scotch hospitals. So, too, are the buildings spread over the site, so as to give a far larger area of site per bed than is customary in our own modern hospitals. At the great University Hospital at Halle, in Germany, the arrangement resembles a collection of small hospitals rather than one huge hospital like our own St. Thomas's Hospital.

Another hygienic arrangement common in Continental hospitals is the plan of forming verandahs, balconies, and even detached out-buildings, or summer-houses, in which a large proportion of the patients are placed, while still in bed, practically in the open air, by night as well as by day, during some four or five summer months of the year, and I am assured by eminent surgeons and medical men that this arrangement is attended with great benefit to the patients. The plan is growing in England, and has been found in several instances in my own knowledge to be most beneficial. This plan of moving the patients out of the general wards during the summer affords the opportunity for allowing those wards of the hospital to be emptied for purposes of cleansing and sweetening, indeed, an eminent German physician once told me in Berlin of the hygienic value attaching to the arrangements of a hospital admitting of every ward being allowed to "lie fallow" for a period every year during which the window-sashes are removed and the interior exposed to wind and weather. This is in accordance with the experience of a fever hospital with which I am associated, where it has been found and recorded that after every time of purifying, whitening and painting the wards, the patients with scarlatina first received into them do better than those received into wards which have not been recently purified.

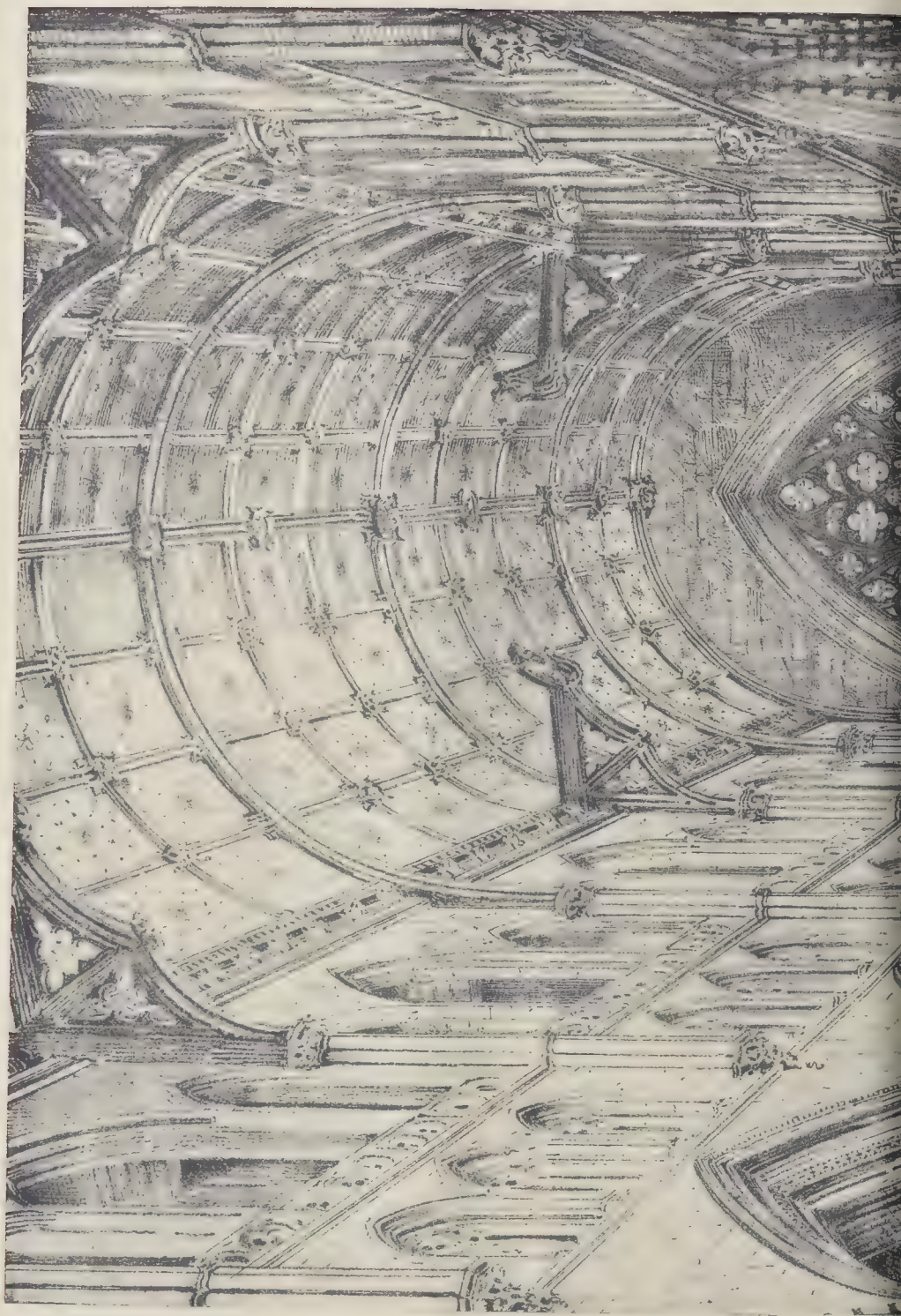
It is unnecessary for me to deal generally with the question of arrangement of domestic buildings in their hygienic aspect, since the need for ample means of light, access of sunshine and circulation of air about them must be well known to all. But there are one or two points about this class of building to which I must briefly refer. There are plenty of examples of blocks of so-called "Model" dwellings in all our large towns which may be pointed to as "models" of what to avoid. In London we may easily find instances of blocks six and seven stories high directly connected at right-angles, and even at acute angles, so that the sun (even when it does shine) can never reach many of the windows, and so that there is inevitable stagnation of air; or, again, that are arranged in streets—*culs de sac*—only

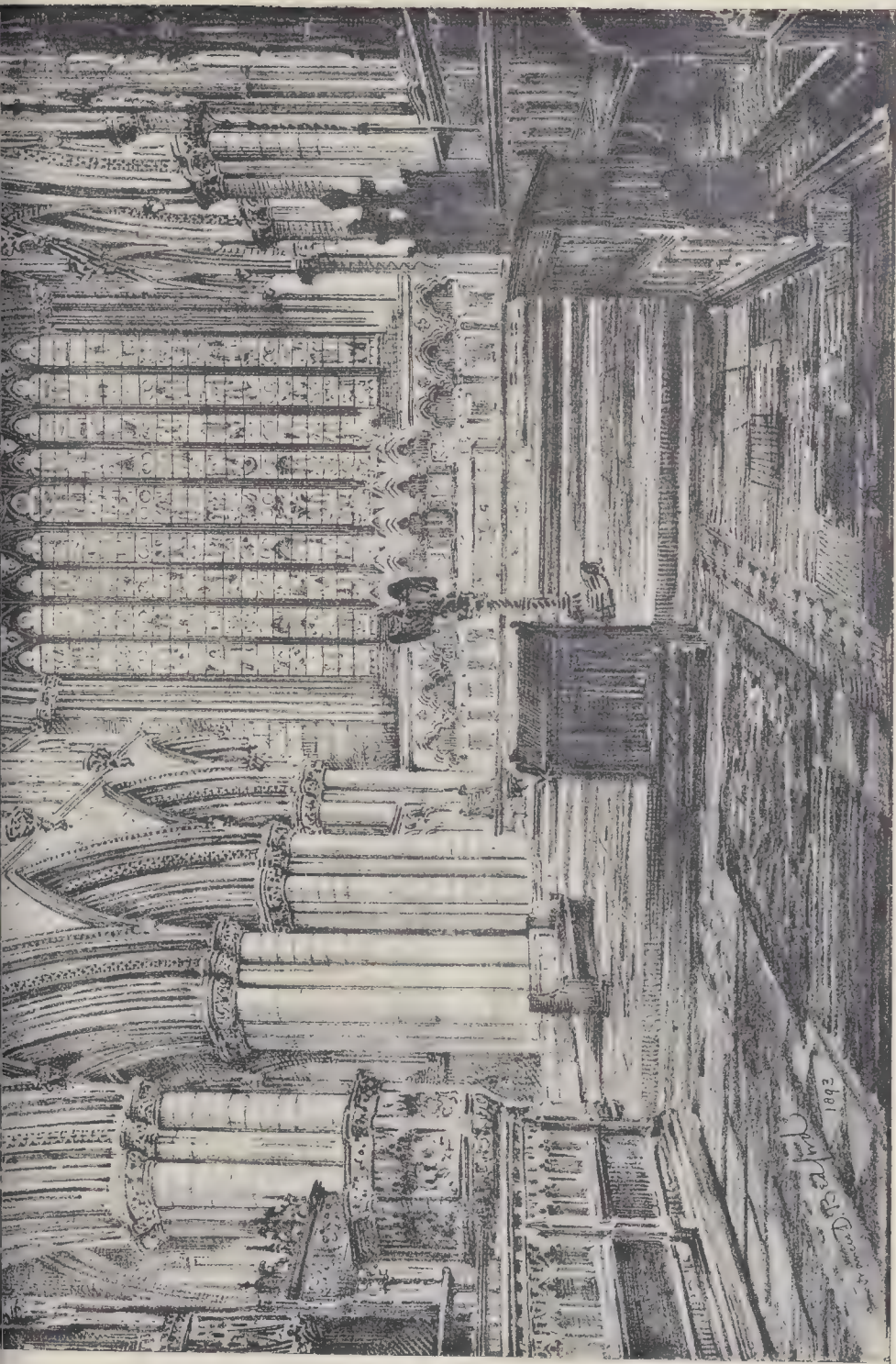
* Dr. Thorne, in his "Progress of Preventive Medicine" (pp. 42 and 43) records that, in an investigation he made into an outbreak of diphtheria in Essex "the incidence of the disease upon children from 10 to twelve years old was about 50 per cent. greater upon those known to have attended school than upon the remainder." He also quotes from Mr. Power's report on an outbreak at Fribright "on four successive occasions while the village school was open, well-marked diphtheria occurred among the scholars . . . and this although the school premises were free from recognisable sanitary defects, and although the school was not, after its first closure, re-opened until the disease had seemed extinct in the parish and careful measures of disinfection had been used." Dr. Thorne further points out that the re-opening of the school appeared on each of the four occasions to be responsible for giving a serious quality to the resulting diphtheria; and he adds that there are grounds for believing that the aggregation together of cases of diphtheria and of allied throat affections under circumstances such as those obtaining in elementary schools constitutes one of the conditions under which a form of disease of particular potency for spread and for death may be, so to speak, manufactured.

† "Vital Statistics," p. 423.



THE BUILDER, MAY 6, 1893.





CARLISLE CATHEDRAL: VIEW IN CHOIR—FROM A DRAWING BY MR. F. D. BEDFORD, A.R.B.A.

28 ft. wide. These errors are common enough, owing to the absence of any sufficient controlling power, and though they are fully recognised by the architect and by the County Council too, they are nevertheless often committed under professional superintendence in order to comply with the client's demands for adequate if not excessive return for outlay.

In many of the earlier built blocks of artisans' dwellings it was common enough to arrange them in such a manner that many families were aggregated together in the one enclosed atmosphere of a building many stories high. These buildings were very disappointing in their wholesomeness, and the evidence given before the Royal Commission on the Housing of the Working Classes, 1884, affords some suggestive information bearing upon this important question of hygiene in its application to the arrangement of buildings, while the density of population, in some instances reaching a rate of about 1,000 to the acre, was shown to be very high. The mortality rate in these huge blocks of artisans' dwellings is commonly higher than it ought to be, when it is borne in mind that the tenants are to a large extent specially selected for their respectability and other good qualities. I do not imply that any system of selection is intentionally adopted by the landlord, but that, in effect, the tenants come to be sifted down, so to speak, to a picked set of respectable families, the average being more steady, sober and reputable than the average of the same class living elsewhere. Notwithstanding this advantage, the difference between the mortality rate in these block dwellings and in the whole Metropolis is often very small, and this, too, even in the rate of infant mortality. Thus, it has been stated that in a population of between 6,000 and 7,000 occupying upwards of a dozen different estates of block dwellings, the general death rate was 15·6 per 1,000, while in the whole metropolis it was 18·5 per 1,000; but in those same dwellings the rate of infant mortality was 140 per 1,000 births, or only six less than in the whole Metropolis, where the rate during the same period was 146 per 1,000 births, a difference, in that most important matter, which is so small as to leave much material for reflection and inquiry.

Closely akin to the subject of block-dwellings is that of common lodging houses, and so called "refuges" for homeless persons. When it is borne in mind how the persons resorting nightly to these dwellings carry disease about and spread it all over the country, it will be admitted that improvement is desirable in the arrangement and other conditions of the buildings they inhabit. It has been noticed over and over again that where extensive works, such as railway construction, water conduit works, canal works, and the like, are in progress, and a large number of navvies have to be temporarily housed, various kinds of disease commonly break out among them, and are often spread from them over very wide areas. Now if we look at the conditions under which these people are usually housed, we shall find them crowded together night after night in large numbers with the scantiest amount possible of space, cubic and superficial. The contractor's navvy is housed in a wooden hut, the lodger in the common lodging house is crowded into an indifferently ventilated dwelling, and the houseless poor seek the shelter afforded either by the charitable or the parochial authorities in such refuges as are available, and there are many, but the hygienic arrangements of them generally leave much to be desired. They often hold some hundreds of lodgers, the dormitories having as many as fifty to seventy or more beds in them, and this in two or more stories. These conditions are obviously not calculated to promote the health of the lodgers, but rather to foster and encourage any latent disease that may exist among them.

In my opinion it is most desirable that the building should be so arranged as to allow the large numbers received into such lodging houses and refuges to be subdivided into small groups, the dormitories being severed as much as possible, aerially, one from another, and the number of lodgers in each reduced to a maximum of some twenty, unless the customary amount of superficial and cubic space to each lodger be largely increased.

It will be gathered from what I have said that great hygienic importance attaches, in my humble opinion, to such arrangement of building as will ensure the segregation of human beings as far as practicable where they have to be collected together for special purposes, and it is because I have been led to this opinion by many years of observation that I venture to urge it as strongly

as I do. I have noticed that, even quite recently, competition plans have been, or are to be, invited for large schools—in one case a day-school for some 1,200 children, and in another a residential school for some 700 boys, with an intimation that accommodation will be needed later on for about 500 girls—and so far as I have been able to gather the really important questions of the hygienic arrangement of buildings and of the disposition or grouping of the children for purposes of health, are practically ignored, or are left to be determined on the lines that it has been the custom to follow for very many years, and which I venture to think ought to be regarded as obsolete.

I do not doubt that much may be said in favour of the present system of arrangement—the aggregation system I will call it—on the score of economy, but I am inclined to demur to a good deal that has been urged on this head. Time, however, does not allow of my going into the question of relative cost of the two systems on the present occasion. But I will conclude with the hope that the points I have urged may be helpful to the architect in the advice he may be called upon to give his client as to the best way, from a health point of view, of arranging the building he is commissioned to design.

[Some notes of the discussion which followed will be found on another page.]

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

NEW OFFICES FOR THE "MORNING POST."

ON the occasion of the last of this session's spring visits, the extension to the premises of the *Morning Post* in Wellington-street, Strand, were inspected by a large number of members of the Association, under the guidance of the architect, Mr. H. O. Cresswell, and of Mr. F. T. W. Goldsmith, jun., hon. sec. Mr. Cresswell explained that the visit had been robbed of a part of its interest by a recent disastrous fire at the contractor's shops, which had unfortunately consumed the whole of the hard-wood fittings of the building; these had been entirely completed and only awaited delivery, nevertheless the visit was a most interesting one. As is well known, the site is a commanding one at the corner of Wellington-street and the Strand, and the building can be seen from Waterloo Bridge. The fact that the new portion is only an extension of existing premises has influenced to a great extent the design, and many points which create comment may be attributed in most instances to this cause. The front elevations have been kept plain, with a ground floor story of Portland stone, and the upper portion of red brick and Portland stone dressings. There is evidence of restraint in the treatment which is too often lacking in modern work, and this is distinctly commendable. We should, however, have liked to see somewhat thicker sash bars to the upper windows, and a little more bulk to the balusters of the window openings, the thinness of the latter suggesting other material than stone. We gave view, plans, and description of the buildings in the *Builder* for February 18 last, but may say here that each floor is in communication with the old portion. The basement has space for engine, boiler, and machines. The ground floor is devoted to the offices for advertisements, cashier, &c., and this is entered from the corner of the building. There is an open area at the back, and around this two staircases are grouped, with the lavatory arrangements on each floor. The ventilating shaft and smoke shaft also occupy space in the centre of the building, immediately adjacent to the strong room. The first floor is devoted to waiting-room, manager's, editor's, and sub-editor's room, and the upper floors to rooms for leader writers and others. The roof-story is top-lighted for the use of compositors. A further inspection of the old premises brought the visit to a close, and here the various processes used in the printing of a large daily paper were demonstrated by the staff in an interesting manner. The contract for the building has been carried out by Mr. D. Charteris.

THE ENGLISH IRON TRADE.—The English iron market shows little appreciable change on the week. Crude iron continues quiet, with few alterations in price. Finished iron is in poor inquiry, but tinplates maintain fair activity. Steel is in only limited request, and both shipbuilders and engineers report little amelioration in prospects. The coal trade remains quiet.—*Iron.*

INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS: MIDLAND COUNTIES MEETING AT DUDLEY.

A MIDLAND Counties District meeting of this Association was held at Dudley on Saturday, April 29. It was very well attended. Assembling in the Council Chamber of the Town Hall, the members were received by the Mayor (Mr. G. H. Cloughton) and warmly welcomed by him to what was once the capital of the Midlands. Mr. Cartwright (Bury), the President of the Association, having taken the chair, Mr. A. T. Davis, of Shrewsbury, was on the motion of Mr. Lobley (Hanley), seconded by Mr. Godfrey (King's Norton), unanimously re-elected Hon. Sec. for the District.

The visitors then proceeded in brakes to Rowley Regis, to inspect Messrs. Doulton & Co.'s drain-pipe, brick, and terra-cotta works. Here they were received by Mr. James D. Doulton, and by him conducted over the extensive and busy works, which are probably the largest drain-pipe works in the world, from the point of view of production and output. The works were established rather more than forty years ago with twenty men. They now cover thirty acres, and gives employment to about 700 persons. The visitors, after inspecting one or two of Messrs. Doulton's newest specialities, including their new safety adjustable or flexible drain-pipe joint, witnessed the production by machinery of drain-pipes of various sizes, from 4 in. up to 30 in. in diameter. The visitors witnessed the various processes the clay undergoes from its reception until it emerges as a finished product. Eight steam presses are at work, turning out about ten miles of sanitary pipes per week. The rapidity and exactitude with which the pipes are made and handled, and the ingenuity of the machinery and appliances brought into play, excited much interest. The visitors subsequently inspected the drying floors on which the pipes are stored for some time preparatory to firing, and the kilns, two of which were open. They also inspected the terra-cotta moulding shops, the brick-making shops, the brick-kilns (we were informed that the plant is equal to an output of 100,000 bricks per week), the engineering shop, and other departments of the works, and after thanking Mr. Doulton for his kindness they resumed the carriages, and on their way back to Dudley inspected the new Public Baths, the Sewage Catch-Pound, and the new Fire Station. They also alighted to inspect a street at Netherton, in which the whole of the houses (comparatively newly-built) have been more or less completely wrecked through subsidence of the ground caused by mining operations below within the last year or two. These houses (all of brick construction) are picturesquely leaning over, at all sorts of angles out of the perpendicular, and parting company from each other in such a way as to make it a marvel that they stand at all, for very little seems to be done in the way of shoring. Of course, all the houses that are most seriously affected are without occupants, but they are not hoarded in for the protection of passers-by, as houses in such condition would be in London; and some houses which show signs of material subsidence remain occupied. An inspection of the street referred to, as well as of other buildings in Netherton, would probably disturb with nightmare the slumbers of some of the District Surveyors in London, who are sometimes regarded as taking too alarmist a view of cracks or settlements in buildings. It is difficult to account for the fact that the buildings referred to at Netherton do not totally collapse, except on the supposition that they are better built than the average house of suburban London, which would probably not stand the ordeal to which the Netherton houses have been subjected.

Returning to the Town Hall, the President, Mr. Cartwright, took the chair, and Mr. Gammage, the Borough Surveyor of Dudley, read a paper giving a brief outline of the principal points of interest in the borough, so far as they affect the work of the municipal engineer. The borough was incorporated in 1865; it has an area of 3,602 acres, the greater portion of which is mining land. Its population is about 46,000 persons, residing in 9,800 houses. The borough consists of Dudley and the outlying districts of Netherton and Woodside, lying about a mile apart. The town is built on the ridge of the Pennine range, with railway and canal accommodation at the foot of the hill on its north-east and southern sides. It is connected with the London and North-Western Railway and Birmingham and Stafford Railways at Dudley Port,

and with the Great Western Railway, which passes through a portion of the borough. It was made a County Borough when the County Councils were established, and is in the county of Worcester, being insulated in the southern extremity of Staffordshire. It is also a Parliamentary borough, extending into the county of Stafford, and an old market town. Two hundred and fifty years ago it had but 360 houses, with about 1,800 inhabitants, including those at the Castle. In 1831 it had a population of 23,000, which it has doubled in the last sixty years. Its trades, in addition to coal, ironstone, and fireclay mining, include iron and brass manufacture, comprising chains, anchors, anvils, nails, vices, edge-tools, gas and water tubing, bridge girders, boilers, bedsteads, fenders and fire-irons, cast-iron water and gas pipes; also glass and cycles. The borough is rich in ironstone, coal, and limestone, which afford all that is required for smelting purposes. Fireclay and basaltic rock are also found in the borough, so that with good trade the district should be a prosperous one. The forty-two miles of streets and roads in the borough cost on an average about 115*l.* per mile per annum for maintenance, which compares favourably with other towns, when taking into consideration the cartage of heavy material to and from the various works, including the coal for gasworks purposes, as well as the large quantity of materials conveyed through the town to and from the surrounding works outside the borough. Mining operations also materially affect the state of the roads and streets of the outlying districts by occasional subsidences. Dudley is a centre for several districts which contain, within a radius of three miles, another 100,000 inhabitants. Before the year 1870 very little seems to have been done to improve the condition of the borough, but since that time the Corporation has taken every opportunity of making improvements, and has followed very well the lead of other towns with regard to sanitary matters. The death-rate is low and the town healthy. Public baths were erected in 1880-81 at a cost of 10,000*l.* The sewerage scheme for the town was carried out from 1879-84 at a cost of 59,000*l.*, and it claims to be one of the best in the country. The sewerage of Netherton and Woodside districts is now being carried out upon the same lines as that of the other portion of the borough, a joint board having been formed consisting of the Corporation of Dudley, the Local Boards of Rowley Regis, Quarry Bank, and other Sanitary Authorities, for a joint scheme by which the sewage will be conveyed to land at Whittington, adjoining the Stourbridge sewage farm. A library and art gallery was erected in Dudley in 1883-4, at a cost of 7,000*l.*, and contracts for the erection of two branch libraries and other buildings for the outlying districts of Netherton and Woodside have recently been entered into, at a cost of 9,000*l.* The town possesses two small blocks of buildings for smallpox and fever cases. Several old properties have been purchased by the Corporation and removed to improve the various streets and markets of the town. Nearly nineteen miles of footway paving of various materials have been laid, at a cost of 12,184*l.* A new fire station, with stabling attached, has, during the past year, been erected at a cost of 1,600*l.* During the past year, thirty-two acres of land have been purchased and laid out as recreation grounds. Notwithstanding all these improvements and new works, the debt of the town is only about 66,000*l.*, and the town is the lowest-rated in the district. The town has also the use, by the permission of the Earl of Dudley, of the Castle grounds, containing sixty-six acres. The late Earl of Dudley also erected a large fountain in the market-place.

Mr. Gammage afterwards (in the unavoidable absence of the author) read a paper on the Sewerage and Sewerage Disposal Works of the Borough of Dudley, by Mr. E. D. Marten, M.A., Assoc. M.Inst.C.E. We make the following extracts from the paper, which was an excerpt from the "Minutes of Proceedings of the Institution of Civil Engineers," vol. civ. t—

The difficulty of dealing with the sewage question is enhanced in the populous district which overlies the celebrated South Staffordshire ten-yard seam by mining operations. Wherever this coal is worked the surface is more or less affected, and subsidences or is "drawn" sometimes gradually, but sometimes with such suddenness as to endanger life. Water-pipes of the ordinary description are frequently fractured by these movements, which often cause considerable leakage at the joints. So much is this the case that the author's father, Mr. Henry John Marten, M.Inst.C.E., many years ago found it necessary to design a special socket to obviate the difficulty. Some of

the canals which intersect the district are now carried upon embankments 20 ft. in height, over ground which, within the memory of man, was on a level with their banks. It will readily be understood that these subsidences, which are of everyday occurrence in the Black Country, seriously interfere with the work of the sanitary engineer.

The difficulties are not so formidable in the towns themselves as in the districts which surround them, since in most cases the value of the surface-rights in towns, and the necessity of affording vertical and lateral supports to buildings, make any mining operations thereunder impracticable, and it is generally, but not always, found possible to construct and work a system of internal sewerage. It is mainly in connexion with outfall and intercepting sewers laid outside town limits that the troubles accruing from mining operations are experienced. Whilst, moreover, the mining operations in this district are a standing cause of leaky sewers, they are at the same time emphatically a reason why they should be watertight. The South Staffordshire Mines Drainage Commissioners have spent large sums of money in draining the coalfield and in constructing works to prevent water finding its way into the mines, and they very properly watch with a jealous eye any action which may possibly add to their pumping expenses. All sewers constructed outside the actual town district have to be laid in a thick bed of puddled clay, and sometimes are required also to be of cast-iron.

Sewage-farming within the mining area would be attended with great difficulty, as even if a sufficiency of surface land could be acquired without the vast expense of purchasing the minerals below, anything in the shape of irrigation would be open to suspicion, as likely to send water into the mines, and would probably be opposed by the Mines Drainage authorities on that ground. Precipitation, aided by artificial filtration, is practically the only process available for the central towns of this district, unless the sewage can be conveyed by some means over the intervening mining ground on to the non-mining *terra firma* which surrounds it. Precipitation, however, is also attended with considerable difficulties, because, to enable the necessary works to be constructed, the first requirement is suitable land, the mines and minerals underlying which must be purchased. This adds considerably to the cost, and further difficulties are often experienced on account of the operations of adjoining mine-owners, which have a tendency to "draw" the site and the structures erected upon it.

The municipal borough of Dudley has a population of about 46,000, the town itself containing about 30,000 inhabitants, while the remaining 16,000 are scattered among the mining villages which lie within the borough boundaries. It is situated upon a ridge running nearly north and south, and forming a portion of the watershed of England, the natural drainage of the town being partly into the Severn basin and partly into the Trent basin. Some of the houses stand at an elevation of over 800 ft. above sea-level; and the lowest part of the ridge, where it passes through the town, is 660 ft. above sea-level. The districts to be drained lie on each side of the main hill, extending as far down as 590 ft. above sea-level, so that it is only possible to deal with the whole sewage of the town, at any one point, by means of long lines of intercepting sewers connected by a tunnel about half-a-mile in length through the ridge. To these difficulties, arising from the conformation of the ground on which the town is built, were added those arising from mining operations around it.

In 1876 the Corporation purchased an estate known as the Russell's Hall estate, 70 acres in extent, closely adjoining the western side of the town, and lying at a sufficiently low level to deal with the whole of the sewage from both sides of the ridge.

It was proposed to bring the sewage to this land by means of intercepting sewers traversing both flanks of the hill upon which the town is built, and connected by a tunnel, and to deal with it there by means of a combination of filter-beds and irrigation. The estate consisted entirely of mining-ground, and the scheme was consequently opposed, both by the South Staffordshire Mines Drainage Commissioners, and by the late Earl of Dudley, who was by far the largest ratepayer in the borough, and who was advised that the diversion, as proposed by the Corporation, of storm-water as well as sewage on the land, would injuriously affect his mining operations in its neighbourhood, and the streams passing through his estate, besides being unnecessarily costly and likely to create a

nuisance. The author's father, Mr. Henry John Marten, M.Inst.C.E., was consulted, and with the concurrence of Mr. George Taylor, the agent for the surface of the Dudley and Himley estates, prepared an alternative scheme which was laid before the Town Council in a report, on July 25, 1876. This scheme, after a delay occasioned by the necessity of obtaining an Act of Parliament—certain portions of the Earl's settled estates being affected by the covenants entered into with the Corporation—was carried out by Mr. H. J. Marten, assisted by the author, during a period extending from June 25, 1879, to July 30, 1884.

The town has been entirely re-sewered on the separate system, and upon the most modern principles. The gradients are in most cases so steep that practically no artificial flushing is required, and from the same cause a few ventilators carried up the sides of the houses in the higher parts of the town are sufficient, with the aid of the ventilating covers of the manholes, to keep the sewers pure and wholesome. The branch sewers are all stoneware, and the joints are made with tared yarn and cement. Manholes are placed at every change of line or gradient. Only one case of stoppage has occurred since the system has been in operation; and on an investigation being made as to the cause, it was discovered that a butcher was in the habit of discharging hot fat into the sewer. This was put a stop to, and it has always worked well since. The houses have, to a large extent, been disconnected from the old drains, which are intended to be used henceforth exclusively for surface-water, which they convey to the streams and brooks, eleven in number, forming the natural outlets from the town. Only such storm-water as it is impossible to exclude is allowed to enter the new sewers. The old drains, as is usually the case, were found to be of immense size compared with the work they were constructed to perform, and to have been put in without any attempt at system, and the capital outlay which they represent would probably, if properly applied, have sufficed to put down three or four complete modern systems of internal sewerage for the town.

The sewage, collected as above described, gravitates to an intercepting sewer along each side of the ridge upon which the town is built. These intercepting sewers, whose flattest gradient is 5 ft. per mile, converge upon the Russell's Hall estate, the northern one being for the last $\frac{1}{2}$ mile in a tunnel which is in some places more than 100 ft. below the surface of the ground. The hill through which this tunnel passes has been formed by an upheaval of the Upper Silurian Limestones, which here form an anticlinal, from the summit of which the coal measures have been denuded. No trouble, consequently, was experienced from mining operations in driving the tunnel, though the intercepting sewers themselves suffered greatly from this cause. They had to be laid almost entirely in a thick bed of puddled clay, and as near the surface of the ground as possible, which added seriously to their length, as it was necessary to follow the contour of the land. To show the difficulties which have to be contended with in a mining country, the author may mention that, during the construction of the works, he found one morning that some thirty yards of the new sewer had disappeared bodily into the workings below, leaving nothing to be seen except a deep hole resembling the crater of a volcano. This accident rendered necessary a somewhat costly deviation from the line originally selected.

At Russell's Hall estate, the liquid is first sent through rough strainers capable of removing the heavier solid matters; it is then passed into a small reservoir or storm-water catch-pound, formed partly by excavation and partly by embankment, and capable of holding about 2,500,000 gallons. This storm-water catch-pound is situated upon the upper part of the Russell's Hall estate, and the level of its top water-line is 544 ft. above Ordnance Datum. There is a considerable fall between this and the River Smestow, 4 $\frac{1}{2}$ miles to the westward, the bed of which is 344 ft. lower. Still going westward, the country rises rapidly for the next mile beyond the river to the summit of a range known as the Black Hills, which is 426 ft. above Ordnance Datum. From this point there is a gradual fall westward for some miles. The sewage, collected as above described into the storm-water catch-pound, is delivered by gravitation through a 13 in. cast-iron main, acting as an inverted siphon, across the valley of the River Smestow, on to the summit of the Black Hills above referred to, near the Whitehouse Farm, in the centre of a considerable area of land belonging to the Earl of Dudley. This 13 in. main is 5 $\frac{1}{2}$ miles in length, and the average fall between the

catch-pound and the point of delivery at Whitehouse Farm is about 21 ft. 6 in. per mile. The pipe follows all the irregularities of the land along which it is laid, with rising gradients in the steeper parts, ranging from 1 in 10 to 1 in 21, the total rise from the bottom of the valley to the Whitehouse Farm being 210 ft. in a length of three-quarters of a mile.

There is an overflow weir at the top-water level in the catch-pound, but the accumulated sewage has never risen so high, even during storms. In ordinary times it passes directly from the sewers into the 13-in. main without rising up in the catch-pound, and although consequently it undergoes no previous "settling," and the only treatment it receives is from the rough strainers before referred to, the scouring power is such that the main is always free from silt.

Means are provided at all depressions of pouring out any deposits which may form, and air-valves are fixed at every summit. In constructing these, care was taken to prevent the possibility of the ball-seats becoming at any time choked with sewage. This was effected by means of a separate connecting-pipe between the bottom of the ball-seat and the main air-valve branch. In all other respects the fittings were the same as for an ordinary water-main. For the first two-and-a-half miles the 13-in. main traverses the mining district to the west of Dudley, but near Himley Hall, one of the seats of the Earl of Dudley, the main fault is crossed, and for the remaining three miles of its course, it is entirely over the Soft Red Rocks and Conglomerates of the Bunter Series of the New Red Sandstone, which also extend beyond it for two miles to the west of the terminus, and for many miles to the north and south. Throughout the last three miles, the main lies entirely upon the property of the Earl of Dudley. It is provided, at convenient intervals, with lateral branches leading to circular brick reception-tanks placed in elevated situations on various parts of the estate. On each of these a sluice-cock is fixed so that sewage may be run into the tank when desired. In order that it may not be discharged high into the air by the pressure in the main, a wrought-iron shield or spreader is fixed over the inflow, so that the liquid impinges against it, and is spread quietly over the floor of the reception-well. Openings leading in several directions and guarded by sluice-boards are provided in the tank, and through these the sewage passes to carriers in any direction. This ramification of distributing-pipes is available over a tract of country (including certain lands to the west of the terminus at the Black Hills) for some four or five miles in length, and having an average breadth of two miles, or between 5,000 and 6,000 acres in area.

Although this land is available, and is amply provided with the means for the distribution of the sewage, by far the larger proportion of it serves for the present merely as a reserve, and the most interesting operations are to be observed on a comparatively small area in the neighbourhood of the terminus at Black Hills. Here the sewage is applied intermittently to three farms, with an aggregate of 722 acres, under the control of the Earl of Dudley's principal land agent, Mr. George Taylor. Unlike the greater part of the available land (which is upon the Upper Soft Red Rocks of the Bunter Series, and which is tolerably fertile) these three farms are upon the Conglomerate, and the soil is poor and sandy, so that prior to the construction of the works of the Dudley Corporation this land was a by-word in the neighbourhood for sterility. At first the supply of sewage, as might naturally have been expected, was limited; but as from year to year it has increased, the fertility of the farms has developed in a more than corresponding degree.

This bargain is perhaps unique in the history of sewage disposal. The Earl of Dudley takes the sewage from the Corporation without either paying for it or receiving any payment for doing so. He relieves the Corporation, by an ample indemnity, of all further responsibility in connexion with it, by an agreement which has been ratified by special Act of Parliament. Thus the town of Dudley is rid for ever and entirely of its "sewage question," whilst that portion of the Earl's estates under treatment is considerably improving in value. The bargain has been satisfactory to both the parties to it.

A point upon which sanitary engineers will desire information is as to the nature of the effluent from these farms. Mr. Taylor, on being asked, replied, "We have never seen an effluent. The soil absorbs it all," and it is impossible to detect, either in the River Stomestow or any other neighbouring brook course, a trace of the proximity of sewage farming operations. The district

is sparsely inhabited, but it has never been suggested that there is any contamination of the few local wells. The sewage operations, whilst a great boon as enhancing agricultural prosperity, are not more of a nuisance than others connected with the manuring of the land which are usually carried on in rural districts.

No precipitation is required. The matter held in suspension, which has been described as the bane of the ordinary sewage-farmer, and which clogs the pores of ordinary soil, is found, when applied in the intermittent and sparing manner adopted in this case, to mix admirably with the sandy soil, the nature of which it is gradually changing. The essential feature of the scheme is that the land available is practically of unlimited area as compared with the volume of the sewage. Finally, there are no working expenses. The Corporation men clean out the strainers at Russell's Hall once a week, and by way of precaution a turncock is sent along the line of the 13-in. main once a month to open and oil every valve. In every other respect the system is self-acting.

The total cost of the works, including the internal sewers, the intercepting sewers, the storm-water catch-pound, and the $\frac{5}{8}$ miles of 13-in. gravitation main, was about 44,000*l.*, but the purchase of Russell's Hall estate, way-leaves for intercepting sewers, and other extraneous expenses, brought the total up to about 55,000*l.* The cost of the 13-in. main and the necessary valves for scouring purposes, &c. (but exclusive of the distributing fittings), was 16*l.* 2*d.* per yard, laid complete. No way-leave had to be paid. The storm-water catch-pound, with the necessary ironwork, brick-work, &c., cost 16*l.* 1*d.* per 1,000 gallons capacity, or including a high unclimbable iron fence which was ultimately found to be necessary, 17*l.* 11*d.* per 1,000 gallons. The intercepting and internal sewers, including all manholes, junctions, and other necessary adjuncts, but exclusive of way-leaves, cost 30*l.* 42*s.* 5*d.*, or 1*l.* 0*s.* 3*d.* per head of the population served by the sewers. These figures are based on the final certificates. They do not include engineering or clerk of works, for which, and one or two other small matters, about 7*l.* per cent. should be added. 59,000*l.* was borrowed.

In conclusion, it may be remarked that the Corporation of Dudley claim—and with some reason—that they have a sewerage system which is practically perfect. They enjoy all the advantages of the possession and user of a sewerage-farm without any of its liabilities; they are burdened with no perpetual charge in the shape of working expenses; they have an entirely modern system of internal and outfall sewerage which gives complete satisfaction; and they get all this for the moderate expenditure upon works of under 30*s.* a head of the population. Moreover, the only other interest affected (that of the Earl of Dudley) has largely benefited by the operations. That Dudley has succeeded in wiping off what may be termed the adverse balance resulting from mining difficulties, and from the physical conformation of the town, and in replacing it by the exceedingly substantial asset which has been described, should be an encouragement to municipalities where the sewage question is still unsolved. At the same time it must be admitted that this state of things resulted from three circumstances, all exceptional, namely:—1st. That there was a practically unlimited tract of land eminently suited for the reception of sewage within a few miles of the town. 2nd. That the level of this land was such as to allow of the sewage passing on to any part of it by gravitation. 3rd. That the owner was willing to take the sewage and deal with it thereon upon the terms which have been described.

A brief discussion followed the reading of the paper, in which Mr. Middleton (Walsall), Mr. Eayrs (West Bromwich), and Mr. Davis (Shrewsbury), took part, and a vote of thanks was passed to the authors of the papers.

Subsequently a visit was paid to the interesting remains of Dudley Castle, and to the remarkable limestone caverns in the Castle Hill, which were specially illuminated for the occasion at the cost of the Mayor of Dudley. Mr. Madeley gave an interesting description of the geological characteristics of the place. On emerging from the caverns the visitors were entertained by the Mayor at a late luncheon, and so the day's proceedings terminated.

"ORIENTATION OF CHURCHES."—In our article on this subject last week the extreme angle of sunrise on Ascension Day for latitude fifty-six north has been incorrectly taken from the table as that for fifty-three north. It should read "Ascension Day, in like manner, those from 28° N. to 40° 30' N."

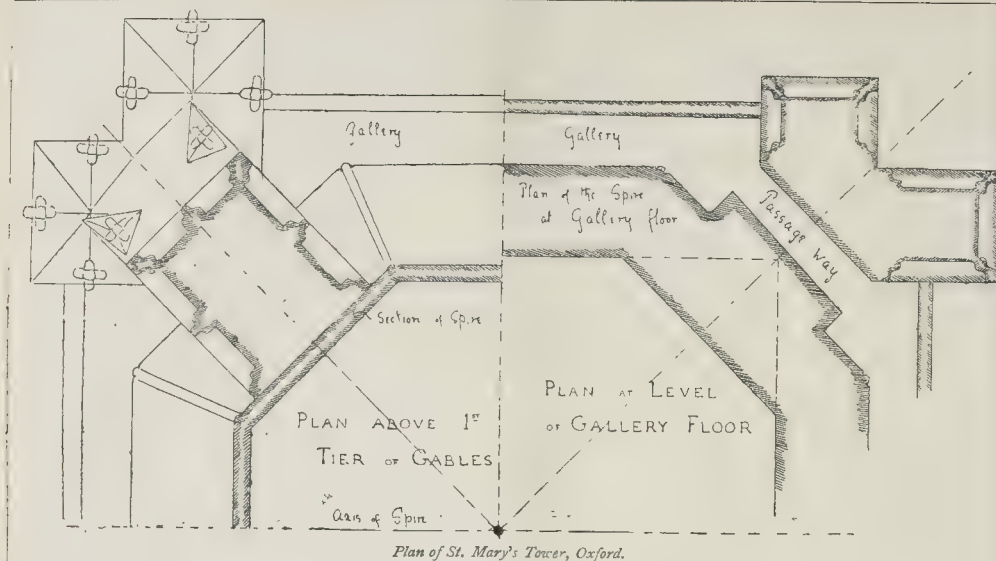
COMPETITIONS.

CHRIST'S HOSPITAL SCHOOLS.—This important competition has at last been arranged, after considerably longer delay than was anticipated. It was originally intended, as our readers may remember, that only four competitors should be selected, but the feeling which was expressed in one or two letters in our columns, that this was a rather restricted number for so large a competition, seems to have had its effect with the committee and with their assessor (Mr. Christian) also, and eventually it was agreed that six names should be selected. Having selected the six, it was then, however, necessary to write to each of them and ask if they objected to the substitution of six for four names, the latter number having been formally advertised. One of the six objected and withdrew, regarding it as an infringement of the advertised conditions. There now remain therefore five selected competitors, who are, giving them alphabetically, Messrs. Carpenter & Ingelow, Mr. T. E. Collicutt, Mr. T. G. Jackson, Messrs. Paley & Austin, and Messrs. Webb & Bell. The one whose design is considered best of the five will be selected to carry out the building, the other four will receive a fee of 400*l.* each. The designs are to be sent in by January 1 next year. One hundred and thirty architects applied for selection.

PROPOSED COUNTY BUILDINGS, ANGLESEY.—A special meeting of the Anglesey Standing Joint (Police) Committee, presided over by Mr. O. H. Foulkes, was held on the 28th ult. at Llangefni, to consider the question of the erection of county buildings in that town. The Committee had some time ago offered a premium of 60*l.* for the best plans of county buildings, and nine sets of plans had been sent in for competition. A sub-committee appointed to consider these plans had decided upon a set bearing the motto of a "Goat," which plans they had accepted, the successful competitor proving to be Mr. Lloyd Williams, of Denbigh. At a subsequent meeting of the Police Committee, objection had been raised to the procedure of the sub-committee, it being contended that they had no authority to accept any plans, and a motion in favour of adopting the plans recommended was negatived. The present meeting was therefore convened to reconsider the whole question, and several members objected to the amount proposed to be expended—namely, 6,000*l.* Major R. Ap Hugh Williams, J.P., said that there was a strong feeling in the county that the sum proposed to be expended was much larger than was needed, and that it was mere extravagance. He moved that none of the plans sent in be accepted. Dr. O. Elias Owen, J.P., hoped the committee was not going to stultify its own action in the matter, as the question had been decided once. The plans having been got, the sub-committee had spent a great deal of time to consider them, and had called Mr. O. M. Roberts, of Portmadoc, as assessor. Major T. J. E. Lloyd, J.P., seconded Major Williams's motion. Mr. Lewis Hughes moved an amendment that the plans of Mr. Lloyd Williams, of Denbigh, be accepted, provided the net cost does not exceed 4,500*l.* The Rev. S. A. Fraser seconded the amendment, which was ultimately agreed to.

NEW BOARD SCHOOLS AT MENSTON, YORKS.—We hear that a limited competition for the erection of new Board Schools has been decided by the Board. Mr. Peterson, of Bradford, was called in as professional referee, and on his recommendation the plans submitted by Messrs. Fairbank & Wall, architects, of Otley and Bradford, were accepted, and, at a Board meeting held on the 2nd inst., tracings were ordered to be forwarded to the Education Department. Mr. T. E. Marshall, of Harrogate, was placed second, and Mr. H. Chippendale, of Guiseley, third.

EDINBURGH STREETS AND BUILDINGS ESTIMATES.—On the 20th ult. the Streets and Buildings Committee of the Town Council had before them a provisional estimate for the repair and maintenance of streets, &c., in the year to May 15, 1894. The total estimated expenditure is 50,020*l.*, as against an estimated expenditure in 1892-93 of 49,920*l.*, and an actual expenditure in 1891-92 of 41,295*l.* The receipts next year are estimated at 4,634*l.*; last year these were estimated at 6,805*l.*, while the actual revenue in the preceding year was 1,400*l.* The committee had also submitted to them a draft estimate of expenditure for the formation and maintenance of sewers and drains during next financial year. The total estimate amounts to 21,800*l.*; in 1892-93 the figures were estimated at 20,025*l.*; and in 1891-92 the actual expenditure was 19,110*l.* The revenue for next year is set down at 850*l.*, as against 400*l.* estimated last year, and 650*l.*, the actual receipts in the previous year.—*Scotsman.*



Illustrations.

ST. MARY'S CHURCH, OXFORD.

THE splendid steeple of St. Mary's Church at Oxford, which dates from the end of the thirteenth or beginning of the fourteenth century, was repeatedly damaged by storms which destroyed part of the great pinnacles that are grouped round the base of the spire. The upper part of these pinnacles was repaired and remodelled by Vice-Chancellor King in the time of James I., but in a very inartistic manner. The tower in this state is to be seen in Logan's print of 1675, and it remained unaltered till 1848. At the latter date, the whole steeple, including the tower, was repaired and in a great measure remodelled, and a new form was given to the great pinnacles in substitution for the somewhat bungling contrivance of the Jacobean period. The steeple is shown at the side of the present illustration in the form to which it was brought by the work of 1848-52.

The stone from the Taynton quarries then used was of a perishable nature, and the whole of the masonry of the pinnacles is now in a state of ruin and requires to be reconstructed. Mr. Jackson, whose design we illustrate, proposes to take advantage of this in his reconstruction in order to reduce the excessive height to which the upper part of the pinnacles was raised by Mr. Buckler forty years ago, and to introduce other minor alterations with the object of improving the outline, and bringing it nearer to what was probably the original form. The effect of the alteration will be judged by comparison of the two designs, which are placed side by side in the drawing.

CARLISLE CATHEDRAL.*

THE architectural history of a cathedral church is chiefly to be found in the changes and additions that have been made to the eastern arm, differing in this respect from an ordinary parish church, where the growth of the nave responded to the growth of the parish. Carlisle is no exception to this rule as regards the eastern limb, for the noble choir we now see is the third, if not the fourth, that has occupied the site. The nave also has a history of its own, in that it formed the parish church, and that it has come down to us so shorn of its goodly proportions as to be but a shadow of its former self.

We have little to guide us in the history of this cathedral, beyond tradition and the actual remains of the buildings themselves. We know

* This series of illustrations of the Cathedrals of England and Wales was begun in our issue of January 3, 1891. A list of those already illustrated, with particulars of future arrangements, will be found on page xxii. We intend to supplement this series with another illustrative of the Cathedrals of Scotland, commencing in the number for July 1. Full particulars will be shortly announced.

that in 1092 William Rufus visited Carlisle; that he found it a waste chester, inhabited by a few Celts only; that he set about the erection of a fortress, a *turris fortissima*, on the north of, and abutting on, the site of the ancient Roman town; that he sent Flemish masons and other artificers from a distance to carry out the buildings; and that Walter, a Norman, was in charge of the works.

To this Walter is given the credit of having commenced to build a church at Carlisle, and of intending to found a religious house. The work was taken up by Henry I., who brought settlers from Kent, Essex, Middlesex, to people the town, and, at the intercession of his Queen Matilda, founded and endowed a church and a house of Regular Canons of St. Augustine, in honour of the Blessed Virgin Mary in the year 1101, and appointed as Prior Athelwold, or Adeluph his chaplain, then Prior of St. Oswalds, at Nostell, in Yorkshire, a house of the same order. The same king, in the year 1133, founded the Bishopric of Carlisle, and made Athelwold the first Bishop.

The site selected for this religious house was within the area of the old Roman City, between the new fortress and the site of St. Cuthbert's Church. It possessed all the necessary requirements: water within a few feet of the surface, a frontage to the city boundary, through which they could, and did thereafter, contrive a postern gateway of their own, with access to the rich meadows beyond, a river running almost at the foot of the walls, with possibilities for a mill race, for mills and fish-garths, which they eventually possessed.

The site consisted of a good square plot of ground amounting to nearly five acres, with the road to the castle on one side of it, the city wall on the other, and a narrow lane on its north-west boundary, which afterwards became Paternoster-row. From its western angle, a street ran directly to the west gate of the city, then, perhaps, the most important outlet, opening as it did to the Port of Sandsfield, and the ancient fords.

This street, known certainly from the time of Henry VIII., if not earlier, as Abbey-street, is stated by the Rev. Mackenzie Walcott in his "Memorials of Carlisle" to have been called Irish-street, a name which still attaches to the site of the old gate; this gate is marked in old plans as Calidey Gate, from the adjoining river, and still gives its name to the suburb beyond it. The site on its south-west corner abutted on a narrow strip of property extending along the city walls, some half an acre in extent. This property, the then owner of it, Robert de Eglesfield, the founder of Queen's College, Oxford, and chaplain to Philippa, Queen of Henry III., gave in the fourteenth century to the Priory.

In the latter part of the seventh century Carlisle and the ecclesiastical district round it had been assigned to St. Cuthbert. So that it is probable that a religious house existed at Carlisle long before the twelfth century, but no positive proofs exist of any older building on this site, except two

early grave stones, one in the Clearstory wall of the present Norman nave and the other on the south transept.

On the site I have described the buildings were laid out with masterly skill. The church was set diagonally across the north-west portion of it, with its main axis almost due east, the west end of the church being set about 33 yds. from the boundary, and thence, as far as the site allowed, the arrangements followed the normal plan. To the south of the nave was the great cloister, about 96 ft. by 90 ft. or thereabouts, round which the buildings appertaining to the monastic life were grouped, and it will be convenient to refer to them now, as they eventually grew to be.

The east side was occupied by the dormer, which abutted on the south transept, and had a doorway and staircase into the church. In the cellage under the dormer was, next the church, a slype or parlour which gave access to the canon's cemetery to the east. Then came a library or treasury and the vestibule to the Chapter House, which the ruins show to have been an octagon of about 28 ft. across. Beyond the vestibule was the common room, or calefactory, with windows to the south and west, looking into the Infirmary Court, to which a passage on the south side of the cloister gave access.

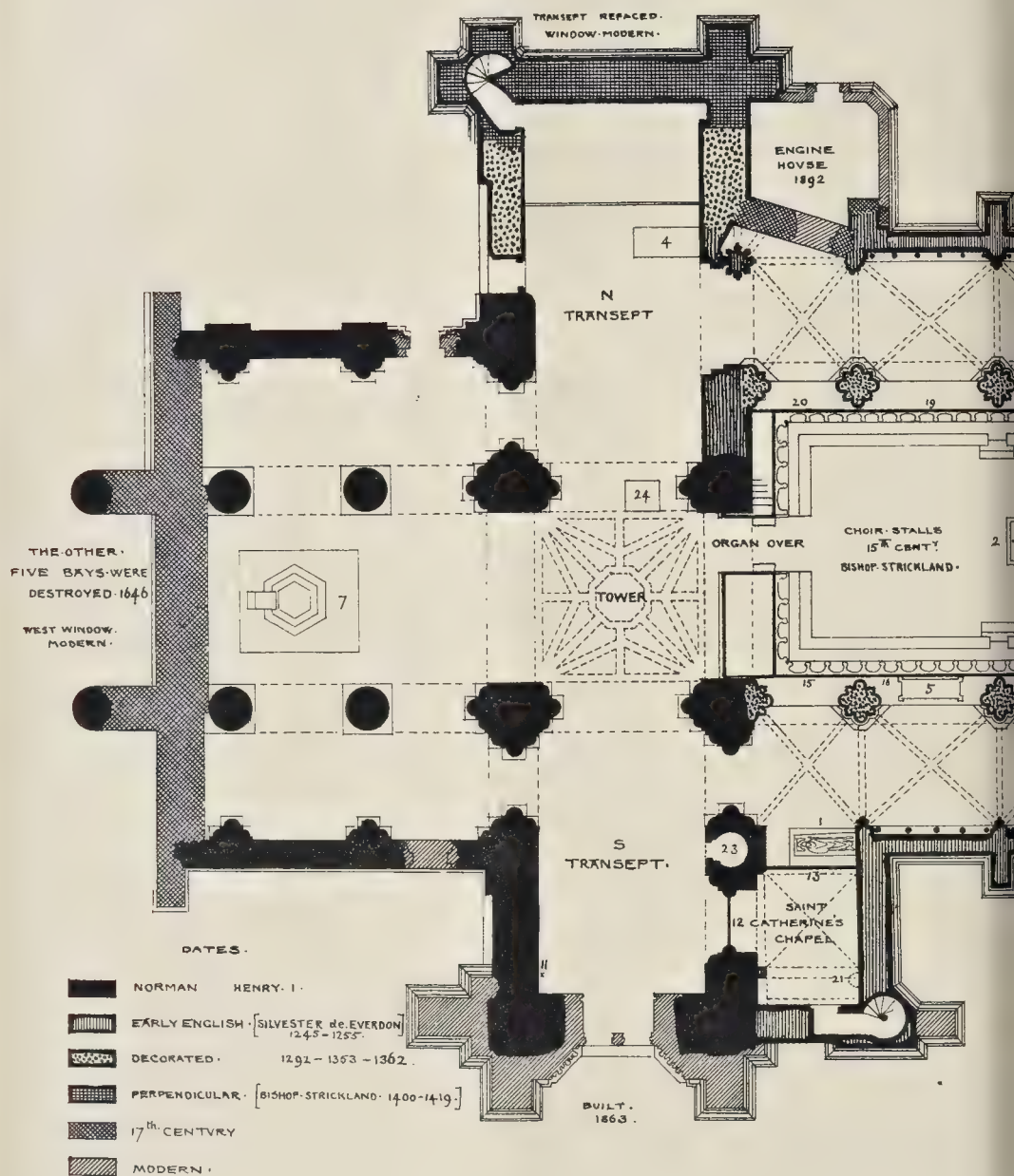
This south side was occupied by the Frater House, or refectory, with a vaulted basement under it. At the east end was the staircase to the dormer, which still remains, and the passage already referred to as leading to the Infirmary. At the west end of the Frater House was the kitchen court, beyond which the menial offices of the monastery extended: the larders, pantries, wash-house, laundries, brew-house, and stables, with the horreum or great barn at the extreme boundary, a sloping way under the road giving access to a postern in the wall, and to the meadows, mills, and fish-garths beyond. To the west of the church and of the great cloister was the curia, or outer court, with the Prior's Lodgings or Camera, now the Deanery, adjoining the monastic buildings and the gate-house on the further side. The kitchen-court was cut off from the curia by the bridge or covered way which connected the Prior's Lodging with the cloisters, and by the passage under it which connected the Frater House with the kitchen; the doorway leading to this upper passage still exists in the deanery.

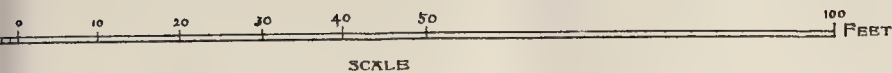
I am inclined to think that, on account of the position of the Prior's Lodging, the buildings enclosing the west side of the cloister must have been low and unobtrusive, if more than a wall only as at Alnwick. In that case the buildings devoted to hospitality in addition to the Prior's Camera would probably be placed between the lodge and the gate-house; the remains show that buildings were attached to the gate-house itself, and they would probably be the Almonry or common hall. These buildings were of various dates,



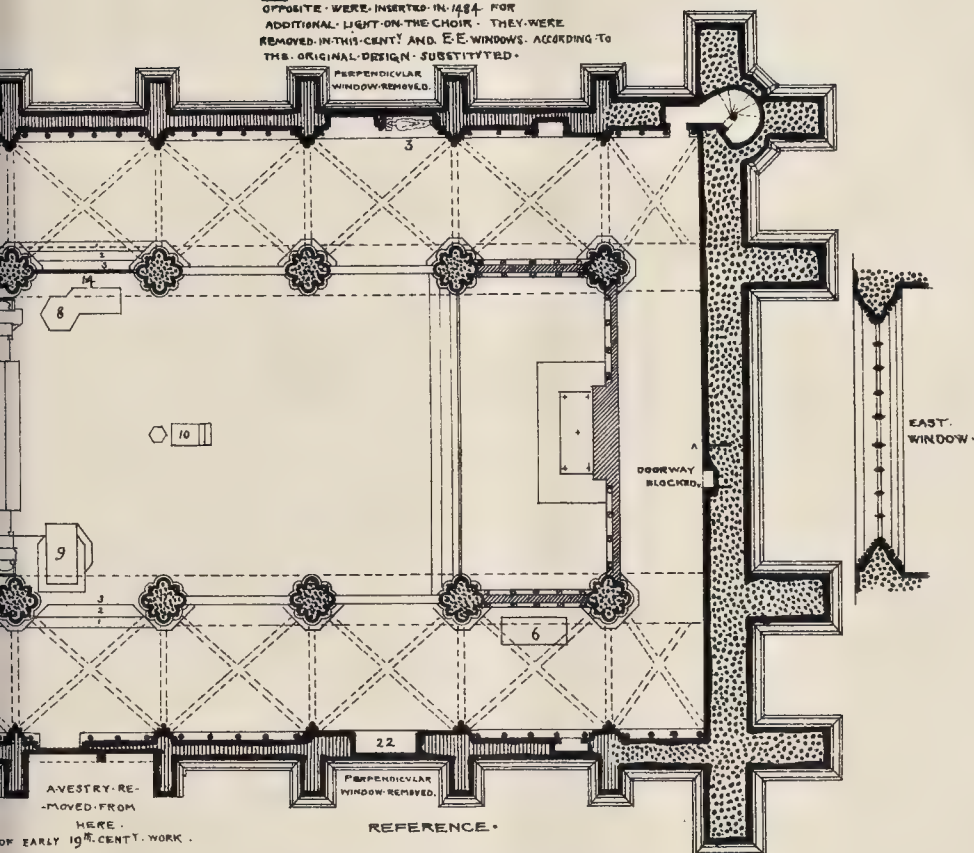
CARLISLE • CATHEDRAL •

GROUND PLAN •





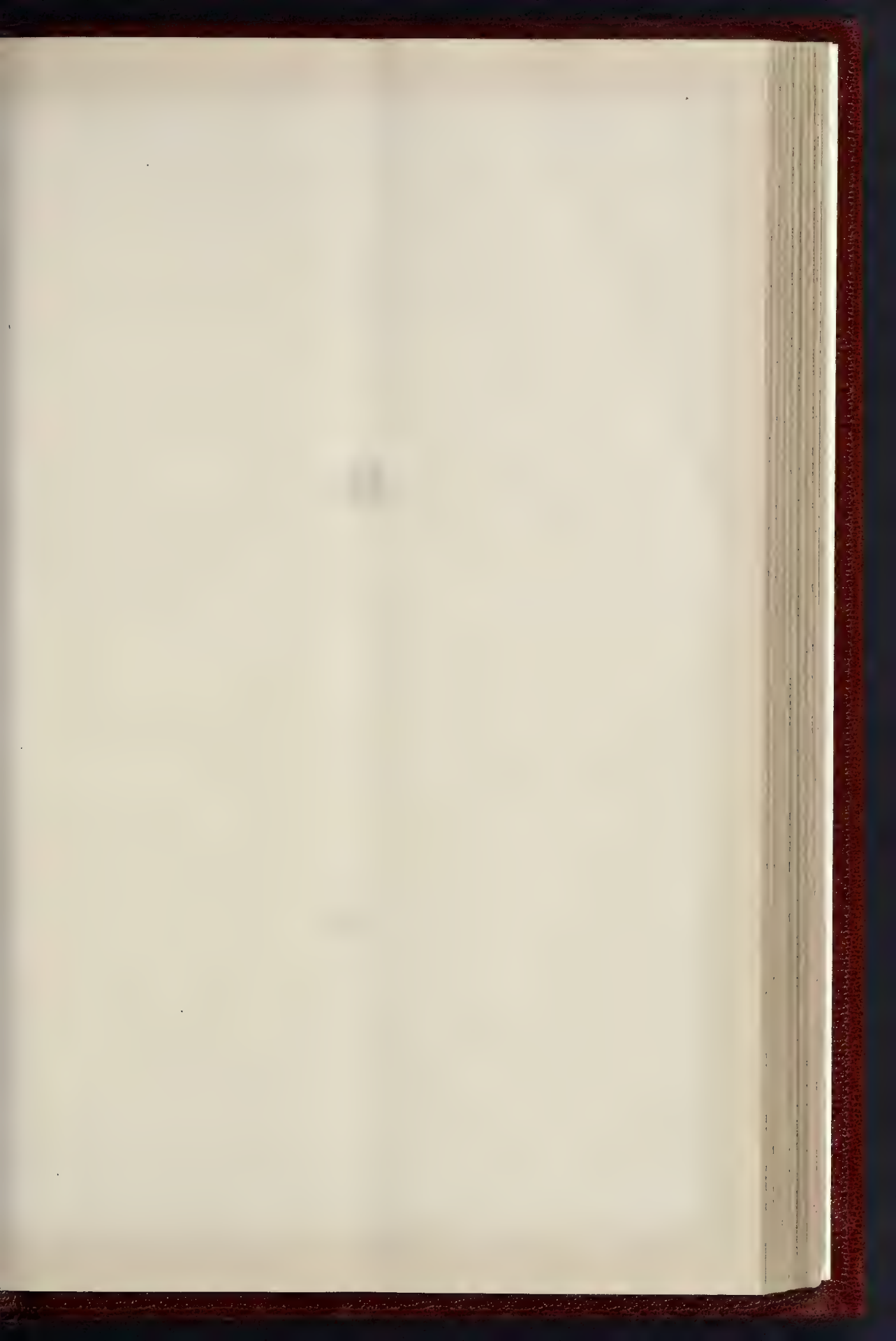
NOTE. THIS PERPENDICULAR WINDOW, & THAT OPPOSITE, WERE INSERTED IN 1484. FOR ADDITIONAL LIGHT ON THE CHOIR. THEY WERE REMOVED IN THIS CENT. AND E.E. WINDOWS, ACCORDING TO THE ORIGINAL DESIGN, SUBSTITUTED.

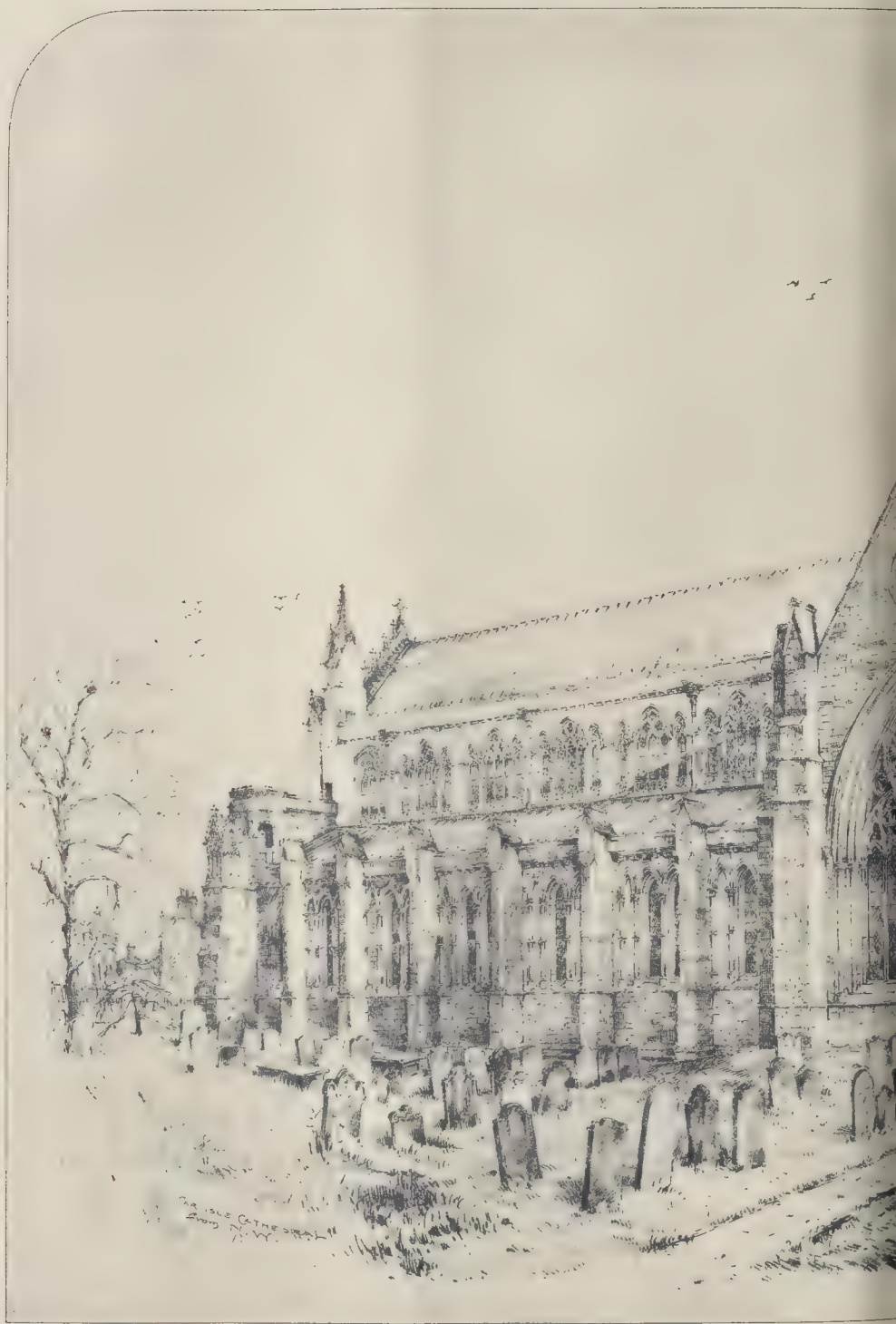


REFERENCE.

- 1 TOMB OF BISHOP BARROW. 1429.
- 2 BRASS EFFIGY OF BISHOP BELL. 1496.
- 3 EFFIGY OF BISHOP DE EVERDON. 1253. OR BISHOP IRTON.
- 4 TOMB OF SIMON SENHOUSE. PRIOR IN THE REIGN OF HENRY VII.
- 5 " " FRANCIS CLOSE. DEAN. D. 1882.
- 6 " " SAMUEL WALDEGRAVE. BISHOP. D. 1869.
- 7 MODERN FONT.
- 8 PULPIT.
- 9 BISHOPS THRONE. MODERN.
- 10 LECTERN.
- 11 ON WALL AT A. RYNIC SCRIBBLE. "DOLPIN. WROTE THESE RYNES"
- 12 { WOODEN SCREENS. PRIOR GONDIBOVR. 1484.
- 13 { RENAISSANCE SCREEN. PRIOR SALKELD. 1532.
- 14 {
- 15 { LEGENDARY. 12 APOSTLES. PRIOR GONDIBOVR
- 16 { PAINTINGS. LEGEND OF S. ANTHONY. 15th CENTY
- 17 { AT THE. LEGEND OF S. AUGUSTIN.
- 18 { BACK OF. LEGEND OF S. CUTHBERT.
- 19 { THE STALLS.
- 20 {
- 21 STONE BRACKET FOR FIGURE.
- 22 TOMB OF SIR JOHN SKELTON?
- 23 { WELLS
- 24 {

This plan was prepared from an outline plan
that Mr. Ferguson made 40 years ago. The fittings
& modern additions measured by
Francis D. Bedford
March 1893.





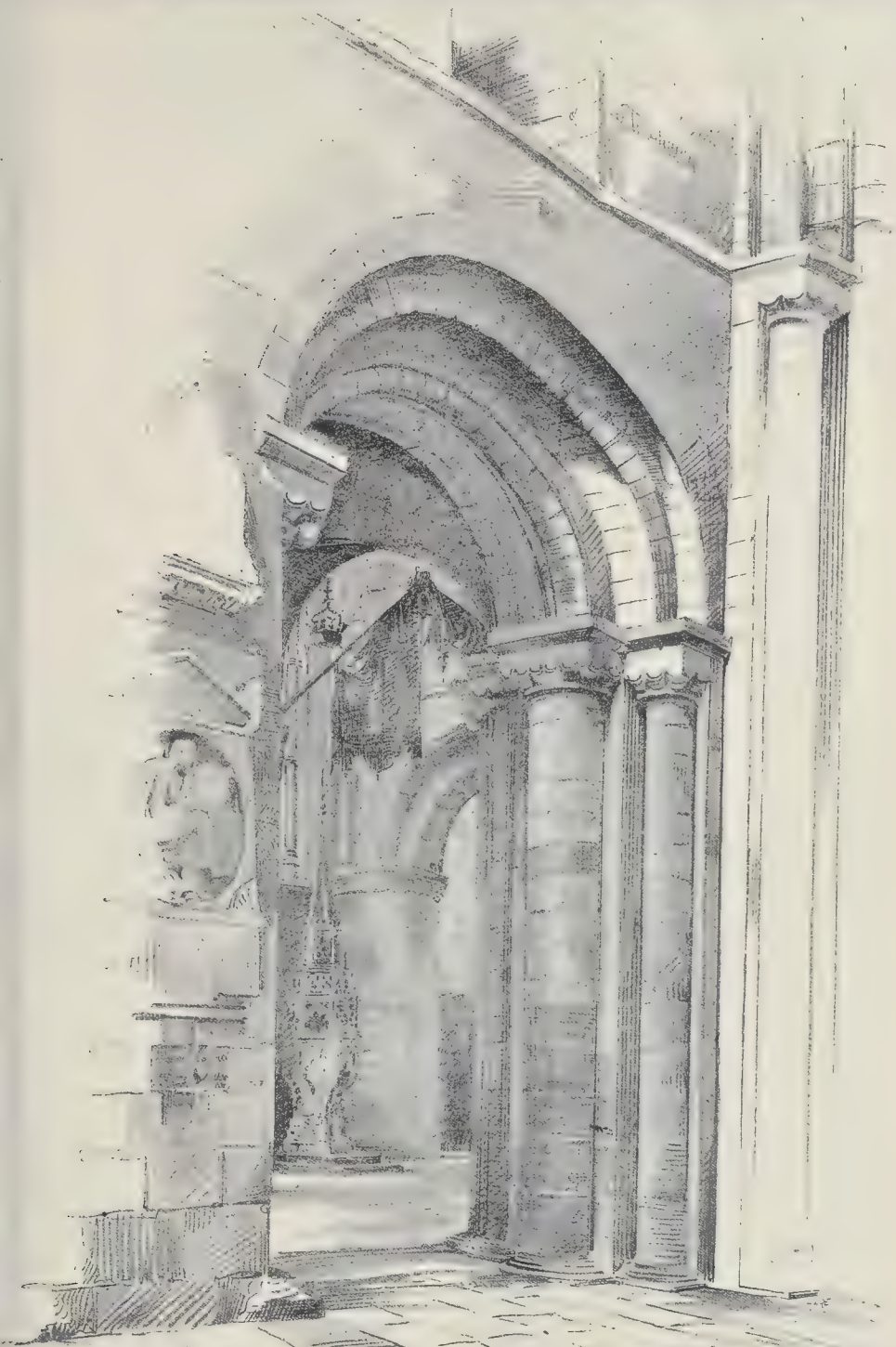
Cathedrals of



and Wales.

Drawn by Mr E Ridsdale Tate

NO PHOTO. SPRAQUE & CO. 45, 46, EAST HADONG STREET, LONDON, ENGLAND.



Francis Bedford. 1893.

Carlisle Cathedral.
The Nave from the
South Transept.

they had been reconstructed more than once, and at different times, but the parent house must from the first have been set out on these lines and on a considerable scale.

A view of Carlisle in the reign of Queen Elizabeth, now in the British Museum, published in Lyson's Cumberland and again in Bishop Creighton's Carlisle, shows the remains of the buildings as they then existed. The Deanery is there depicted as nearly equal in size to the Cathedral, and the Frater House much exceeds the choir, but the general lay of the buildings is easily distinguished, especially the Chapter House with its conical roof. Of these buildings there now remain the great church with a portion of its nave, an indication of the Chapter House and of the cellarge under the dorter, the Frater House, the Prior's Lodging, now the Deanery, the gate-house and a great portion of the tithe barn, together with their postern in the city wall.

Recent discoveries at the east and west ends show that the Norman church was of the Basilican type; that it consisted of a nave, with transepts and north and south aisles; that the nave was of seven bays, and 122 ft. in length to westward of the crossing, and 61 ft. in width; that the west wall was upwards of 7 ft. thick; that it had four flat pilasters, about 6 ft. 6 in. broad and 1 ft. 3 in. deep, and a great doorway in the centre of four orders; that from the eastern face of each transept projected a small circular apse; but we have no precise information as to the termination of the eastern limb beyond the transepts, whether it terminated in three apses of unequal projection or in one. We do know, however, that there were at least two arches between the Presbytery and its aisles, because the remains of a circular pillar, very similar to those of the nave, have been found almost *in situ*.

Of this Norman church three bays only of the nave remain, portions of the transepts, and the arches of the crossing.

The fact that the eastern and western arches of the crossing are carried on corbels so as to leave the sides below smooth and free from impediments shows that the eastern limb was short, and that the ritual choir extended westward of the crossing. The plan was of an early type, such as a Norman architect would have supplied, but the recent exposure of the foundation of the apse of the north transept proves that the workmanship was of a later type. It was throughout of well-bonded masonry, whereas the early Norman builders imitated not only the fashion but the constructive methods of the Romans, and built in concrete faced with stone without bond or tie, as may be seen in the early work at Canterbury Cathedral, at St. Peter's, Northampton, and in the staircase of the great Norman Keep at Carlisle. I take it, therefore, that some delay took place in the execution, and that no work now visible is earlier than that of Athelwold. The uncovered foundation of the apse showed signs of a building and rebuilding; the stones were tooled with a hatchet. The details of the apse return on the north transept, and reappear in the aisles of the nave, thus showing that they are of one date.

The Norman church was built of a beautiful grey stone, said to be from a quarry near Rickerby, now unknown. Much of it had probably done duty first in the Roman wall or other Roman buildings. No trace of French influence is to be seen in its details, it follows rather the simple massive character of Durham, on a small scale. The long, low line of its nave was characteristic of English work—it is bold, simple in treatment, and the vigour of its execution may still be discerned in the life-like corbel courses under the eaves. The arches of the nave are much crippled from defective foundations, aided by sandy springs of water said to run across the transept from north to south. The nave, aisles, and transepts were all intended for wooden roofs. It has, however, been suggested that the aisles were vaulted, but the remarkable thinness of the walls precludes this idea, for the aisles are 14 ft. wide, and the north wall not more than 2 ft. 9 in. thick, exclusive of the pilasters.

In the transepts are two wells now walled up. In 1853 some Scandinavian runes were discovered on the lower part of the transept wall; they are the scribble of some master mason or workmen, and the generally received reading is:—"Dolphin made these marks."

We have no record of how long the Norman apse existed, or whether it was destroyed or taken down, as so many others were, to be rebuilt on a larger scale. The evidence of the existing building shows that, towards the middle of the thirteenth century, a scheme was commenced for the entire rebuilding of the church on a scale of

great size and magnificence; it comprised a new eastern limb of sufficient size to take in the ritual choir; in length, it fully equalled the western limb, which it exceeded in breadth by 12 ft. and very considerably in height. This was carried out, and the further intention was to have taken down the north transept and rebuilt it on the same scale, with an aisle to the east of it. This is proved by the existence of one pillar of the intended aisle, and by an off-set on the north face of the aisle wall, with the return of the base course and string course upon it, left almost to to-day ready for the aisle that never arose, for in 1292, when it is probable from internal evidence that the new choir was about finished, one of those disastrous fires arose which were the scourge of the mediæval towns and totally destroyed the choir, the belfry, and the bells, and thus it happened that for the next hundred years and more, the energies of the canons were devoted to building up the choir anew. Then it was that the great east window arose, which marks a step in advance in art, and is the glory of the building.

The determination with which this work was carried on during the episcopate of at least six bishops seems to show that it was part of a settled plan, supported possibly by the great Chapter of the Austin Canons, which met in the south.

The Canons of Carlisle, except at certain intervals, had, after the beginning of the thirteenth century, an independent endowment of their own, and would, therefore, be able to take the initiative. On the Bishop fell the begging, the issuing of briefs and indulgencies, and thus his name would be publicly associated with the work, and when they had for their Bishop a man conversant with their wants, of local knowledge, and of more than local position, they would be able to make progress. Such they had in Walter Malclerk, once a canon of their own church; he held the see for twenty-three years—from 1223 to 1246—he was in high favour with the king, and a leader in political life, and it seems probable that the first great scheme of rebuilding was initiated during his episcopate. Such, again, they had in Bishop Halton from 1292 to 1325, a prelate selected by Edward I. for the most important trusts, of whom it is stated by the late Mr. Hartshorne, "that whatever was done in this fortress (of Carlisle) in the Cathedral, at Rose . . . or whatever was done in the diocese to the ecclesiastical architecture must be attributed to the superior mind, and energy of John de Halton;" he also had been a canon of the church, and it was during his episcopate that the first thirty years' work of the rebuilding of the choir took place, that the choir was set out on an increased scale, and that the great east window was conceived and erected as high as the springing of the arch. In this rebuilding they added a bay to the choir, and increased its length to a total of 134 ft. 3 in.: the width remained the same, 34 ft. 2 in. between the pillars and 72 ft. across the aisles. The new walls they increased considerably in thickness—the aisle walls to 5 ft. and the east wall to 6 ft. 6 in., indicating a building of greater height than its predecessor. The aisle walls of the thirteenth century they retained, as they had been protected from the fire by their stone roofs; the arches common to them and the choir they also retained, either by rebuilding them on new pillars, or by undersetting, so that we find arches of the thirteenth century on legs of the fourteenth: in the bay they added, they followed the general outline of the earlier work in the aisles: they repeated the beautiful cinquefoiled arcading under the windows, but they applied to it the more advanced detail of the day. The carving and some of the decorative work, even a great part of the mouldings of the east window, they left unwrought, and thus we have a curious interweaving of work—early work with later work below it and later work over it. We find thirteenth century work on a small scale in perfection in the aisles—we can note in the south aisle the gradual step taken towards the development of window tracery in uniting the single lights under one arch, and we see window tracery carried to its perfection in the east window. We see the crisp Early English carving in the corbels of St. Catharine Chapel, the more naturalistic carving of a later period in the corbels to the choir of the roof; and in the capitals of the piers executed in the beginning of the fourteenth century we have the most complete representations of the seasons known to exist, the first six months being on the south side from east to west the last six on the north from west to east.

In the triforium and clearstory we find the master hand has gone—the windows, mere perforations on the face of the wall—no depth—

no shadow—no life—without buttresses and without a break—it looks as if the importance of Carlisle was already on the wane. With such a clearstory the roof was of necessity of wood, but it has the appearance of a compromise; the great hammer-beams promise an open timbered roof like the chapel of St. Stephen's at Westminster, or the great hall there, and the panelled ceiling that was eventually carried out looks somewhat incongruous—a ceiling that now glows in the utmost brilliancy of modern paint. Notwithstanding these defects, the choir is a noble one, equal if not superior in width to those of St. Albans, Durham, Salisbury, Winchester, and Wells, exceeding Durham and Wells in height, as it also exceeds those of Lincoln, Ely, and Canterbury. The new developments of architecture to be found in it, mark it as a creation in which that art made no small advances. A further departure was made in the erection of this choir in the use of redstone; we find the older quarries deserted, and the redstone used for the first time on any great scale.

The fabric work was complete in the last quarter of the fourteenth century. In the roof of the choir the arms of those who contributed towards the work were placed—the Lucy's, Neville's, Percy's, and Edward III. (king). The glass was inserted in the great window between the years 1380 and 1384, as proved by the arms therein. The old glass still remains in the tracery, the only old glass the Cathedral possesses—the subject, a Doom, the Resurrection, and the Judgment.

The later history has no such brilliant record as that passed through. We again have records of losses by fire, and subsequent rebuildings, but of parts only. The idea of a complete rebuilding on the scale of the choir dies away, and during the episcopate of Bishop Strickland, about 1401, the central tower was rebuilt, not as the makers of the east window would have built it, but on the old piers and scale of the nave, as nearly as could be half the bulk it would have been to fit the new choir. It is said to have been capped by a short spire covered with lead, but no prettiness could ever supply its want of size; it is too narrow, by more than 12 ft., to span the choir; this defect is cleverly screened on the north side, but not overcome. About the same time, the forty-six stalls were erected in the choir. They stand upon a plinth of red sandstone, and with the canopies and tabernacle work which surmounted them almost immediately, they present an admirable illustration of the furniture of the day. The statues are gone from the niches, and the hand of man has blacked the woodwork and somewhat dulled the carvings, but their vigour can still be discerned, and the whole is rich and effective.

In Prior Gondebour, who was elected to his office about 1484, the church found a munificent supporter. He may be said almost to have rebuilt the monastic offices. The Chapter House and cellarge on the east side are shown by the remains to have been of the time of Edward II. The Frater House on the south side he built anew, as shown by his initials on the cellarge under it. It is a fine room, some 79 ft. by 27 ft., with the usual arrangement of the entry within a screen, and the very unusual one of having its front door turned inside out—that is, the door opens outwards into the ambulatory, midway on the stair of access from there to the refectory. It possesses a charming little gallery for the reader, and two beautiful canopied niches in the interior. It is well lighted by traceried windows, those on the north side being placed high on the wall to allow for the roof of the ambulatory.

Gondebour also rebuilt the kitchen offices abutting on the Prior's Camera and the great barn. This barn, or the best part of it, still stands at the boundary of the property; it is entirely open on one side, with a row of massive oak posts to support the roof. The roof itself is quite a forest of timber beams 21 in. deep, all held together by pins, without a nail in it, and puts most modern roofs to shame. Gondebour also caused the legendary paintings to be executed on the backs of the stalls, with subjects taken from the history of St. Augustine, St. Anthony, and St. Cuthbert. He added some beautiful screens, the remains of which are still to be seen in St. Catherine's Chapel. He further inserted the two Perpendicular windows in the aisles since removed, and he is said to have completed the decorative work of the choir. The roof he painted in red, green, and gold, on a white ground; the choir pillars white, diapered with red roses nearly 12 in. in diameter, with an I. H. C. and J. M. in gold. His successor, Prior Senhouse, repaired and beautified the Prior's

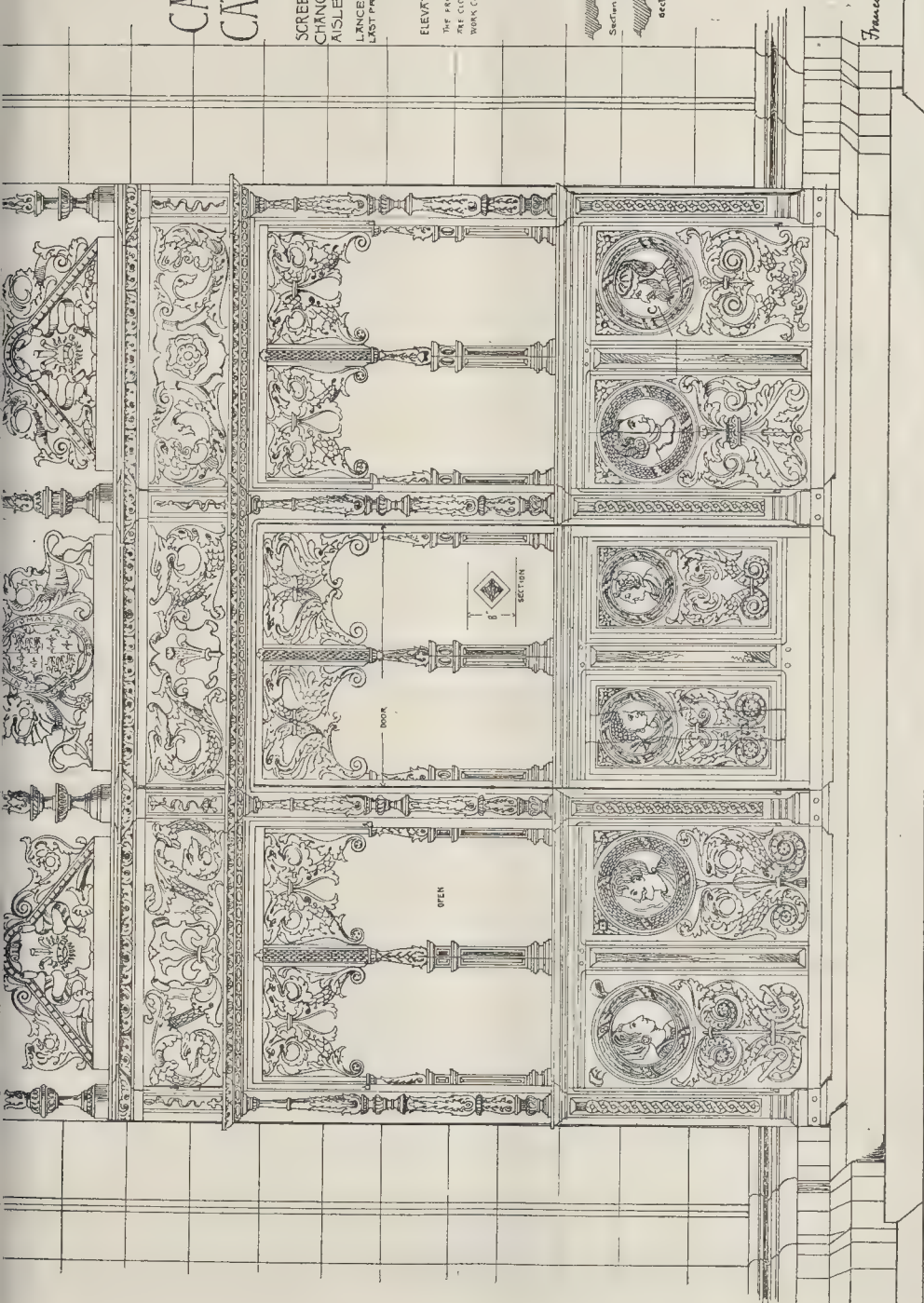
CARLISLE CATHEDRAL

SCREEN BETWEEN
CHANCEL AND NORTH
AISLE.

LENGEL OTSELWELD.
LAST PATRON AND FIRST DEAN
1532.

ELEVATION TO N AISLE
THE PRIEST WITH LOWER PANELS
ARE CLOSED THE REST IS OPEN
WORK CRAWING.

Section at C
section at A



Lodging. To him is due the painted ceiling of the Solar. On it we read that

Symon Senns Prior set this roof and cell up here,
To the intent that prayer should be said every day of the year.

We find birds and scrolls and the motto of the Prior, "Loth to offend." The spelling is without rule; the same words spelt differently on the same beam, and even his own name is spelt in several different ways. The Prior's Lodge, however, possesses a further interest in that it is a fourteenth-century Peel Tower, a little fortress, with a vaulted basement of ribbed arches similar to that in Lord Dacre's tower at Naworth; it had its Solar, sleeping rooms and battlemented roof over, with garderobes and closets on each floor. The Gale Tower at the north-west angle of the Curia was rebuilt by Prior Slee in 1528, as the inscription round the inner arch tells us. It is on rather a larger scale than usual with a deeply recessed portal on the outer front, with a gateway and wicket recessed within the archway; it possesses an upper chamber, to which access was gained by a circular stair. The battlements and parapets have been long since removed and replaced by chimneys and imitation chimneys set up at the four corners of the roof. It had a porter's lodge on the north side and other buildings attached to it on the south-west side.

To Launcelot Salkeld, the last Prior and first Dean, is due the beautiful Renaissance screen on the north side of the choir; it has his initials upon it, followed by the letters D.K., Decanus Karlioliensis, the initials of his new title.

The Cathedral possesses few ancient monuments. In the south aisle is the recumbent effigy of a bishop of the date of the middle of the fifteenth century. On the floor of the choir is the incised brass effigy of Bishop Richard Bell, who died in 1496. Under an arch in the north aisle are the remains of a recumbent effigy of a bishop of the thirteenth century; above the head is an Early English canopy, now much mutilated.

It also possesses the remains of two copes. The earlier one is of the usual semi-circular form, of flowered dark blue damask, with beautifully embroidered splay of foliage applied to it in fine wool and gold thread, a portion of the orphray only remains; it has on it the representation of eight figures, each under a canopy standing on conventional foliage. The second cope is also semi-circular, of cloth of gold, with a bold pattern formed by the ruby silk of the warp. Again, a portion only of the orphray remains, so dilapidated that the pattern cannot now be deciphered. An impression exists of the Common Seal of the Priory and Convent of the Cathedral Church of Carlisle amongst the Corporation muniments; it is circular, 2½ in diameter. The device thereon is a half-length figure of the Virgin crowned, with infant Saviour at her breast, with censuring angels on each side with outspread wings; below, under a semi-circular arch, are trefoil-headed niches, with a vesica over, in the former the figures of the Bishop and Prior, and in the latter a Cross. To right and left of the arch is seen the Priory Church, a pinnacled front with three lancet windows and a small trefoil over; below is an embattled parapet. The legend is much broken, and the only words to be deciphered are *Ecclesie sancte*, and a portion of the word *Karlioli*. The seal is of the thirteenth century, and has not been heard of since 1660.

The Priory was surrendered to the crown January 7, 1540, its revenue, being valued at 481l. a year. The charters and statutes of the present foundation, changing the dedication to that of the Holy and undivided Trinity, were given on June 6, 1545.

The buildings, there is reason to suppose, were handed over in good order at that time, and it was not until the civil wars in 1646 that we hear of the destruction. Dr. Todd in his manuscript records that: "The Abbey cloisters, part of ye Deanery, Chapter House, and houses built for ye prebendaries and ye rest of ye members of ye College, which was stately buildings, they pulled down, and employed ye stone to build a maine guard, and a guard house at every gate, to repair ye walls, and other secular uses as they thought fit." The westward of St. Mary's Church they demolished, which was after built shorter, as it now stands.

This practically brings the history of the growth and partial demolition of the Cathedral Church of Carlisle to a close. Since then its record has been a praiseworthy and generous endeavour to bring it into line with the standard of the day, under the direction of men of the highest reputation; and if, in the doing of it,

something has been lost, much, on the other hand, in the way of permanence and stability has been gained.*

C. J. FERGUSON.

THE ARCHITECTURAL ASSOCIATION.

The twelfth ordinary meeting of this Association was held on Friday, April 28, in the Meeting-room of the Royal Institute of British Architects, Conduit-street, Mr. H. O. Cresswell, President, in the chair.

Mr. H. W. Tomes was elected a member.

On the motion of Mr. F. T. W. Goldsmith, honorary secretary, votes of thanks were accorded to (1) Mr. E. W. Mountford for allowing the members to visit the Battersea Polytechnic, and for kindly conducting them over the building, and to Messrs. Holloway Bros., the builders, and their foreman, for their attentions on the occasion; (2) to Mr. Aston Webb for kindly permitting the members to visit the French Protestant Church in Soho-square, and conducting them over the building; and (3) to Mr. J. J. Kelly and Father Vere for kindly conducting the members over the new Catholic Church of St. Patrick, in Soho-square.

The President said he had to announce that the lectures on Painting, Sculpture, and the Allied Arts in their relation to architecture, which were put down on the syllabus of the Association in the Fourth Division, would be thrown open to all members of the Association who wished to attend. Those on sculpture would be delivered by Mr. Stirling Lee; those on the allied arts by Mr. Walter Crane; and those on painting by Mr. C. Whall. The lectures would be given at 56, Great Marlborough-street.

The President also announced that the Members' *Soirée* would take place on May 17. He had been asked to intimate that, as there had been some little misunderstanding on the subject, ladies would not be admitted, and smoking would be allowed.

Mr. E. S. Gale, senior hon. sec., then read the house-list of nominations for officers and committee for next session. These nominations included the following:—President, Mr. E. W. Mountford; vice-Presidents, Mr. W. D. Caroe and Mr. E. S. Gale; and honorary secretaries, Mr. F. T. W. Goldsmith and Mr. B. F. Fletcher. The President further intimated in this connexion that under by-law 31 any other nominations for officers or committee must be made at the next meeting of the Association, which will be the last meeting but one of the session, the elections taking place on the last meeting in the session.

Mr. P. Gordon Smith, F.R.I.B.A., Architect to the Local Government Board, then read a paper on "Hygiene in its Application to the Arrangement of Buildings," which we print *in extenso* under its own heading.

In the discussion which followed,

Mr. H. D. Searles-Wood proposed a vote of thanks to Mr. Gordon Smith for his instructive and valuable paper, and expressed his regret that there had not been a larger audience to listen to it. They were all highly indebted to Mr. Gordon Smith for placing the valuable information which he possessed on the subject before them in such a lucid way. The paper could not fail to be of great value to them when it came to be published in the press, and it would, he thought, be of great use to them on many occasions in enabling them to convince their clients as to the necessity of providing thoroughly hygienic buildings. Architects were often urged to do things with which they could not wholly concur, and if their hands could be strengthened by the arguments and facts set forth in Mr. Gordon Smith's paper the results could not but be beneficial. In planning buildings for the accommodation of large numbers of people, the question seemed to be between aggregation and segregation. The difficulty of dealing with this question satisfactorily from an economical point of view, so far as the cost of buildings was concerned, must be admitted, but he thought there would be no doubt that the principle of segregation was the right one. It occurred to him that there was one point as to which Mr. Gordon Smith had said nothing in his paper, and that was as to the sanitary condition of factories. The same remarks which he had made

* I am indebted for much valuable information relating to the cathedral to Mr. Ewan Christian, under whose direction the restorations in 1866 were carried out; to Mr. Purday, who acted as his representative on the works at that time, and who published a short history of it; to the valuable copy of the statistics translated and published by the Archdeacon of Carlisle; and to many papers in the "Transactions of the Cumberland and Westmorland Antiquarian Society," on the glass, the capitals, the copes, and other matters.—C. J. F.

with regard to other buildings would of course apply to factories, in many of which most unsanitary arrangements obtained. He thought that Mr. Smith's paper would be useful in removing what was a very common error even among architects. Many people thought that hygiene was a matter which was only concerned with drains and traps, but it was a far wider matter than that, and a building to be healthy must be well planned, free from damp, well lighted, and well ventilated, as well as being well drained.

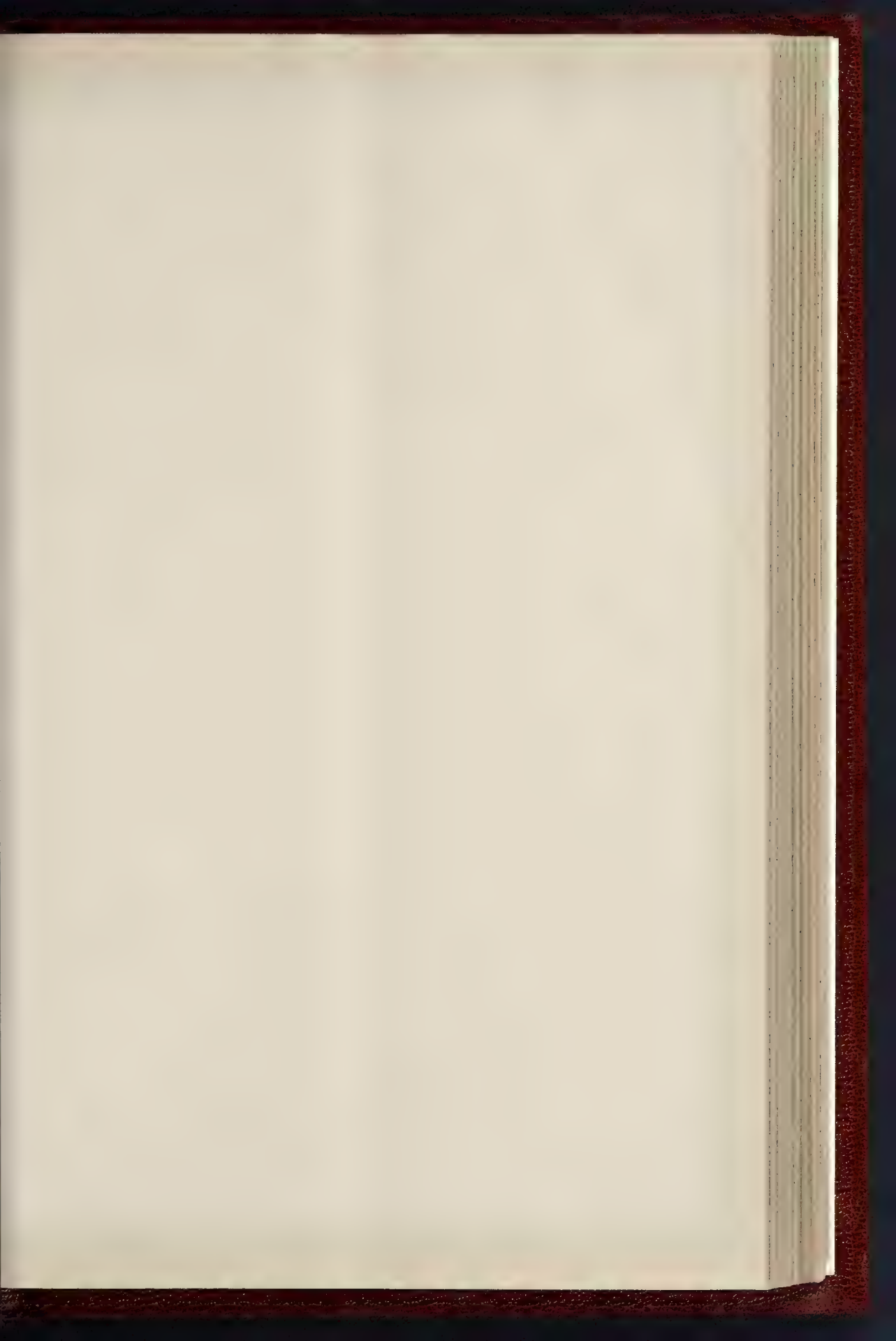
Mr. A. Saxon Snell, junr., in seconding the motion for a vote of thanks to Mr. Gordon Smith, said that that gentleman spoke with great authority, because plans of important public buildings for erection in all parts of the country came before him for critical examination, and with regard to buildings for Poor Law purposes, none of them could be erected unless the plans had previously obtained his sanction. With regard to the dominant note of the paper, he thought that Mr. Smith's advocacy of the principle of segregation as opposed to aggregation would commend itself to all who had thought about the matter. There could be no sort of doubt whatever as to the desirability of segregation, but unfortunately architects could not always do what they could wish in that direction, because their clients had not yet been brought to see the absolute necessity of it. He trusted that the Local Government Board and other public bodies would move forward in that direction. While Mr. Smith was referring, in the early part of his paper, to the mortality in hospitals, he (the speaker) called to mind a remark made by Miss Nightingale on that subject. She said that one of the first things to be observed in designing a hospital was to ensure that it should do no harm to the patients.

That seemed a rather curious thing to say, but as Mr. Smith had shown, the observation was not uncalculated. There was no doubt that the arrangement of many hospitals, as to ventilation, &c., were theoretically perfect; but their successful working must always be, to some extent, dependent upon the willing and intelligent co-operation of the staff. We often heard of foreign hospitals and institutions, and of elaborate means adopted for providing them with warmed fresh air, but all such elaborate apparatus should be kept clean and in good order, otherwise they would get foul. His father was a few years ago in the basement of a large institution of the kind on the Continent, in company with Mr. Gordon Smith. In the course of their examination of the ventilating arrangements, Mr. Gordon Smith placed his hand deep down into one of the underground ventilating channels; when he withdrew it it was covered with black mud, over which the air passed on its way to the wards. The great point was for architects to design buildings of that kind in such a way that they could be easily cleaned and kept clean. The rooms should have impervious walls and floors, rounded angles, and all such facilities for cleanliness. The health of such institutions depended more upon good planning and suitability of materials than upon the devising of elaborate systems of ventilation.

Mr. Bernard Dicksee, in supporting the motion, referred to the very small enclosed areas or wells for light and air which were now permitted in large blocks of mansions in flats. He had seen some only about 10 ft. square going up through six or more stories. Upon these small wells the kitchens, servants' bedrooms, waterclosets, &c., were dependent for light and air, and obviously in the lower stories there was very little of either. He regarded such small internal courts or wells with perfect horror, and he feared that the health of the inmates must suffer.

Mr. C. H. Brodie also joined in supporting the vote of thanks to Mr. Gordon Smith, remarking that it was a great pity that the architect who was carrying out the very insanitary plan at the large institution vaguely referred to in the paper could not be named. There certainly ought to be some authoritative control over the planning and arrangement of large semi-private institutions such as orphanages. He hoped that young architects generally would learn from Mr. Gordon Smith's paper that "Hygiene" meant something more than soil-pipes and drains.

The President, in putting the motion, said he must concur with what had already been said as to the scantiness of the audience which had assembled to hear so valuable a paper, which was the more valuable, inasmuch as there was very little literature on the subject of which it treated; and if he might venture to make a suggestion, he hoped that some day Mr. Gordon Smith would amplify his paper, and produce a book on the subject, and thus supply a deficiency



THE BUILDER, MAY 6, 1893.



The Spire and Pinnacles
as reconstructed in A.D. 1852
from Mr. Duckler's design.

ST. MARY
THE VIRGIN
OXFORD.

Proposed repair
and reconstruction,
of the Pinnacles.

For Messrs. J. & C. G. Duckler,
14, Buckingham Street, W.C.

that was very much felt. He quite agreed with Mr. Gordon Smith that in planning buildings for large numbers of people the principle of segregation ought to be followed rather than that of aggregation, although it was not always possible for architects to do what they would wish in that direction. He entirely concurred with what had been said by Mr. Gordon Smith, and by one of the speakers as to the unsatisfactory nature, from a sanitary point of view, of the nameless plan which had been referred to. He had often thought that there was one class of buildings which, if they were to be judged by the canons of modern sanitation, would be condemned: he referred to the Oxford and Cambridge Colleges, which, however, they would all be very sorry to interfere with.

The vote of thanks having been carried by acclamation,

Mr. Gordon Smith briefly replied. In the course of his remarks he said he quite agreed with Mr. Scarswood that there was necessity for improvement in the hygiene of factories and workshops. As to the suggestion that he should amplify his paper into a book on the subject, he had already attempted to do something in that direction, in conjunction with Mr. Keith Young, in a work on Public Health and Hygiene, published by Churchill. In that work, of which the present paper was virtually a "boiling down," he had touched upon the subject of the hygienic arrangement of factories, places of business, shops, and so on. He concurred in general with what had been said as to elaborate schemes of ventilation, which he thought should be adopted with great caution. With regard to the circulation of air in the quads at Oxford and Cambridge, no one would be more sorry than himself to see those buildings interfered with; but he thought that architects who had to design large buildings of a similar kind might profit by the example afforded them by the river front of Somerset House, in which open colonnades had been provided, greatly, in his opinion, enhancing the appearance of the building, while serving a valuable purpose in the admission of a plentiful supply of air to the quadrangle. He could only wish that that example had been followed when the new Foreign and India Offices were planned.

The meeting then terminated.

ARCHITECTURAL SOCIETIES.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—The seventeenth annual meeting of this Society was held on the 24th ult., Mr. G. B. Bulmer, F.R.I.B.A., President, in the chair. The report, which was read by the Hon. Secretary, Mr. W. Carby Hall, F.R.I.B.A., said that the Society had continued to expand in membership, in the area from which the members were drawn, and in the usefulness of the work done. The Council had agreed with the Leeds Master Builders' Association upon a form of contract agreeable to both parties, but, learning from the Council of the Royal Institute of British Architects that a committee appointed by the Institute were in consultation with the Institute of Builders on the subject, and that it was hoped shortly to issue a form of contract which would be acceptable for use throughout the country, further action in the matter was postponed. The Council had had under consideration the subject of unrestricted bill-posting in Leeds, and after obtaining information on the matter from various Continental centres, a memorial had been presented to the Leeds County Council, in the hope that it would strengthen their hands in dealing with the question in the new Consolidation Bill. A memorial had been sent from the Society to the Council of the Institute concerning the anomaly at present existing in the election of Fellows of the Institute, by which young architects of the age of thirty who had been in practice for seven years could present themselves for election and so evade the examination, which was obligatory upon candidates for the Associateship. A memorial, generally signed by the members, was sent to the Leeds School Board last year with reference to the remuneration for professional services offered in the conditions of a competition for a new Board School. A deputation also waited upon the Board, but the Building Committee could not see their way to deviating from the course already laid down, and a large number of the competitors withdrew from the competition. The Council had under consideration a scheme promulgated by the Institute for the dividing of the United Kingdom into architectural provinces for the promotion of architectural education by the systematic organisation of the various classes upon

technical subjects. The Society now numbered 121 members—31 honorary members, 50 members, and 40 Associates, as against a membership of 110 last year.—On the motion of Mr. W. H. Thorp, F.R.I.B.A., seconded by Mr. W. H. Bevers, the report was adopted.—The following gentlemen were elected the officers for the ensuing year:—President, Mr. G. B. Bulmer, F.R.I.B.A.; vice-Presidents, Mr. H. B. Buckley and Mr. J. H. Greves; hon. secretary, Mr. W. A. Hobson; hon. librarian, Mr. W. J. Mettam, A.R.I.B.A.; members of Council, Messrs. W. H. Bevers, E. J. Dodgshun, F.R.I.B.A., G. F. Danby, A. Marshall (Otley), C. H. Thornton, W. Watson (Wakefield); auditors, Mr. F. W. Bedford, A.R.I.B.A., and Mr. A. E. Kirk, A.R.I.B.A. The proceedings then terminated.

LIVERPOOL ARCHITECTURAL SOCIETY.—The annual general meeting of this Society was held on Monday evening last, Mr. T. H. Harrison presiding. The annual report showed that the membership had increased from 115 to 125. The Council congratulated the Society on the result of the conference of architects recently held in University College. The original object was to facilitate the mapping out of the country into districts, each with a society at its head, so as to improve architectural education throughout the country. The Council hoped that before the beginning of another session they would have arranged with University College a system of education which would be beneficial to all young architects and students of architecture, and that the classes would be well attended. The financial statement showed a good credit balance. After the adoption of the report and the statement of accounts, the officers were elected as follows:—President, Mr. H. Hartley, F.R.I.B.A.; vice-Presidents, Messrs. A. Culshaw, F.R.I.B.A., and H. W. Keef; hon. treasurer, Mr. J. L. Blakey, A.R.I.B.A.; hon. librarian, Mr. James Dod. The retiring President (Mr. T. H. Harrison), gave an interesting address on climate and its effect on architecture. The President was cordially thanked both for the paper and his appreciated conduct of affairs during the past year.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday afternoon at Spring Gardens, the Chairman, Mr. John Hutton, presiding.

Finance and the new Works and Stores Committee.—The Finance Committee presented their usual weekly report, which contained the following paragraph and recommendation:—

"Among the estimates is included the sum of 1,017, 16s. 10d. for timber purchased by the Works and Stores Committee in the open market, beyond the sum of 1,000, which the Council on the 28th April authorised the Committee to spend for that purpose. We have received a notification from the Works and Stores Committee of this outlay, with an intimation that unless the amount is paid by the 4th May a discount of 25 per cent. will be lost, and we have therefore included the amount, 2,017, 16s. 10d., in the list of proposed payments. These special estimates submitted by the Works and Stores Committee are somewhat irregular, but we must admit that they are payments of an urgent nature, and as it is not expedient to have them of frequent occurrence we consider it desirable that the Works and Stores Committee should confer with us on the subject, so that if possible we may bring up a recommendation to the Council which will conform to the provisions of the 80th section of the Local Government Act. We therefore recommend—

"That the Works and Stores Committee be instructed to confer with the Finance Committee with a view to devising a code of regulations which, while conforming to the 80th section of the Local Government Act, will provide for the purchases of stores for ready money when urgently necessary.

The recommendation was agreed to, and in the Report of the Works and Stores Committee, which was taken at a later stage of the sitting of the Council, it was explained that "in the recent public sales there were found some suitable parcels of dry and other timber wanted for the several works now in hand, and the Committee therefore sanctioned the purchase of the selected lots at a cost of 1,017, 16s. 10d., the prices being in each instance fair and reasonable."

Limit of Height of Buildings.—The consideration of the Special Report of the Building Act Committee on this question (which report we printed *in extenso* last week, p. 326) was again adjourned.

The Palace Theatre of Varieties.—Mr. Fardell, Chairman of the Theatres and Music Halls Committee, in answer to a question put by Mr. Mercer, categorically denied the accuracy of a number of statements recently made by Sir

Augustus Harris and Mr. G. A. Sala to the detriment of the Council in regard to this building, late the New English Opera House. It had been stated that the Council had compelled the company now owning the building to expend a sum of 18,000*l.* in alterations. Mr. Fardell said that the alterations required by the Council would not have cost more than 20*l.* He had referred the matter to the Architect, who said that, as a matter of fact, no structural alterations were required by the Council, who, however, had been obliged to call upon the company to alter unauthorised alterations, and hence arose the expense.

After transacting other business, the Council adjourned at seven o'clock.

THE INSTITUTE OF BUILDERS:

ANNUAL DINNER.

THE annual dinner of this Institute was held on Wednesday evening last in the "Marble Salon" of the Grand Hotel, Charing Cross, the President, Mr. F. J. Dove, in the chair. About eighty members and visitors sat down to table.

The usual local toasts having been proposed from the chair and duly honoured, Mr. H. H. Bartlett proposed "The Navy, Army, and Auxiliary Forces," coupled with the name of Colonel Stanley George Bird, who replied in some brief and well-turned sentences.

The Chairman, in proposing, "The Institute of Builders," said that the Institute was a continuation of the Builders' Society, which was established about sixty years ago. The primary objects of the Builders' Society were, firstly, the framing of a satisfactory form of contract—a matter which had again been occupying the attention of the Institute of Builders quite recently. The second object in the formation of the Builders' Society was the promotion of good fellowship in a trade in which competition was then, as now, very great. The third object which the founders of the Builders' Society had in view was the establishment of a society membership in which would be some guarantee to architects and their clients of reliability, integrity, and competence. After an existence of about fifty years it was thought by some of the members of the Builders' Society that the scope of its operations might be somewhat extended, and they consequently took steps to become incorporated under the name of "The Institute of Builders." By being incorporated they had acquired a *locus standi* as the representatives of the builders of London before Parliamentary committees and public bodies, such as the London County Council, which had, as he thought, entered upon a very ill-advised attempt to become their own builders. Of course the master-builders could not wish the Council God-speed with regard to that particular scheme. He had referred to the question of an improved form of contract, in devising which the Council of the Institute of Builders had been for the last three or four years much engaged in consultation with the Council of the Royal Institute of British Architects, and he wished to take the present opportunity of thanking the Council of the Institute of Architects, including Mr. Aston Webb, Mr. Rickman, and Mr. White, the Secretary, for the very courteous and considerate manner in which they had received the suggestions of the Institute of Builders. As a result he believed that they had succeeded in framing a perfectly satisfactory and intelligible form of contract, which was now in the hands of the solicitors of the two Institutes; whether, when it emerged from the hands of the solicitors, it would be quite so intelligible, remained to be seen, but he sincerely trusted that during his year of office the new and improved form of contract would become an accomplished fact, so that they might thenceforth proceed upon lines which should be beneficial, not only to builders and architects, but to their clients, the public.

Mr. J. Howard Colls next proposed "The Architects and Surveyors," coupled with the names of Mr. Aston Webb and Mr. Charles Trollope.

Mr. Aston Webb, in responding to the toast, said it afforded him very great pleasure to be present, for he was strongly of opinion that nothing was more essential to the production of good work than that the architects and builders should be on the best possible terms. Their work was of such a nature that unless there was the most perfect concensus between them it could not possibly go on. The subject of the form of contract had been referred to, but they would, he was sure, all agree with him when he said that the most perfectly-drawn contract in the world would be to a large extent inoperative in the absence of confidence and mutual good-will between architects and builders. It was no doubt necessary to have carefully-worded contracts, but he generally put them away in his safe, and had happily seldom or never found it necessary to withdraw them from their resting place, and he had no doubt that was very largely the experience of the master-builders. He had especially pleasure in being present on that occasion, because he had had the good fortune of knowing the chairman for seven or eight years, and had been associated with him in the carrying out of works of some importance, without, the slightest

hitch of any sort occurring, and with great satisfaction to their mutual employers. Mr. Aston Webb, after some interesting remarks, which time and space preclude us from reporting, concluded by expressing the hope that the builders and architects would continue to work harmoniously together, and that their joint efforts would result in producing works of architecture, showing that whatever else the nineteenth century did, it knew how to build.

Mr. Charles Trollope having replied on behalf of "The Surveyors,"

Mr. Thomas F. Rider, in genial terms, proposed "The President." Mr. Dove having briefly replied, proposed "The Visitors," coupled with the name of Mr. Richard Roberts, L.C.C., who, in replying, made a spirited but temperate defence of the County Council. He urged that that body was very much misunderstood, partly owing to the bald and meagre reports of its proceedings which appeared in the daily papers. He believed that, rightly understood, the interests of the Council, who were the representatives of the public, were identical with the interests of both masters and men in the building trade, and he urged the members of the Institute of Builders not to too hastily judge the Council, but to co-operate with it in the promotion of good and wholesome building.

The proceedings then terminated.

FOUR-INCH VERSUS SIX-INCH DRAINS: APPEAL TO THE LONDON COUNTY COUNCIL.

MR. ERNEST TURNER appealed on April 27 to the London County Council against a requirement of the Fulham Vestry to lay 6-in. drains to thirty small houses in Laundry-road. Each house has w.c. and two sinks, and in addition the rain-water has to be conveyed from roof, forecourt, and back-yard. Mr. Turner contended that a 4-in. drain to each house would, from a sanitary point of view, be more efficient, and in support of his contention submitted evidence that he had drained many large houses since the year 1884 to the present time with 4-in. pipes, and that the result was more satisfactory than where 6-in. pipes were laid. With respect to the rainfall, the capacity of the pipes very largely exceeded the requirements of any known rainfall. The Appeal Committee, after hearing the arguments on both sides, unanimously decided in favour of 4-in. pipes.

Correspondence.

To the Editor of THE BUILDER.

BIRMINGHAM ASSIZE COURTS COMPETITION, 1871.

SIR,—My attention has been directed to an article in your issue of January 7 ("English Architecture of the last half century") wherein some inaccuracies occur in noticing a design I submitted in competition for Assize Courts and Municipal Buildings at Birmingham in 1871. I wish more particularly to correct the statement that "the Corporation purchased the plan." The Corporation, on the contrary, returned the plans.

It is also stated "the design sent in with it was quite unfinished," as if to account for its not having been premiated. This was not so. The drawings were certainly not elaborated after the manner of some competition drawings, but so far as simple geometrical drawings—elevations and sections—could express it, the design was fully set forth. Besides, the design was given first place by the assessor in the first instance, but subsequently its position was reversed. As I recollect the matter, the assessor submitted to the Corporation a report in which he placed my design first in order of merit, but in a second report, while commending the design very highly, he held it to be disqualified through alleged contravention of the "instructions," and he then awarded the first place to the design of a local architect.

How the assessor was led into the unusual course of revising his report after it had been submitted did not quite appear.

W. H. LYNN.

. We think Mr. Lynn's memory must have deceived him as to the completed state of his drawings. In our review of the competition in the *Builder* of April 1, 1871, we find, "No. 9, as we conclude it to be (there was neither motto nor number attached), is a rather remarkable plan, shown only in a few imperfectly finished drawings." The author intimates that other business stood in the way of his completion of these drawings." There must have been some such intimation on the drawings, as we did not know who their author was, and could not have got it in any other way. In regard to the other question, we believe Mr. Lynn is mistaken in thinking that the assessor (Mr. Waterhouse) revised his decision. It was the committee who revised it themselves. In the *Builder* for September 2, 1871, when we published Mr. Lynn's remarkably fine plan, we also published the assessor's remarks on it, and the two following decisions of the Committee, after considering the assessor's report:—

"1. The design without a motto, and marked No. 9 by your committee, having disregarded the instructions to architects issued by your committee, in breaking the street line, and projecting the building into Congre-street, cannot enter into the competition for premiums without breach of faith with the other competitors, and is, therefore, excluded from the competition."

"2. Agreeing in opinion with Mr. Waterhouse, that the design referred to as No. 9, without a motto, is the most masterly design of the series, and by far the best of the set, your committee recommend that they be authorised to treat with the author thereof for the acquisition of the drawings, so that the council may not lose the benefit of that design when it proceeds to consider the important question of erecting the contemplated buildings."

We presume that this proposal to treat with the author, which we thought had been carried out, never came to anything.—Ed.

SHOULD BRICKLAYERS TILE?

SIR,—Certainly not, if they are so stupid as to bed the tiles in mortar or to nail them to the battens. And all architects who specify such methods should be "sent back to their studies." But there are bricklayers and bricklayers, and architects and architects.

The only places where bedding with mortar is permissible are verges, and against chimneys, dormers, and other vertical walls. Then they should be tilted about $\frac{1}{4}$ in. A cement-fillet then forms a good finish, and is perfectly weighttight, without any unsightly lead flashing.

A very good method has been lately introduced, where Broseby or other nibbed tiles are used. I refer to 4 in. weatherboarding beneath the tiling. This is nailed to the rafters, the thick edge at top, which answers for the battens on which the tile hangs. This weather-board is now imported ready to hand.

WAT TYLOR.

ORIENTATION OF CHURCHES.

SIR,—The comprehensive table of horizontal angles of sunrise now given to your readers (April 29) must prove of much service to the practical student of orientation. May I be permitted to remark, as two methods of obtaining the required point of sunrise have been referred to, viz., astronomically and by watching for the sun, that in the latter case the sun would appear nearer to the north than in the former, as the effect of refraction is to raise the sun above the horizon, so that when it had risen, speaking astronomically, it would have so far proceeded on its inclined path above the horizon that its centre would appear one diameter higher, and somewhat nearer to the south, than when first seen by an observer on a plain.

With regard to the increasing error of the Julian mode of reckoning, it seems probable that the church founder who may have obtained his line from the shadow of a pole would use the Julian Calendar as he found it, while on the other hand the builder who set out the axis astronomically would probably foresee that the error in the Calendar must be corrected sooner or later, and would consequently, by correcting it, connect a certain day with the sun, for the whole period during which his building might stand, even though the date of its erection in process of time might be forgotten. Is it not, therefore, advisable in investigating this subject to apply either method, with regard to the Calendar, provided, that in giving a result, it is explicitly stated by what means it has been obtained?

The difficulty of ascertaining, in many cases, the name of the original patron saint is by no means a light one, for one writer, Mr. Weaver, in dealing with one county, Somerset, has given lists of sixteen churches in which cases the patron saint had been changed since A.D. 1530, and twenty where the dedication is now unknown. For this reason, and seeing that documentary evidence is frequently conflicting, the testimony of the original founders so unalterably laid down in stone—upon the assumption that a particular day was referred to in setting out the lines of their work—seems to be of the first importance in recovering the original dedication; although there may be much difference of opinion at present as to the precise mode of interpreting their testimony; a difference which, it is hoped, a more extended research may eventually remove.

J. HOUGHTON SPENCER.

Taunton, May 1, 1893.

STABILITY OF PIER OF ARCH.

SIR,—I regret to find that I have made an error in developing the expression for the value of p , in which '0777' should be read instead of '777'. This will materially affect the value of p in the examples given, and for $p=34$ read $p=24$. The value of (B) is 385.5, instead of 471.5, which being less than the value of (A), the structure is in a condition of instability.

In the second example the value of (B) is 400, and the structure is also unstable.

If the height h of the pier is 7 ft. 6 in., we find the value of (A) to be 325, and that of (B) is 371; consequently the structure in this case is in a condition of stability.

E. W. T.

VIGERS (THE WESTMINSTER PATENT FLOORING COMPANY) V. THE ACME WOOD FLOORING COMPANY, LTD.

SIR,—An advertisement appeared in your columns in June, 1890, inserted by the Acme Wood Flooring Company, warning all persons against using the flooring of the Westminster Patent Flooring Company as being an infringement of the patents claimed by the former company. An action for infringement was brought by the Acme Company and afterwards abandoned, and we, subsequently, on behalf of our clients, the Westminster Patent Flooring Company, brought an action against the Acme Company for damages in respect of that advertisement. This action was tried on the 18th inst. before Mr. Justice Graham and a jury, and resulted in a verdict being returned in our client's favour against the Acme Company for 300*l.* damages and costs.

As the publication of the advertisement did our clients considerable injury, may we ask you to insert this letter as a notification that the advertisement in question was totally unwarranted.

WEST, KING, ADAMS & CO.

The Student's Column.

CHEMISTRY.—XVIII.

Symbol, Mg. Magnesium. Atomic Weight 24.

MANY compounds of magnesium are found native. The magnesium limestones and "dolomites" have been referred to in a previous paper as carbonates of magnesium and calcium. Steatite, soapstone, talc, asbestos, meerschaum, &c., are all silicates of magnesium, while sulphate of magnesium is known as Epsom salts.

The element magnesium is a silver white metal which, when heated in the air, burns with a dazzling, bluish-white light, forming the oxide magnesia, MgO. The light thus produced being rich in actinic rays is often employed as an artificial light for photography. For the so-called "flash-lights" powdered magnesium is often used, the finely-divided metal being blown through the flame of a spirit-lamp.

Magnesium is prepared by heating magnesium chloride with metallic sodium. Carnallite, a double chloride of magnesium and potassium, which is found at Stassfurt, in Saxony, is often utilised as a source of the metal.

Magnesia, or magnesium oxide, MgO, is usually obtained by subjecting magnesium carbonate to a red heat. It is a soft, white powder which is almost insoluble in water, and is tasteless and infusible. It is known in pharmacy as "calined magnesia."

Magnesium Carbonate, MgCO₃, is found native as a crystallised mineral termed *magnesite*. The *magnesia alba* of pharmacy, which is a mixture of hydrate and carbonate of magnesia, is prepared by adding a solution of magnesium carbonate to a hot solution of magnesium sulphate, and washing the precipitate thus obtained.

Magnesium Hydrate, MgH₂O₂, or Mg(OH)₂, is found in the form of a crystallised mineral known as *brucite*.

Magnesium Sulphate, Epsom salts (MgSO₄ + 7H₂O) occurs in a mineral spring at Epsom, and also in other waters. It is also found in the potash mines of Stassfurt. Commercially the salt is sold in the form of colourless crystals possessing a bitter taste.

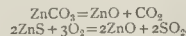
Magnesium Chloride, MgCl₂, is also found some mineral waters.

Magnesium is precipitated from its solutions in the presence of ammonium hydrate and ammonium chloride by sodium phosphate, as a crystalline ammonia-phosphate, MgNH₄PO₄ + 6H₂O, which, when ignited, leaves a residue having the composition Mg₂P₂O₇.

Symbol Zn. Zinc. Atomic Weight 65.

Metallic zinc is not found native, but is obtained from its ores, zinc blende or Black Jack, which is a sulphide of zinc, and Calamine, a zinc carbonate. Zinc is also sometimes manufactured from the red oxide ZnO, and sometimes from the silicate ZnSiO₃ + H₂O. Blende is found in considerable quantities in this country, but Calamine is imported principally from Belgium and Spain, while the red oxide occurs in America.

To prepare zinc from blende or Calamine, the ore is first roasted and then converted into oxide—



This oxide is then mixed with powdered coal or coke and heated in fire-clay retorts. The oxide is thus reduced—



and the zinc, which is volatilised, distils over and is condensed.

Cast zinc is known in commerce as "spelter." When heated in air, zinc burns with a greenish flame, forming zinc oxide, ZnO . In comparatively dry air, zinc does not oxidise to any appreciable extent, but it becomes coated with a film of oxycarbonate of zinc upon exposure to water containing carbonic acid. The film is not porous, and protects the metal from further action; hence zinc is much used for coating iron. The iron is first cleansed by pickling it, *i.e.*, dipping it into dilute hydrochloric or sulphuric acid; it is then washed, dried, coated with ammonium chloride, and finally dipped into a bath of molten zinc; the zinc adheres firmly to the iron, which is then said to be "galvanised." Zinc is readily soluble in hydrochloric, nitric, or sulphuric acid, and is attacked by air containing any of these acids. At ordinary temperatures it is brittle, but if pure, becomes malleable and ductile at about 220 deg. F. At higher temperatures, such as 400 deg. F., it again becomes brittle. Commercial zinc usually contains lead and iron, and sometimes cadmium and arsenic as impurities. The total quantity of these impurities should never, however, amount to one per cent.

Zinc oxide, ZnO , when pure, is a white powder which changes to yellow when heated, but the native oxide is coloured red by the oxides of iron and manganese it contains. It is insoluble in water, but soluble in acids. Oxide of zinc is not blackened by sulphuretted hydrogen, and is therefore sometimes used instead of lead carbonate in white paint. It is prepared by distilling metallic zinc in retorts through which a current of air is passed. The metal volatilises, and combining with the oxygen of the air, is condensed as a fine white powder. It is then placed in canvas bags and pressed.

Griffith's Zinc White is an oxysulphide of zinc, obtained by calcining sulphide of zinc at a cherry red heat, raking it out while hot into cold water, and finally drying and grinding it.

As a rule, the term *zinc white* is used to denote the ordinary oxide obtained by the oxidation of zinc.

Chinese White is prepared by grinding zinc oxide into a cream with a gummy mucilage, obtained from a plant termed tragacanth, or goat's thorn.

Zinc Sulphide, ZnS , is white; consequently if zinc oxide becomes changed to zinc sulphide by sulphuretted hydrogen, the colour is not affected.

Zinc Sulphate ($ZnSO_4 \cdot 7H_2O$), sometimes termed white vitriol, is a white crystalline substance. In small doses it is sometimes used as an emetic in cases of poisoning.

Zinc Chloride, $ZnCl_2$, is a white deliquescent salt, which may be prepared by dissolving zinc in HCl , and evaporating the solution to dryness. In solution it is used as a disinfecting agent, and is known as Burnett's Fluid. It acts as a true disinfectant in killing germs and fungi, and has also the property of absorbing the offensive gases, such as sulphuretted hydrogen, given off by decaying organic matter. It is often employed for cleaning the surfaces of metals, previous to soldering them.

Zinc Carbonate, $ZnCO_3$, is found native as Calamine.

Symbol Cd . Cadmium. Atomic Weight 112.

Cadmium much resembles zinc in its properties, and is usually found in small quantities in zinc ores, and in the metallic zinc of commerce. The metal is used in the preparation of Wood's fusible metal, which contains 4 parts by weight of bismuth, 2 of lead, 1 of tin, and 1 of cadmium, forming a hard, white alloy, which fuses at about 142 deg. F. The most important compound of cadmium is the yellow sulphide, CdS , which is obtained by passing sulphuretted hydrogen through an acid solution of a cadmium compound. It is used as a pigment, and is known commercially as "cadmium yellow."

Symbol Fe . Iron (ferrum). Atomic weight 56.

Iron is occasionally found in small quantities in a free state, principally in meteorites, but all the iron used in commerce is obtained from native compounds. The following are the most important of the iron ores:

Red Hematite, or specular iron ore, is an oxide of iron, Fe_2O_3 , which is found in many forms, often as kidney-shaped masses possessing a red colour, but sometimes in brilliant black crystals. Red hematite is the richest iron ore which occurs in large quantities in Britain. It yields from 50 to 60 per cent. of iron, its chief impurity being silica. It is found in the carboniferous lime-

stone of Cumberland and Lancashire, and in Glamorganshire.

Magnetic Iron Ore, or Loadstone, is another oxide of iron, Fe_3O_4 , but is not found in sufficiently large quantities in this country for it to form one of our iron-yielding ores. It is found in small quantity in Devonshire, but in Sweden and Norway it occurs in large deposits.

Brown Hematite is a hydrated iron oxide $2(Fe_2O_3 \cdot 3H_2O)$ which is usually found in brown, fibrous-looking masses. The pure ore contains about 60 per cent. of iron. It is found in the Forest of Dean (Gloucestershire), also in Cumberland, Durham, Devonshire, Northamptonshire, and in many foreign countries.

Spathic Ore, or Siderite, is a carbonate of iron, $FeCO_3$, which usually yields about 37 per cent. of iron. It is found in Devonshire, Somersetshire, and Durham.

Clay Ironstone is a very impure iron ore, often resembling clay in appearance. It is a carbonate of iron, containing clay and iron pyrites. It is, however, the ore which is most largely worked in England, because it is found in enormous quantities, and usually occurs in the immediate neighbourhood of coal, and is more easily reduced than many of the richer ores. It sometimes only yields about 20 per cent. of iron. It is found in the coal measures of Shropshire, Derbyshire, Staffordshire, Yorkshire, &c., but the ores vary considerably in value, some yielding only about 20 per cent. of iron, while others yield as much as 40 per cent.

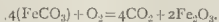
Blackband ironstone is a clay ironstone, containing bituminous matter. It is found in Durham and Staffordshire, and also in Scotland and in North Wales. Its yield of iron varies greatly, that from the Scottish, which is the best, being about 40 per cent. Iron ores which are rich in manganese are often used for the manufacture of Spiegeleisen, a mixture of compounds used for making Bessemer steel.

The following analyses from Thorpe's "Chemical Analysis" will serve as specimen analyses of the various iron ores:—

Analyses of Iron Ores.

	Magnetic Ore.	Haematite.	Blackband Ironstone.	Clay Ironstone.	Spiegeleisen.
Ferric Oxide Fe_2O_3	70.23	94.21	90.05	7.75	7.72
Ferrous Oxide FeO	29.65	—	—	48.12	40.77
Manganese Oxide	—	0.24	0.88	0.81	—
Alumina	—	0.61	0.14	1.63	—
Lime	—	0.05	0.06	1.75	0.90
Magnesia	—	trace	0.30	0.70	0.72
Silica	—	4.98	0.27	1.62	10.10
Carbonic Acid	—	—	—	39.02	36.41
Phosphoric Acid	—	—	—	0.09	0.54
Sulphuric Acid	—	—	—	0.09	—
Iron Pyrites	—	0.03	—	—	—
Water	—	0.50	0.22	0.45	1.00
Organic matter	—	—	—	0.39	1.38
	97.88	100.72	101.56	100.51	100.00

Iron Pyrites, FeS_2 , is a sulphide of iron which is worked principally for the sulphur it yields, being largely used for sulphuric acid manufacture. When clay ironstone or any other form of carbonate of iron is the ore employed for manufacturing metallic iron, the ore is first roasted in order to drive off CO_2 , and leave the iron as oxide—



The ore, after roasting, is left in a more porous condition, thus rendering it more easy to smelt; it is also found that the ore can be broken into small pieces far more readily than before it is burnt.

Smelting of Iron Ores.

The smelting of iron ores is effected in large cylindrical furnaces into which a strong blast of air is passed. If, as is now usually the case, the air before being sent into the furnace is heated (generally to 800 deg. to 900 deg. Fahr., but sometimes to 1,400 deg. Fahr.), the process is called the *hot-blast* process, but if the air is not previously heated, but sent into the furnace at the ordinary atmospheric temperature, the iron obtained from the furnace is termed *cold-blast* iron, and is said to have been produced by the *cold-blast* process. The cold blast is very seldom employed in this country.

The blast furnaces, which are often 60 ft., and sometimes 100 ft., in height, are built of strong firebrick and masonry, and are bound together

externally by iron plates. Fig. 14 represents in section a typical blast furnace. The top of the furnace is closed by a door in the shape of an inverted cone (A) suspended in position by a chain or by a lever arm. By lowering this inverted cone the mouth of the furnace is opened and the

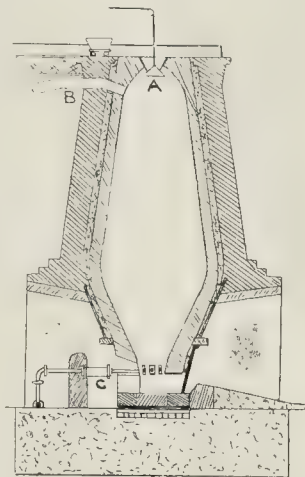


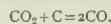
FIG. 14

fuel and ore may be thrown into the furnace. The object of keeping the mouth of the furnace closed is to enable the gases which are generated during the smelting, the principal proportion of which are combustible, to be led away by the tube B at the side of the furnace to be utilised for heating the blast of air which is forced through the pipes, called "twyers" or "tuyeres." C, at the bottom of the furnace under a pressure of several pounds on the square inch. To start a furnace, a charge of coal or coke is first ignited in it, then the iron ore mixed with limestone is introduced, and the blast admitted to the furnace. In this way, alternate layers of coke or coal and iron-ore and limestone are arranged until the furnace is filled.

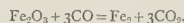
The hot air passing into the red-hot coal or coke yields its oxygen to the red-hot carbon to form carbon dioxide



which by rising through a further quantity of red-hot carbon is converted into carbon monoxide.



This carbon monoxide coming in contact with the heated ferric oxide (Fe_2O_3) combines with the oxygen it contains to again form CO_2 , and leaves metallic iron in a molten condition.



But this carbon dioxide, rising through the next layer of coke or coal, is again reduced to carbon monoxide, which in turn reduces the layer of ferric oxide above it. In this manner the alternate layers of iron oxide are reduced until, at a certain height in the furnace, a point is reached at which the heat is not sufficiently intense to effect the reduction.

When first produced, the iron is scattered in the form of small beads throughout the clay and other impurities present in the iron ore, and as the clay is infusible at ordinary furnace temperatures it is not possible to collect the whole of the iron formed, unless a *flux*, *i.e.*, a substance which causes the impurities, such as clay and other siliceous matters to melt and form a *slag*, is added. The flux employed is limestone, which is either mixed or arranged in alternate layers with the iron ore.

PRESENTATION.—Mr. Hugh S. Cregeen, Consulting Surveyor to the Bromley Local Board, has been presented by the *employers* of the Board with a silver-mounted walking-stick and silver pencil-case, as a mark of their appreciation of his kindness to them during the time that he was Surveyor.

GENERAL BUILDING NEWS.

NEW CHURCH, BUDLEIGH SALTERN, DEVONSHIRE. The new Church of St. Peter's, Budleigh Salterton, was consecrated by the Bishop of Exeter (Dr. Bickersteth), on the 25th ult. The church, the cost of which will be about 8,000*l.*, occupies a site in the centre of the town, and has been erected from a design by Mr. G. H. Fellowes Prynne, F.R.I.B.A. It is in the Early English style, and is cruciform in shape, having a nave 90 ft. long by 27 ft. broad, and north and south aisles and transepts. The chancel is 40 ft. long by 24 ft. broad, with the usual cross passages. The facings of the church externally and internally are of rough Devon limestone, the internal dressings being of Beer stone, and external dressings of Douling and Monk's Park stone. The roof is covered with red Bridgewater tiles. The builders were Messrs. E. L. Luscombe & Son, of Exeter, and Mr. J. Worwell has been clerk of the works. Messrs Goad, of Plymouth, have supplied the polished marble. The church is capable of seating 300 persons. It contains also a chancel screen given by Lady Gertrude Rolle, the panels of which will afterwards be filled with figures of fishermen who have in the history of the church been canonised as saints. At the east end of the south transept is a Lady Chapel. It is proposed to complete the edifice by a tower and spire of 140 ft. in height. The choir stalls were executed by Messrs. H. Hems & Sons, of Exeter.

NEW CHURCH, HENTHORPE, DONCASTER. Lord Grimthorpe has accepted the tender of Mr. W. Anelay, builder, Doncaster, for the erection of a new church at Henthorpe, near Doncaster. The amount of the tender is 4,560*l.*, and the whole of the cost will be borne by his lordship and his sister, Miss Beckett-Denison. The plans are being prepared, from sketches supplied by Lord Grimthorpe, by Mr. H. Athorn, architect, Doncaster, who will superintend the carrying out of the work. The church will be in a populous district, and situated at the junction of two roads, known as Sunny Side and Shady Side.—*Sheffield Telegraph.*

TECHNICAL SCHOOL, ROCHEDALE. The new Technical School at Rochdale, built as a memorial of the Queen's Jubilee, was opened on the 26th ult. by Sir Bernhard Samuelson, M.P. A Higher Grade Board School, erected in close proximity to the Technical School, and with which it is to be more or less connected, was inaugurated at the same time. The Technical School, with its equipment, has cost over 10,000*l.* The building is of red brick, with terra-cotta and stone dressings. Provision is made for the teaching of weaving, cotton-spinning, engineering, practical plumbing and wood turning, chemistry, and dyeing. Messrs. Woodhouse & Willoughby, of Manchester and Stockport, were the architects. The adjoining Higher Grade School has accommodation for 440 pupils. It contains a lecture theatre, a chemical department, and a series of special class-rooms. It has been built at a cost of about 7,000*l.*, from designs by Messrs. Butterworth & Duncan, Rochdale.

CONSERVATIVE CLUB, BLACKLEY, LANCASHIRE.—On the 20th ult. a new Conservative Club was opened at Blackley. The building, situated in Market-street, has cost about 1,600*l.* The land on which it has been erected is about 12 ft. below the level of the street. The whole of the work has been carried out from the designs and under the superintendence of Mr. Everard W. Leeson, architect, of Manchester.

MISSION CHAPEL, ADAMSOWN, CARLISLE.—On the 25th ult. the Rev. Canon Roberts laid the foundation-stone of St. Elvan's Mission Chapel, Adamsdown-square, Cardiff. The new chapel, the erection of which will entail an expenditure of about 800*l.*, covers an area of 80 ft. by 30 ft., and when completed will seat about 300 people. It is being built of brick, with stone dressings, and will have offices and retiring-rooms attached to it. The builders are Messrs. Cox & Bardo, Cardiff, and the designs for the chapel were prepared by Mr. E. W. M. Corbett.

MINERS' HALL, SILKSWORTH, DURHAM.—The new Miners' Hall at Silksworth, which has just been completed, was opened on the 22nd ult. by Alderman W. H. Patterson. The principal entrance to the building is in Blind Lane-terrace, and consists of an entrance hall, on either side of which are the committee-room and pay-office. At the west end of the hall, and immediately over the entrance, is the gallery, capable of seating 240 persons. The ground-floor seating accommodation is for 560 persons. Adjoining the hall there is a building two stories in height, containing reading-room (28 ft. by 18 ft.), billiard-room (28 ft. by 18 ft.), and recreation and committee-rooms. In the rear of the reading-room block there are the usual offices. The cost of the work has been about 3,100*l.* The works have been carried out from the designs and under the superintendence of Mr. Henry Greaves, architect, South Shields. The contractor for the whole of the work was Mr. T. P. Shifford, of Sunderland.

WESLEYAN CHAPEL, EASTRINGTON, YORKSHIRE.—On the 18th ult., foundation-stones of a new Wesleyan chapel were laid at Eastington, Yorkshire. The designs for the building were prepared by Mr. W. A. Gelder, architect, of Hull, according to which the scheme includes a chapel and class-room, the dimensions of the chapel being

39 ft. by 28 ft. The seats are to be arranged for open stall ends, and there will be sitting accommodation for 120 persons. The contractor is Mr. G. H. Walters, of Hull.

THE BLACKPOOL TOWER.—Messrs. Maxwell & Tuke report that the tower is now erected to 203 ft. 6 in. high, with the exception of a few braces. The riveters are following up the work rapidly, and if all goes well, the tower will be completed within the specified time.

PROPOSED NEW STATION FOR PETERBOROUGH.—The Great Eastern Railway Company, it is stated, will commence the building of a new station at Peterborough shortly. There will be two spacious platforms, 800 ft. long, which will be built on a level with the steps of the carriages. The present booking-offices and adjacent buildings will not be pulled down, as they are said to be roomy and well built. The whole of the surroundings of the station, however, will be greatly improved. The cost of the new station is estimated at 100,000*l.*

ADDITIONS TO COUNTY HOSPITAL, AYR.—Additions to the County Hospital, Ayr, have just been completed. The extensions, which are from plans prepared by Mr. John Murdoch, architect, Ayr, are in keeping with the main building, and consist principally of a sitting-room for the nurses in the general hospital, a servants' hall, nurses' room for the general hospital, and separate accommodation for the nurses in the fever wards. In addition to these extensions, the baths, drainage, &c., have all been remodelled.

WESLEYAN CHURCH, NEAR WHITBY.—On the 27th ult. a new Wesleyan church was opened at Thorpe. The foundation-stone of the edifice was laid by Mr. E. W. Beckett, M.P., in the autumn of 1891. The building is of stone, with red tiles. Mr. Waddington, of Manchester, was the architect.

CHANCEL, ST. THOMAS'S CHURCH, LEEDS.—On the 25th ult. the chancel of St. Thomas's Church, Leeds, was consecrated by the Bishop of Ripon. The church, which is in the Decorated style, was built from designs by Mr. W. Butterfield, architect, London, and consists of a lofty nave of five bays, aisles, and south porch. An interval of forty-two years passed away before it was possible to undertake an extension of the building by the erection of a chancel, and plans having been prepared by Mr. Butterfield, these were carried out under the superintendence of Mr. C. R. Chorley, of Messrs. Chorley & Cannon, architects. The chancel is about 32 ft. in length and 25 ft. in width, and is faced both inside and out with red pressed bricks, relieved with plain stone strings, corresponding in design with the church. The roof over the chancel is of oak, the buildings being supported on granite and marble shafts built into the walls, and the space between the buildings panelled. The walls of the chancel have a tiled dado, and the choir seats and other fittings are of oak. The east window is of five lights, with moulded jambs and arch of Harehills stone. On the north side there is a stone staircase leading down to the crypt under the chancel, which will serve the purpose of a vestry for the clergy and choir. The crypt is lined with red pressed brick, and the roof is groined or arched in the same material. In the east wall of the present south aisle an arched opening is formed leading into a small cloister, by which communicants can return to the nave of the church. The total cost of the work is expected to be about 1,700*l.*

SCHOOL BUILDINGS, PORT TALBOT, GLAMORGANSHIRE.—On the 24th ult. the corner stone of the intermediate and technical schools at Port Talbot was laid by Miss Talbot, of Margam Abbey. The buildings will be built of a warm red brick, relieved with Bath-stone dressings. In the centre of the building is to be an assembly hall, divided by a screen, for the use of boys and girls. On the right hand of the assembly-hall will be the boys' class-room, cloak-rooms, and lavatories, with a corresponding accommodation for girls on the left hand side. The building is to be two stories in height, and accommodation will be provided for masters and mistresses, as well as music and cookery rooms, &c. The contractor is Mr. Evan Thomas, Neath, whose contract price for the building was 3,293*l.* 17*s.* 6*d.* The architect is Mr. T. P. Martin, of Swansea, and the clerk of the works is Mr. Evan Koderick, Port Talbot. The school will accommodate eighty boys and sixty girls.

NEW WESLEYAN CHAPEL, BOLTON-ON-DEARNE YORKSHIRE.—On the 13th ult. the foundation-stones of a new Wesleyan Methodist chapel at Bolton-on-Deerne were laid. The cost of the structure will be 725*l.*, and in addition a schoolroom and class-rooms will cost 500*l.* The chapel is to accommodate 250 persons. The architect is Mr. J. Willis, of Derby, and the builder Mr. G. H. Smith, of Mexborough.

FOREIGN AND COLONIAL.

FRANCE.—A rope railway has just been constructed which connects Bas-Meudon, on the bank of the Seine, with the terrace of Bellevue. The General Council of the Seine will shortly have to occupy itself with an important scheme for the complete sanitation of the numerous communes in the suburbs of Paris. The total cost of the necessary works is estimated at 8,750,000 francs. The Council have also in hand the project for the construction of a new bridge over the Seine, between

Neuilly and Puteaux.—The War Department is proceeding to the destruction of the fortifications of the little town of Aire-sur-Lys (Pas-de-Calais).

The following is the result of the competition opened for the re-building of the Hôtel de Prefecture at Troyes. The first premium has been awarded to M. Louis Dauvergne, architect, of Paris; the second is given to M. Masson, of Paris, and M. Brouard, of Troyes, as on an equality; the third to M. Thibaut, of Paris; and an Honourable Mention has been given to M. Gabriel, of Bar-sur-Aube.—The Maison Didron at Paris has in hand some remarkable windows for the decoration of the Church of Notre Dame at Dijon, executed in the style of Louis XIII.—The monument raised to the memory of Emile Lebon is to be inaugurated at Dieppe in July.—The Minister of Commerce has laid the first stone of the savings bank for the town of Dreux.—The death is announced of M. Eugène Beyer, historical painter, at Nîmes, at the age of seventy-nine. He was a pupil of Guérin and of Paul Delaroche. Among his works may be mentioned "La Persecution des Juifs à Strasbourg Pendant la Feste de 1240" (Salon of 1857), and "Une Famille Protestante célébrant son culte en cachette en 1685" (Salon of 1865). M. Beyer was deputy for Strasbourg in the Constitutional Assembly of 1848. He died, it is melancholy to add, in absolute poverty.—We hear also of the death of M. Camille Ruphy, Departmental Architect of Annecy, Architecte de bâtiments civils, and of the State, and President of the Société des Architectes de Dauphiné and Savoy. M. Ruphy died at Annecy at the age of seventy-four.—M. Trian, architect, of Paris, has obtained the first premium in the competition opened by the town of Neuilly-sur-Marne for the construction of a group of schools. The second premium was awarded to M. Lequeux, of Rouen, and the third to M. Pierre Bonis, of Paris.

MISCELLANEOUS.

A NEW MORTISING MACHINE.—A new chain cutter mortising machine, known as the "Star," has been introduced recently by Messrs. Hall & Parry, of the Rosebery-avenue Engineering Works, Vine-street, E.C. As indicated by the name, the cutters are arranged in the form of a chain, which is made to traverse over the wheel at the upper end, and descends into the slot cut in the wood, as the material is removed. It is claimed that, great saving of time and labour is obtained by this arrangement. The mortice is cut through in one operation, without turning over the wood, or splitting it on the under side, and the core is thrown out by the revolving cutters. Hard wood can be mortised without preliminary boring, so that neither a boring apparatus nor a core-driver is required. A notable feature is the absence of vibration in working; an advantage that will be readily appreciated, and, moreover, which lends to the additional benefits of a machine not requiring any special foundation. Wedge-shaped mortices can be cut in one operation as quickly as parallel mortices, and that without canting the table. The machine can also be used for grooving. The table is operated by a foot-lever, to bring the work up to the cutters, and is adjusted to suit the depth of the wood by means of a screw underneath. The cutter-chain may be taken out and replaced by another of different width in a very short space of time. The machine will cut mortices across the grain, and also with grain, from $\frac{1}{4}$ in. upwards.

THE BRITISH PRODUCTION OF FINISHED IRON.—The statistics issued last week by the British Iron Trade Association, although in part still incomplete, show a serious falling-off in the output of manufactured iron last year. There were produced 1,560,697 tons of puddled bar against 1,733,902 tons in 1891. This shows a decline for 1892 of 173,205 tons, or 10 per cent. The decrease was heaviest in Cleveland (113,633 tons, or over 32 per cent.), due, for the most part, to the stoppage caused by the Durham miners' strike, but also partly to the gradual substitution of steel for finished iron. In all other districts but two the production also fell off, although to not such an alarming degree. The two exceptions were Shropshire and Lancashire, where the output increased by 26 and 0.6 per cent. respectively. So far as can be judged from the partial returns received, the heaviest output of finished products (bars, plates, and sheets, hoops, angles, &c.) was in Lancashire (264,473 tons); the lowest in South Wales (24,389 tons). Cleveland produced 226,752 tons; Scotland, 151,206 tons; South and West Yorkshire, 104,619 tons. The largest production of finished iron bars is recorded in Lancashire (189,895 tons); of ship plates, Cleveland (129,797 tons); of wire rods, Lancashire (57,598 tons); of hoops, Lancashire (44,945 tons); of sheets, Lancashire (26,252 tons). The latter district thus seems to have suffered least during last year's depression.

THE PRESERVATION OF AMERICAN FORESTS.—It is gratifying to observe that many State Legislatures of the United States are at length endeavouring to arrest the process of forest spoliation which has been going on unchecked for many years. The prairie States were among the first to advocate arboriculture, trying not so much to preserve as to restore and rehabilitate. The general Government interposed seasonably to save the magnificent red

wood trees (*Saguya gigantea*) of the Yosemite region and Yellowstone Park in Wyoming, but it remained for the several States, each within its own jurisdiction, to supplement the work initiated in the national domain. New Hampshire has taken action with respect to the White Mountains to hold in the hands of speculators. The new law in that State, like the present law in Massachusetts, authorizes the State to take and protect the rights of land which are made by its own citizens or by the people of other States, and to construct roads or paths over these domains, but forbids that they should ever again be used for private purposes. Thus the threatened destruction of forests is arrested. In like manner the Legislature of New York, in passing the Adirondack Park Bill, establishes a reservation which ensures its protection by placing the entire region under the control of a forest commission invested with adequate authority. The tract covers at present about 500,000 acres of forest land lying in six contiguous counties, including for future enlargement. Maine is also awakening to the need for the preservation of the forests in the Androscoggin region, while a Bill is before the Pennsylvania Legislature to stop the denudation of the forest area within that State.

ARCHITECTURAL ASSOCIATION: DISCUSSION SECTION.—The twelfth and last meeting of the Section was held at 56, Great Marlborough-street on Wednesday evening, the 3rd inst. at 7 p.m. Mr. W. Henry White presided, and Mr. S. B. Beale, Chairman of the Section, read a paper on "Architectural Drawing and Draughtsmanship." The paper dealt very thoroughly with drawings and draughtsmen of the present day, and was illustrated by a large and carefully-selected series of typical illustrations. The author specially pleaded for the architectural rendering of architectural drawings, and deprecated the introduction of sketching, as shoddy to serious professional work. The following gentlemen were elected as officers for next session:—Chairman, Mr. C. H. Brodie; Vice-Chairman, Mr. W. Henry White; Hon. Secretaries, Mr. H. A. Satchell and Mr. W. Pywell. The meeting terminated with a cordial vote of thanks to Mr. S. B. Beale for his services to the Section on his retirement from the chairmanship.

THE SOCIETY OF ENGINEERS.—At a meeting of the Society of Engineers, held at the Town Hall, Westminster, on Monday evening last, Mr. W. A. Vestminter, Valon, J.P. (President), in the chair, a paper by Mr. Edmund Burrows on Blake's Bridge, Reading, was read. This bridge crosses the river Kennet, and unites the north and south sides of the borough. The old bridge was erected in 1855, with a carriage road only 14 ft. wide. Proving too narrow for the increase of traffic, it has been removed, and a new bridge, 30 ft. wide, has been erected by the Corporation in its place. The new bridge is a terminus of the railway, and was designed by Mr. A. W. Malmesley, M.Inst.C.E., and consists of lattice girders 4 ft. 6 in. deep, having parallel flanges with momentary cast-iron work between the diagonal members, so fixed as to provide a parapet without interfering with the definite transmission of strain throughout the braced members of the structure, which is constructed of mild steel. With the view of distributing the live load more evenly, a steam roller of 15 tons, together with a distributed weight over the remainder of the platform estimated at 2 cwt. per foot, super, trough flooring 5 in. deep is used, giving the lines of ridge and furrow fixed at right angles to transverse lattice girders 4 ft. 6 in. apart, which are the main girders, but stiffened in their attachments at the ends by side brackets. The girder form of construction was adopted as providing uniform headway under the bridge, while the original level of the approaches and roadway over the bridge was not raised. With the view of employing the abutment walls of the old bridge, the new piers were carried on brick piers supported by the foundations, and surmounted with ornamental tony caps. The upper flange of each of the lattice girders is covered with American oak to form hand-rail. The bridge was tested after completion by loading with water-vans, a 10-ton steam roller, 4 loaded stone trolleys, in all amounting to a load of 63½ tons distributed, and gave a deflection in the centre of 1½ inch. The bridge was opened for public traffic on October 6, 1892. During construction, vehicular traffic was only impeded for but two and a half months. Messrs. Parker & Co. were the contractors for the foundations and masonry, and Messrs. Handyside & Co., of Derby, the erection of the steel and iron work. The total cost of the bridge and improved approaches was £100,000. The author acted as Resident Engineer for the Reading Corporation during the construction of the bridge.

CAPITAL AND LABOUR.

STRIKE IN THE BRIGHTON BUILDING TRADE.—The 1st inst. 400 men came out on strike at Brighton, owing to the employers' refusal to advance wages 4d per hour and accept the rules regulating hours and overtime.

LEADS PLASTERERS THEIR WAGES.—The (men) plasterers of Leeds had, about eight days ago, their wages reduced from 9d. to 8d. per ft. Some time ago a movement was initiated by

the men with the view of improving their position, and the outcome of several meetings was a decision to serve a six months' notice upon the masters for the purpose of regaining the 1d. taken off. The employers, however, have not seen their way to grant the full demand, but have agreed to concede an advance of 4d. per hour, a concession which, it is understood, the men are prepared to accept. It is reckoned that there are between 200 and 300 plasterers in the city who will benefit from the increase. At the present time the building trade is prosperous, and consequently the plasterers, as in other departments of the building trade, are very busy.—*Leeds Mercury.*

THE CARDIFF BUILDING STRIKE.—A specially-convened meeting of the Cardiff operative masons—the only section of the men affected by the dispute in the Cardiff building trades who have not yet resumed work—was held on Monday night in the Gladstone Hall, Cardiff, to receive the report of Messrs. Huffer and Harvey—the deputation sent down from the men's executive in London—to inquire into the position of the men and the reasons they allege for continuing the struggle. A report was presented favourable to the men, and a gift of £400. was announced from the central organisation to strengthen the position of the men and help them to maintain it in the future.

MEETINGS.

FRIDAY, MAY 5.

Junior Engineering Society.—Mr. A. H. Bromby on "Gold Mining Machinery." 8 p.m.

SATURDAY, MAY 6.

Incorporated Association of Mechanical and County Engineers.—Lancashire and Cheshire District Meeting, to be held at Manchester.
Edinburgh Architectural Association.—Visit to Nunaw.

MONDAY, MAY 8.

Surveyors' Institution.—Discussion on Mr. R. F. Grantham's paper on "Recent Experience in Sewage Treatment considered in Relation to River Pollution." 8 p.m.

Society of Arts (Cantor Lectures).—Mr. C. Harrison Townsend on "Mosaic: its History and Practice." 1 p.m.

Clerks of Works' Association (Carpenters' Hall).—Paper by Mr. E. Moore. 8 p.m.

TUESDAY, MAY 9.

Society of Arts (Applied Art Section).—Professor W. M. Flinders Petrie on "Primitive Art in Egypt." 8 p.m.

WEDNESDAY, MAY 10.

Society of Arts.—Mr. J. B. Hilditch on "The Richmond Lock and Tidal Weir." 8 p.m.

Society of Biblical Archaeology.—4.30 p.m.

Liverpool Engineering Society.—Annual General Meeting. Adjourned discussion on Mr. Ernest W. Pierce's paper on "Engineering Contracting."
Edinburgh Architectural Association.—Annual Meeting. Valedictory address by the President, Mr. W. W. Robertson. 8 p.m.

THURSDAY, MAY 11.

Society for the Encouragement of the Fine Arts.—Mr. John Leighton, F.S.A., on "Pictorial Advertising—its Use and its Abuse Demonstrated." 8 p.m.

Institution of Electrical Engineers.—Mr. W. B. Sayers on "The Prevention of Sparking, Compound Dynamos without Series Coils or Motors, and Self-excited Dynamos and Motors without Winding upon Field Magnets." 8 p.m.

FRIDAY, MAY 12.

Architectural Association.—Mr. E. Guy Dawber on "The Stone Buildings of the Cotswolds." 7.30 p.m.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

9,616.—**DRAIN PIPES: H. Gorman.**—This patent refers to an improved support for drain and other pipes during the process of laying and fixing, at the same time forming a permanent support after the joints have been fixed. It consists in forming a support of earthenware or other suitable material having a flat base to the ground, the top of the support being hollowed out to receive the pipe. These blocks being only fixed at certain intervals there is access to the pipes all round, ensuring the making of a perfectly sound and air-tight joint, without the necessity of excavation.

8,477.—**KILNS: A. Charles.**—This invention relates to a kiln or drying apparatus. In the middle of a square or rectangular structure of brickwork or masonry is a fire with an ashpit underneath. From the fire rises a fire tapering as it ascends, the flue-pipes branching off at angles. These pipes are provided at the top with deflecting caps, and also with dampers by which their upper ends may be closed, whilst branches from them leading to a central chimney remain open. There are also passages for entrance of air to the interior of the structure, and to flues enclosing the central fire-flue. The parts described are all floored over by a metal plate, which may be perforated, and through which the central chimney passes, and hot-air tubes also pass, when desired, to drying chambers which may be erected above. When the material dried upon the floor is not liable to be damaged, the products of combustion as well as the heated air may ascend through the floor, but if the material is likely to be injured by the combustion gases, the flues for these are closed, the hot air being allowed to pass.

10,814.—**CEMENT BLOCKS: O. Birkton.**—This invention has for its object the building of single or double walls of solid or cellular cement, plaster, or stone plates placed edgewise, and a suitable manner of connecting or strutting them, so that the whole wall may be guarded against cracking or bending. It is also suitable for building flat or

domed, single or double ceilings, or bridges with straight or curved plates. In building single or double walls of cement or plaster blocks, &c., placed edgewise, in the first place clamps are employed, tightly connected with one another by means of pins passed through the same and ties, this fastening being allowed to remain until the mortar or cement has set. In double walls a double clamp is tied between both walls, and the fastening is allowed to remain. In the case of double walls for bridges, domes, flat roofs, and the like, both parts of the walls are connected by means of single, double, or elbowed clamps, the ends being thickened, hooked or provided with small discs, one end of such clamps being always cemented or built into one part of the wall, the clamps being arranged in such a way that they may be regarded as the panels of a bridge of which the two walls form the building pieces, and resist cracking or bending when suitably loaded. In carrying out his invention the inventor proposes to use cellular cement or plaster plates in which the cells are turned inwards.

249.—**FIREPROOF FLOORS: M. Fawcett and others.**—This patent relates to improvements in the construction of fireproof floors, and has for its object to effect a further improvement in the manufacture and use of the tubular lintels, described in the specification to Mark Fawcett, No. 2,816, February 25, 1889. The improvements consist in providing the lintels with a number of longitudinal flutings or grooves, into which the concrete keys or holds are pressed, thus preventing the tubes or lintels from being separated or falling away from the concrete in the event of fire acting on the ceiling below.

NEW APPLICATIONS FOR LETTERS PATENT.

April 17.—7,746, T. Hundley, Moulding.—7,765, J. Whitehead, Automatic Door-fastener.—7,771, H. Hawgood, Door and Window Fastenings.—7,779, W. Pitt, Folding Gates.—7,786, A. Boulton, Wood Coverings for Walls, &c. April 18.—7,813, A. Lowe, Combined Cross-grooving and Stop-grooving Plane.—7,868, J. Noel, Cully and Trap-heads, and in grids therefor.—7,877, B. Haigh, Flushing Syphons.—7,883, T. Scott, Brackets for Supporting Shelves in Shop Windows.

April 19.—7,894, C. Haigh, Material for Use in the Construction of Pavements, Floors, Walls, Stair-roads, &c.—7,929, S. Perkins, Sink Traps.—7,941, B. Fadden, Joint for Earthenware, Stoneware, and Metal Pipes.—7,952, A. Taylor, Ratchet Braces.—7,955, G. Leachetter, Hand Planes.

April 20.—7,983, C. Oliver, Seats of Water-closets.—7,999, K. Jenkins, Machinery for Use in Tunnelling.—8,001, J. Urmon, Devices for Use in Painting or Cleaning Walls, &c.—8,014, G. Breese, Sash-fastener.

April 21.—8,057, R. Taylor, Apparatus for Cutting off Bricks at each side of the Brick-cutter.—8,101, O. Elphick, Water-closets.

April 22.—8,133, H. Holland, Can and Brush-holder for Paints, Varnishes, &c.—8,147, D. Keith, Bath Fittings.—8,175, J. Pemberton, Apparatus for Opening and Cleaning Hair for Building Purposes.

PROVISIONAL SPECIFICATIONS ACCEPTED.

3,978.—B. Phillippson, Connections of Water-closet Basins &c.—3,986, C. Cox, Hinge for swinging Looking-glasses.—4,386, W. Mortimer, Doors for Doors.—4,452, W. Oddy, Door Bells.—5,710, J. Tegg, Window or Sash-fasteners.—6,357, H. Filpatrick, Regulating the Discharge of Water from Cisterns.—6,461, C. Norris and J. Richmond, Heating, Cooling, and Ventilating Buildings and other Structures.—6,608, A. Giddings and J. M. Naughton, Water-closet and other Cisterns.—6,620, Dallman, Water-closets.—6,728, F. Sator, Process and Composition for Polishing Wood.—6,799, C. Firth, Sawing or Cutting Stone.—7,042, J. Craven, Machines for Moulding Bricks, &c.—7,076, J. H. Hoveman, Ventilators.—7,234, R. Norris, Brick-moulding Machinery.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

10,359, F. Weldon, Temporary Bridges and other like Structures.—10,363, G. Davies, Window-jack or Scaffold.—10,618, C. Houghton, Windows.—22,400, C. Gibbs and C. Cause, Heating Bakers' Ordinary Brick Ovens.—3,854, E. Piper and G. Davis, Holding Window-blinds.—4,681, H. Berney, Planning and Arrangement of Dwellings of the Cottage Class.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

April 20.—By Dyer, Son, & Hillon (at Lewisham): 113 and 115, Loampit Vale, Lewisham, £, 555.
April 21.—By Wagstaff & Warner: 186 to 192 even, Copenhagen-st., Islington, u.t. 56 yrs., g.r. 81, r. 1661, 1770d., i.g.r. of 101, Copenhagen-st., u.t. 56 yrs., g.r. 24, 125d.; 38 and 40, Richmond-st., Barnsbury, u.t. 48 yrs., g.r. 181, r. 941, 940d.—By Baxter, Payne, & Leffer: 24 and 53, Thornhill, Lambeth, u.t. 68 yrs., g.r. 111, 101, r. 401, 795d.; 10, Thavies Inn, Holborn, £, 1, 165d., 1,840d.—By Carlman Bros.: 71 and 73, Victoria-pkrd., Hackney, u.t. 57 yrs., g.r. 201, r. 1281, 1,250d.—By White, Druce, & Brown: the lease of 42, South Molton-st., Oxford-st. 14 yrs., r. 100d.—By Wetherall & Green: 23, Chantry-rd., Brixton, u.t. 78 yrs., g.r. 61, 101, r. 381, 325d.; 14 and 24, Chantry-rd., u.t. 78 yrs., g.r. 131, 625d.; 9, The Grove, Clapham-rd., u.t. 42 yrs., g.r. 81, 745d.; 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 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to 2, Luton-pl., 1, 300*f*; r. 12 and 12, Park-mr.,
End, f. 450*f*, to 12, 13, 14, 15, 16, 17, 18, 19, 20, 21,
22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35,
4, 166, Brooke-rd., Stoke Newington, f. r. 100*f*, 145*f*,
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138, 174, 210, 246, 282, 318, 354, 390, 426, 462, 498,
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Whitaker-st., ut. 27 yrs., g.r. 20*s*, 27*s*, 65*s*; 33, 34,
35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49,
Valentine-rd., Hackney, ut. 42 yrs., g.r. 5*f*, 106*s*,
2*f*, 25*f*.—*By W. W. Jenkinson:* 11 to 19, 108,
Alma-rd., Wandsworth, f. r. 190*f*, 150*s*; 2, 104,
106, 108, 110, 112, 114, 116, 118, 120, 122, 124,
(odd).—*Birdhurst:* ut. 83 yrs., g.r. 45*t*, 128*t*,
10 to 1 (odd), Fullerton-rd., ut. 82 yrs., g.r. 25*s*, 86*s*,
11 and 13, Fuller-ton-rd., ut. 82 yrs., g.r. 9*f*, 36*s*; 37
39, Lindford-rd., Waltham, ut. 82 yrs., g.r. 100,
102, 104, 106, 108, 110, 112, 114, 116, 118, 120,
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Royal United Service Institution, Whitehall.—Messrs. Aston Webb and Ingress Bell, Architects.....	Two Single-Page Photo-Litho's.
House, "Quarrydene," Westwood, Leeds.—Mr. W. H. Thorp, F.R.I.B.A., Architect.....	Double-Page Ink-Photo.
Gate-Lodge and Stabling, Chertsey.—Messrs. Wimperis and Arber, Architects.....	Single-Page Ink-Photo.
Station Hotel, Fleet, Hants.—Mr. F. H. Tulloch, A.R.I.B.A., Architect.....	Single-Page Ink-Photo.

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Architectural Drawings at Paris.



HE architectural drawings at the old Salon in the Palais de l'Industrie are less numerous than usual. The three usual rooms are filled, but the drawings in the gallery round the central hall, instead of extending as usual nearly round three sides of the hall, only fill one end and half the side. Whether this is to any extent due to some of the architects having been enticed away to the opposition Salon we cannot conclude till we see what the latter has to show us. It cannot be on account of the jury having taken a higher standard than before, for in fact the exhibition is below the average in quality as well as quantity.

As usual, the largest and most elaborate collection of drawings consists of restorations. Of these the *pièce de résistance* is M. Defrasse's "Restauration de l'Encinte Sacrée d'Epidaure." He shows a plan, and a careful geometrical drawing of the existing remains, and below it an elevation of the restoration, on a very large scale and carefully coloured. M. Defrasse shows the circular temple (*Tholos*) with a sloping roof above the colonnade, and the upper part of the *cella* wall rising out of it, and decorated with a frieze of white figures on a blue ground. The appearance of this upper drum of masonry rising out of the tiled roof impresses us as not very good and not very Greek. Both the *Tholos* and the Temple of Asclepius are shown with very strong blue on the triglyphs and on the ground of the tympanum of the latter; the metope spaces are filled up with immense painted rosettes, which again do not look very Greek. A series of photographs of fragments of architecture and sculpture from the ruins is appended, as representing the documents on which the restoration is based, but it does not of course cover all the details.

We have also this year again a prominent piece of Oriental restoration, that of the

royal pagoda of Vât-cheng, the drawings of which are part of the result of a mission sent out by the Department of Public Instruction. This set of drawings is by M. Fournereau, and does credit certainly to his industry and thoroughness of workmanship. The immense geometrical elevation of the pagoda shows a great central steeple or minaret with a pyramidal base, and a similar but smaller erection at each angle. The forms are barbarous, but the drawing is beyond praise, and the whole surface of this vast elevation is covered with coloured decorative detail, all carefully indicated. Of some of this decorative detail, and of the grotesque figures which are painted on the walls, there are careful and brilliantly coloured drawings to a larger scale.

M. Bauhain exhibits a large set of drawings, beautifully tinted in Indian-ink, of the château of Rochefoucauld, showing its actual state and a restoration as it may have been at the Renaissance period. This is, in fact, a restoration of a restoration, for the author gives drawings as the castle was in the fifteenth century, and drawings of its Renaissance renewal and alteration. In the former period it was an irregularly-planned château, with the usual great circular turrets at the angles, and a massive square machicolated tower at one point, dominating the whole, the curtain walls being nearly blank masses, only pierced near the top: the main change in the Renaissance version of the building being, of course, the introduction of a large number of regularly-spaced windows with pilasters and other adornments. This is a very fine set of drawings, but most English architects would be inclined to question whether there was anything in their archaeological and architectural value commensurate with the space they occupy.

Among other drawings of ancient work (we are confining our remarks at present to the drawings in the three rooms, omitting those in the gallery) may be mentioned M. Boutron's measured and restored elevation of the "Jube" of Limoges Cathedral, a curious piece of work, looking exceedingly Gothic in general character, while every detail is in fact of Renaissance type. Gothic

cusplings to the arches are imitated by a succession of curved appendages, not springing out of the arch-mould as Gothic cusping does, but merely as if stuck on to it. This is vile in itself, but is interesting as a bit of character. The drawing is beautifully executed, a large-scale elevation delicately tinted in Indian-ink. M. Rouillard exhibits some coloured drawings of the paintings in the ancient cloister of Notre-Dame d'Abondance (Haute-Savoie), which are from the archives of the Commission des Monuments Historiques. A very interesting collection of drawings is that by M. Henri Deverin of a curious seventeenth-century building, the Abbaye of Celles. There appears to have been some Gothic work left amid the seventeenth-century construction, for one drawing shows a piece of Gothic vaulting (in the vestibule and staircase), with a Renaissance column built up so as to support the groin-rib in the middle of its length, where it had evidently shown signs of failure; one of the oddest architectural combinations we remember to have seen. The principal façade of the building is a curious piece of work, showing narrow flat pilasters, which at the base are projected out into tolerably deep buttresses, the transition being effected by introducing a scroll or console at the foot of the pilaster. The elevation of the side pavilion shows a powerful piece of simple classic design; the wall is rusticated throughout, and the large flat projections along it are treated with an Ionic capital at the top, giving them a special architectural expression, though they do not really constitute an order.

Among the large designs exhibited we find two for railway station fronts; one a "projet" by M. Paul Normand, the other the executed "Gare de Nice," by M. Bobin. The former is an immense elevation, with plan, of a great central terminus, entirely in iron, the main feature being the great window, which forms a four-centred pointed arch, and evidently follows the line of the station roof; its effect is rather weakened by the vertical uprights which cut across it. The station buildings form a block on each side, but are entirely crushed by the iron front, the scale

of which is totally different, and the buildings seem to belong to some other construction. We find in another sense the same want of consistency of scale in M. Robin's much smaller station. This is a masonry front, with a lofty centre marking the width of the railway, while the side portions extend beyond this and mask the rest of the station. The centre portion shows a lofty arch buttressed by large rusticated angle-blocks, over which are large ball finials which at once reduce the scale; and in the frieze is a colossal key-fret pattern, which assists towards the confusion of scale between the centre and side portions. This indifference to scale in details seems to us to be a frequent weakness in modern French architectural design. Otherwise, there are good points about this design, which is superior to much railway architecture that one sees.

M. Camut shows the drawings of his restoration and enlargement of the baths establishment at Mont Dore. The iron staircase details would never be admired in this country (except by engineers), but the coloured elevation of a portion of the wall of the grand saloon is a fine piece of classic treatment. The drawings include a restored plan and some details of the ancient Roman baths on the site. M. Gelbert exhibits six pen-and-ink views of the new church at Lourdes, of which M. Hardy is the architect. One of these has been reproduced in our pages, when we described the nature and object of the building. The view of the interior shows a domed church in solid masonry, of rather low proportions, and treated in what may be called a Neo-Byzantine manner. The drawings are comparatively small, and may attract little notice among the large sheets by which they are surrounded, but the design is one of the best pieces of modern architecture exhibited. No plan is given; a very unusual omission in a French set of architectural drawings.

Another very good design is that by M. Pillette for a proposed hôtel for the "Association des Architectes Diplômés par le Gouvernement." This is a very refined classic elevation; a rusticated basement story, an Ionic order above, with large windows marking the grand saloon (which extends the whole width of the front), and a well-designed attic, only that the vases which act as finials are too large. The section, showing the decorative treatment of the principal rooms, is beautifully worked out and in excellent taste throughout; the whole design being worthy of an architect's meeting-room.

Among prominent designs which represent the less admirable tendencies of modern French architecture are such things as M. Rives' Belvedere Hotel at Bellevue, a kind of mixture of railway-station and rustic park architecture, with round open-timber pavilions, developing enormous roofs like extinguishers. M. Léon Carle shows the elevation and longitudinal section and other drawings of his "Olympia" Theatre, which seems rather to be what we should call a "music-hall," and is certainly gew-gaw enough in its street front and interior decoration for that style of building; the plan, on a very confined site, is cleverly managed. M. Tronchet's "Projet de Bourse Maritime Commerciale," with a light-house tower and flagstaff appended, shows some power in the treatment of the flank elevation, but with a florid exuberance of detail which goes far to spoil it. A characteristic piece of executed shop architecture, "Le Dome Clignancourt," by M. Rives, shows that he can do something better than his Belvedere Hotel. This is a powerful treatment of a large and important business front, with a large central arch and sculptured pediment over, flanked on each side by one of those slightly tapering "pylons" which the French are so fond of; in the lower part of these are arched niches with sculpture, and a boldly-projected balcony over; it is the detail of this part of the work which the large drawing exhibits, the niche being filled with a group by M. Faiguère; a plaster model of the same

portion of the building is also exhibited. This is a piece of work with a great deal of "go" in it; the defect is the one we so frequently find in French street architecture of this class, the want of restraint and refinement in detail. Here the rusticated jointing is on such a large and coarse scale that it seems completely to kill the sculptured group which is the centre of the whole; in the model more so than in the drawing.

The exhibition includes two examples of monumental designs, one of which, by M. Naudin, is of some importance. This is a design for the decoration of the Place Dauphine with a colossal statue of Justice on an architectural pedestal in the centre of the Place, flanked by an architectural screen on each side, consisting of a colonnade divided into sections by pylons at every third intercolumniation, and terminated by a larger pylon at each end; the screens forming segments of a circle of which the statue is the centre. In front of each section of the colonnade is to be a seated statue of an eminent philosopher, orator, or legislator. Duc's Palais de Justice forms the background of the whole, the idea of which of course has relation to the proximity of this building. "Justice," in the drawing, looks rather like a colossal cook; but the architectural portion is well carried out, and might have a fine effect, though it would seem a little too isolated as an erection. We do not suppose, however, that there is the slightest chance of that or anything else of the kind being carried out there. The other design referred to is the drawing by M. Despradelle for a monument "Aux Gloires Françaises," to be erected in the Panthéon. This is a kind of stele on a pyramidal base, with a shallow niche on each side filled up with cartouches inscribed each with a name—"Kleber," "Carnot," &c. The effect of this is not good in a decorative sense; it looks rather like a box of lozenges. At the upper part of this stele a gilded angel seems hung on, flying out from the monument and blowing a trumpet. The whole is crowned by another gilded angel on a flying steed; and the base decorated with bas-reliefs. On the whole, we think the Panthéon will be better without it. As a contrast to this we may draw attention to the admirable design for the monument to Théodore de Banville, by M. Courtois-Suffit (the bust by M. Rouleau). This is a marble stele with a large Ionic capital, the centre of which is hidden by the name-tablet; over this is a section of cornice forming a pedestal to the bust. The front of the stele is decorated by a bronze lyre and foliage, not stiffly designed, but very freely treated and looking as if hung on to the front. Full-size details of the architectural portion are given. The whole is in admirable taste, and a model work of its kind.

In domestic architecture one finds sometimes a very careful setting out of very trite things, as in M. Lethorel's "Maison de Campagne à Ville d'Avray," a most carefully-executed frame of drawings—perspectives in the centre, plans and details all round—of a house absolutely without architectural interest. M. Paul Normand's "Villa à Montmorency," is a country house with a fine and unusual plan, the exterior effect of which is spoiled and vulgarised by the abnormal high roof and spike over the central feature. That is the kind of thing we complain of in the modern French country house; the architect cannot be content with repose of design, there must always be this outbreak of spiky roofs to give (we suppose) the picturesqueness supposed to be suitable to a rural site. In reality, nothing can be more at variance with the spirit of natural landscape. We used to sin in this way in England, in country houses, very much; but that sort of architectural vice is on the decline with us; it seems to be still rampant in France. As a contrast, there is a small set of drawings by M. Escalier of additions to what is evidently an old villa at Charny, probably early in this century. This is a very simple unpretending brick building,

with a remarkable plan; a large oval-shaped entrance hall (the larger axis parallel to the front wall), with symmetrical stairs on each side winding up to the level of the inner vestibule and staircase, the sitting-rooms being arranged symmetrically on each side and in the rear of the staircase. The additional building, containing new kitchen, bath-room, bedrooms, &c., has been added as a block separate from the original house, with which it is connected by a two-storied arched bridge in a very effective manner. The author shows small oil sketches for the decorative paintings of the billiard-room, which are light and clever, though not in a true decorative style.

Decorative design, in fact, does not seem to flourish much. M. Hista gives a perspective interior of his Oriental decoration in a private house in Paris; this is good, though spoiled by the row of hideous masks below the cornice line. M. Lafolloye's "Salle des Fêtes" for the celebration of civil marriages is shown in two large coloured elevations, giving the two ends of the room. These are worth attention; some details of the design are rather eccentric, but the colour effect of the whole is very good, and has really a festal appearance: the worst point in it is the design of the organ-case, which is very weak. M. Ehrmann's design for tapestry—subject, "Prometheus"—shows a circular picture in the centre, the chaining down of Prometheus; the remainder of the space being covered with delicately-designed conventional scroll-work, very good in itself, but not the thing for tapestry, which demands a broader treatment, less dependent on symmetry of line.

Among the drawings which are representations of old work only, there is a fine set of large coloured drawings by the MM. Saint-Père (father and son) of the tomb of "Philippe le Hardi," Duke of Burgundy; a full-size detail elevation is given, showing the heavy black marble base and top, with the carved figures and miniature arcade on the side of the tomb; a full-size section; and a very carefully-elaborated perspective view. It would be interesting to know with what object French architects produce these large drawings of ancient work; there is no statement of this being done for any official commission; is it for study purely, or is it for a place on the walls of the Salon? M. Nodet's "Vieilles Maisons de Tours" are drawings made for the Commission des Monuments Historiques, and most charming pieces of work they are. These are very carefully coloured elevations (mostly) of old buildings, so realistically executed that the very texture of the stones is shown. One of them shows the "Hôtel de Beaune Semblancy," with some of its curious details, including a frieze formed of knotted and festooned rope combined with wings, which must have had some symbolic meaning. Another shows a bit of an old house with one or two mullioned windows inserted in masonry formed of an irregular checker of white stone blocks and red brick; another is a set of drawings of a remarkable brick circular staircase in the Rue Brignonnet, Tours, with a perspective view in which every brick and tile can be studied. The thoroughness with which French architects carry out this kind of pictorial record of old buildings for official purposes cannot be too highly praised. M. Yperman shows some interesting coloured drawings of old decorative work at Verez (Indre-et-Loire), especially one of a half-obliterated but evidently very finely designed fresco of angels with musical instruments, from the chapel of the château of Clos-Luce. M. Goemans' water-colour sketches of Arab architecture are freely handled and effective; M. Schmidt sends a good frame of "croquis de voyage," more carefully if a little hardly executed. The pen drawings of this class are not much to speak of, and some of them would hardly get a place on the walls at Burlington House.

Of the drawings in the gallery round the central hall, a large number consist of a kind

of work that one sees every year with little variety; large classic designs for banks, bourses, and other such buildings; still larger ones for casinos, which seem to be the occasion for the French architectural imagination to run its wildest riots on the largest surfaces of paper. Competition drawings for the "Hôpital Bouicaud" are numerous; one is hung in one of the rooms, and is, we presume, considered superior to those which are relegated to the gallery; for thinking the design by M. Hénoux, in the gallery, is the best plan and the most suitable architectural treatment for a large hospital of this class. M. Petit's "Consular Palace at Algiers" is a good Classic front, and the sheet of details a fine piece of pen-drawing. M. Mignan's Hôtel in the Rue de Varenne is shown in a very large set of drawings, including geometrical coloured drawings of interior decoration of rooms, which to English eyes seem rather cold and uninteresting: the exterior treatment of the house, though plain, is refined and pleasing. M. Mouclos shows an immense number of drawings of an absolutely commonplace villa. M. Cravio's "Villa au Bord de Mer," a stone house in the Italian style, is much better, though not worth all the space it occupies: the external frieze, apparently graffito, with figures and scrollwork white on a buff ground, is very pleasing, and gives a certain special character to the design. An American, Mr. Howard (pupil of M. Laloux) exhibits some sketches which are clever, but with a characteristic American assumption of a right to be as untidy and scribbly in drawing as he chooses. M. Freynet's "Habitation d'un Architecte" does not say much for the architect's taste in regard to detail. M. Chaussepied's drawings of the Chapel of Notre-Dame-du-Murier, at Batz, are a really valuable set of careful coloured drawings of a very interesting relic of Mediæval architecture; the nave arcade, with its richly-moulded arches dying into the surface of the circular piers, with no capital or impost, is very characteristic. M. Delmas' Hôtels de MM. C— and P— shows in one drawing a very good and powerful treatment of an angle house, in a severe Classic style, with a strong cornice and a very plain attic over it; the balconies are rather heavy in design, but the whole is a good example of street house of the larger class. Of the theatre and casino "projets" in the gallery we need say nothing; they cover too much wall space, and that is all; but we may call attention to some fine water-colour sketches (in the end gallery) of very characteristic châteaux, the "Manoir de Landifer," by M. Boutier. The plan is merely a long rectangle with a round tower at each angle; the effect of the building in the sketches is, however, remarkably picturesque. A curious feature in it is the number of small oval openings with which the walls are pierced, at irregular intervals, mostly just above the plinth and the upper string-course. Was this a simple Mediæval expedient for getting rid of slops of all kinds? It is a regular feature in this old château, with an obvious intention of some kind.

Whether the Champ de Mars Salon shows anything of higher architectural interest we must take another occasion to enquire.

LECTURES AT CARPENTERS' HALL.—The Carpenters' Company announces a series of lectures to be given at Carpenters' Hall on Wednesday evenings (commencing Wednesday, May 10) on carpentry and joinery. The list of lecturers includes Prof. Banister Fletcher, Mr. Thomas Blashill, Mr. Keith D. Young, and Prof. T. Roger Smith. The lectures will be given with a view to future examinations and candidates' tickets and particulars may be obtained at Carpenters' Hall.

THE ENGLISH IRON TRADE.—With the exception of steel, business in all branches of the English iron trade remains unaltered. Pig-iron is quiet, and manufactured iron little is doing. Tinplates continue to manifest fair activity. A brisker tone is noticeable in steel. Shipbuilding and engineering are still in a languid condition. The coal trade is slack.—Iron.

NOTES.

THE case of Gale v. Hervey, which came before a Divisional Court of the Queen's Bench Division this week on appeal from a County Court, again showed the necessity for buyers or tenants of houses to have the drainage carefully examined before they enter into a contract. The tenant in this case, as in many others, found the drainage was bad after the tenancy had begun. But there was no warranty in the contract as to the state of the drainage, and the most which could be proved was that the house-owner had said it was "all right." The County Court Judge found that it was all wrong, but he also found that there was no fraud on the part of the house-owner, and, under these circumstances, the Divisional Court pronounced in favour of the house-owner. There are, indeed, scores of house-owners whose knowledge of sanitary matters is so imperfect that they would say that drainage was all right, honestly believing it to be so, when it would be condemned by an expert at the very first glance. We can only repeat that if tenants wish to protect themselves they should call in the aid of an expert. This is not an expensive business when the house is a small one. Any competent builder in these days knows what are the main sanitary requirements. If the house is a large and important one, a person of higher class should be employed. Discomfort, illness, expense, and litigation would over and over again be saved if people in these matters would show but a little prudence and foresight. If the sanitary arrangements of the house which was the subject of litigation in Gale v. Hervey had been inspected before the contract was made, the plaintiff would have been fully protected, and she would not be the victim of an unsuccessful law-suit.

WE hope there will be a good attendance at the Institute of Architects on Monday to hear Professor Baldwin Brown's paper on "The Study of Vitruvius." The subject is one of great interest, and the meeting may be certain to hear from Professor Brown a thoughtful and well-considered paper.

NOW that the competition for the new Christ's Hospital Schools is fairly started, we may point out how important it is that these large schools should be models not only in regard to planning and architecture, but in regard to sanitary conditions. And in order the better to ensure this, it is desirable that there should be a medical expert added to the committee, and if possible one who has had some special experience in regard to the causes of outbreaks of illness in schools, and can make special suggestions as to dangers to be guarded against.

DR. FLINDERS PETRIE gave a lecture on Tuesday evening last at the Society of Arts, upon the "Primitive Art of Egypt." It need hardly be added that all Dr. Petrie's utterances upon Egyptian subjects are listened to with interest and profit. But the lecture in question was of unusual interest, from the fact that it treated of a subject of which little is known, and that little is mainly derived from his own recent discoveries. To ordinary observers, the style of the Egyptian monuments appears to be very much the same, through all the long period of the history of that remarkable country. Analogy with the art-work of other countries, where constant change, if not progress, is observed, is sufficient to dispel the belief, but Dr. Petrie has now demonstrated the differences between early Egyptian work and that of later date. Unlike the work of other nations, however, the earliest known work is shown to be among the best, the sculpture being

altogether free from the mannerism which is all too conspicuous in the later works—in which, in fact, it becomes more apparent as the works become later. Dr. Petrie illustrated his lecture by an admirable series of photographs of the earliest sculptures known, all of which showed portraits of the persons represented. The features being so forcible and so marked, no other conclusion could reasonably be come to. But these works date from the pre-historic Fourth Dynasty! The technical excellence of the works is remarkable, showing that great perfection had already been arrived at in the use of tools at this remote period. Dr. Petrie has found hardly anything of earlier date than the Dynasty named, and he acknowledged that all his researches to find the origin of these works at a still earlier time had not yet produced results. Very many years of work must have passed away before such perfection could have been arrived at. Views were shown of the two most ancient temples yet discovered, those at Gizeh and at Ghorub. In both the stones are cut with admirable precision, and laid in courses of large size, the material in the first instance being polished granite. The chair was taken by Mr. Poynter, R.A., who, on introducing the lecturer, spoke of what the latter had already accomplished with the Egyptian Government for the preservation of the ancient remains of the country. In the discussion which followed, Mr. Thorneycroft, Mr. Phené Spiers, and others took part.

A CORRESPONDENT of an evening contemporary recently called attention to the bad ventilation of the places of worship in London. It may fairly be said that this is a just complaint, but it should not be confined to churches only. The Courts at the Old Bailey—and, in fact, all the Courts of the metropolis—are defective in some way in regard to ventilation. The truth is that buildings which are not constantly used by the same persons in large numbers or of some importance, are not likely to be as well looked after as they should be. A juryman grumbles at the draughts or at the want of air, but he is only a single individual, and there is no collective action to remedy a defect. Again, persons attend church but once a week, as a rule, and consequently put up with want of air in summer in a way they would not do if they were at church every day of their lives. The difficulty in the way of improvement of any kind in these days is the want of collective force and influence. When this can be found, improvements are possible.

A BEGINNING has been made for the building, after the designs of Mr. Taylor, Architect to the Office of Works, of the second block for the new Patent Office (extension). The ground has been cleared between Took's-court and the east end of Quality-court, Chancery-lane. The greater part of the area has been open ground for a long period. It is so shown in Ogilby and Morgan's map, 300 ft. to 1 in. scale, 1677, and in some large scale maps of this and the preceding centuries. Beneath the gardens of the two houses in Took's-court, to which we referred on March 19 of last year as then occupied by Mr. J. C. Francis for the *Athenæum* and *Notes and Queries* offices, some large cellars and remains of thick walls, all built of red brick, have been dug up, at from 2 ft. to 3 ft. below the surface, together with a small room, lighted by a window of which the glazing had remained, and the lower portion of a round kiln-shaped structure. One cellar is divided into nine compartments, perhaps for wine-bins or safes, the dividing masonry being constructed of bricks and large red tiles.

A MONGST the many Scottish properties which have been placed in the market for sale this season is the Balhathock estate,

covering nearly 1,500 acres, and offered at an upset price of 40,000*l.* It lies near to Kinnoull, in Perthshire, and close to the Carse of Gowrie. Not far from the house stands a "keep," which is traditionally the remains of a Templars' castle. It is situated above a deep ravine, and commands a fine prospect over the Tay valley. The castle was the seat of the Blairs of Balthayock in the time of William the Lion, and for long afterwards. In the "Castellated and Domestic Architecture of Scotland," by Messrs. MacGibbon and Ross (1889), the tower is assigned to the period 1300-1400. It is described by them as being a massive simple keep of the usual description, measuring 52 ft. by 37 ft., and having very thick walls. They go on to say:—

"It is still of considerable height, but has lost its battlements, and is furnished with a modern roof. The interior is also modernised, but shows the usual dispositions, the hall being on the first floor, with entrance door at that level, and turnpike stair in an angle to the upper floors." The whole place, they add, is kept in fine order.

THE Beiblatt to the last number of the *Jahrbuch* of the Archaeological Institute at Berlin contains an interesting paper on the recent investigations respecting the Pantheon. The writer, Dr. O. Richter, expressly stated that his views must be regarded as professional, and that he himself waits the completion of the excavations before he can express absolute conviction. His views in summary are:—1. Agrippa built the Pantheon B.C. 27; it was then a circular building of the same dimensions as at present, covered with a tent-roof. This building suffered from fire twice, in A.D. 80 and A.D. 110; the last fire rendered a new building necessary. 2. Hadrian completed the new Pantheon, that standing now, in A.D. 125. He used some of the old material, and raised the level of the temple more than 2 in. The statues of Augustus and Agrippa, and the inscription naming "Agrippa" as the founder, were reset up. 3. At some time that cannot be definitely fixed, between the date of Hadrian and Severus, the portico in front of the building that still stands there was built. At the same time the pediment groups and the Agrippa inscription were placed in, and below the pediment of the portico. 4. In 402 A.D. Septimius Severus carried out a complete internal restoration of Hadrian's structure.

THE ruins of the old Roman north gate at Cologne, which are in close proximity to the Cathedral, have lately been the subject of much discussion in the Common Council of that city, the councillors having to decide whether the interesting archaeological remains were to be further preserved, or covered up so as to facilitate vehicular traffic on the new Dom Platz. According to an article by Bauinspector Schulze, in the *Cologne Gazette*, the gate, which was formerly known as the Porta Papia, had a frontage of 103 ft. and a depth of 39 ft.—dimensions nearly as large as those of the well-known Porta Nigra at Trèves. The gate, which is known to have stood until as late as 1826, showed the usual plan, i.e., the combination of a main entrance with two narrow side entrances, all three provided with double gates, and the main entrance also with a porticulis. The existence of an upper story of architectural pretensions has been proved, and, according to a reconstruction illustrated in the *Centralblatt der Bauverwaltung*, showed the Corinthian Order in its simplest form. The flanking towers to the gateway are not shown higher than the ramparts, and hence resemble those at Aosta and Pompeii. The height of the old ramparts is estimated at 30 ft.

THE *Transactions* of the American Society of Civil Engineers for February, in giving an account of the restoration of the cable ends of the Covington and Cincinnati suspension bridge, built in the years 1856 to

1867 by John Roebling, and which contained the longest span of any bridge in existence until its central span of 1,057 ft. was exceeded in the New York and Brooklyn bridge built in 1870-83 by the same engineer, states that Roebling's faith in the preservative quality of cement mortar had led him to bury the anchor chains and cable ends of the former bridge in masonry, but that subsequent deterioration in the cable ends necessitated further precautionary measures. It is a well known fact that unless rusty iron is thoroughly cleaned before painting, it will continue to rust under the paint, which, in such cases, is only a delusive means of security. Hence, rather than trust to making the chamber containing the anchorage accessible for inspection and repainting periodically, the plan was tried of entirely excluding air and moisture by a permanent oil bath. Paraffin oil was selected, on account of its neutral qualities, coupled with its great fluidity, which allows it to penetrate all interstices between the wires. But when it was found that the oil appeared through the joints of the masonry some distance back and below the tank, it was decided to draw the oil out and replace it with paraffin wax, melted in a steam kettle, which has given a satisfactory result. The cheaper grade or crude wax, which contains a large proportion of oil, was used, melting at 116 deg. Fahr. It was noticeable at the inspection that the greatest deterioration of wire occurred where a piece of wood or stone was in contact with the rope, while a further examination of the cable by the aid of wooden wedges to open the strands, revealed the fact that the inside wires were in comparatively good condition. The same publication, in reporting a discussion upon road construction, maintains the superiority of a 15 or 20 ton steam-roller over the efficiency of a 5 ton horse-roller, and argues as to the action of narrow tyres in destroying the surface of a road, urging that the tyres of traffic vehicles should be constructed so as to prove preservers instead of destroyers of highways. Binding material of a sharp and gritty character, preferably screenings from the stone used for the road, is introduced, not to interfere with the stones coming together, but to fill up interstices, and the object of rolling should be, not to force the lower course down, but to compact the upper layers. The less that binding material is found necessary, the cleaner and more durable will be the roadway.

THE *Journal of the Franklin Institute* for April contains a description of the 100-ton Sellers' travelling crane, erected at the Baldwin Locomotive Works, Philadelphia, where it is operated by electricity over a span of 74 ft. 8 in., with a run of 335 ft., and is capable of transporting with ease either a complete locomotive or a delicate sand-mould without disturbing a grain of sand. The bridge travels at a rate of either 100 ft. or 200 ft. per minute, as desired; the trolley travels crossways 50 ft. or 100 ft. per minute; while the hoisting and lowering apparatus is capable of moving at from 5 to 50 ft. per minute. The author shows the advantages of an over-head traveller occupying no floor space, compared with fixed jib-cranes limited in radius; and he points out that the limit of capacity of any establishment for large orders is determined by its facilities for handling its plant and material with economy and despatch. In extensive shops we think, however, that fixed cranes cannot be entirely dispensed with. A traveller, though indispensable, can only be in one position at a time. Another useful paper in the same journal is that entitled "Causes of Fire," in which the author, while admitting it is a difficult matter to discover their origin, truly remarks that what we frequently call an accident is very often due to our imperfect knowledge of natural laws. The author considers the public to be even more ignorant in these vitally important matters than in hygiene. Inspections are entrusted to unreliable persons because they offer

cheap terms, and he urges the co-operation of the Press in instructing the public, as prevention is better than cure.

PEOPLE with antiquarian tastes who may be content with assertion instead of fact—and there may be some such—will be interested in the "discovery" which a writer in the *Pall Mall Budget* has just made. In the classic region of the Waterloo-roads, Lambeth, he has discovered the site of an ancient nunnery, of which truly there is no record at all! Its gardens stretched down to the Thames; there is a "nun's" walk beneath the roadway, a Roman arch, Norman and thirteenth-century work, and, of course, a cell with a length of chain, the latter being of a peculiar description. The occupier has seen old prints that show the buildings so long ago as before the existence of Vauxhall Gardens (!), and the premises are crowded by antiquaries eager to inspect the ancient remains. The letterpress is accompanied by some fairly good sketches, which indicate some of the features which are more especially referred to. Two of these objects, at any rate, are ancient and of interest. The first is a chimney-piece described as being six centuries old, but having a frieze which is said to date from the "eleventh century," with blue and white tiles of the same early date. It proves to be a very good piece of work of the middle of the sixteenth century, having a decided sance feeling in its sculptured ornament. Frieze and jambs are of the same age, the latter repaired, but the tiles are of modern date, with printed patterns, and the mantel is no older. There is a large bold stone arch in the basement, with circles in the spandrels, of early fifteenth century workmanship, leading to the "Nun's walk," and close to the door of the "cell," all the latter being in modern brickwork. But what is the true history of this blending of really ancient work with such a setting of recent years? The solution is very easy and simple. The house is question, at the corner of Anne-street, now occupied in part by printing works, was formerly the residence of Mr. Cottingham, the well-known architect. Here the Cottingham Museum, that curious assemblage of ancient fragments and modern casts, was collected, and here it existed to the period of its dispersal by auction only about forty years ago. In the period when Cottingham flourished, an architect in fair practice had abundant opportunities of collecting fragments of ancient buildings from the works he might have in progress, or by gifts from his clients, too careless or too indifferent to have any such replaced in the reparations. Hence the Cottingham Museum contained objects that should never have been in it, of which the fireplace and the arch in the basement are examples. Since they are fixtures, they were not included in the sale. The entrance doorway of the house, in the "Norman style," of which our contemporary gives a sketch, is too slight to be of ancient work, but above it is a pretty shield supported by angels, and charged with the arms of England and Old France quarterly, which may be ancient. There was formerly a canopy of stone to this doorway, which was removed a few years ago. All this is such modern history that it is not a little surprising that the hand which can draw well should write with so little care. Reference to any history of Lambeth is not difficult, even if the lists of monastic buildings are not readily obtainable, and the public may reasonably expect that a writer should at least take the small pains of easy reference, which would at once refute haphazard statements.

A CORRESPONDENT has sent us an advertisement, apparently from a Norfolk paper,* headed "Great Yarmouth

* We may take this opportunity of observing that cuttings from newspapers, whether intended to convey information or to be the subject of comment, should always be accompanied by the name and date of the paper from which they are taken.

Union: to Architects," and proceeding to state that tenders are invited from architects desirous of preparing plans and specifications and superintending the new works for additions to the workhouse of the Union, and that the person appointed as architect will not be allowed to charge any fees or commission in addition to the amount stated in the tender. From this it would seem that the Great Yarmouth Union does not understand the difference between an architect and a contractor, and that they are going to give the job to the architect who will work cheapest. A proposal like this implies not only an insult to the architectural profession, but a failure of duty on the part of the Union, who are certainly bound to see public works carried out in the best manner, in regard to construction and sanitation; an end which is not to be attained by advertising for the cheapest architect.

ARCHITECTURE AT THE ROYAL ACADEMY.—II.

HAVING noticed some of the most prominent works in the Architectural Room, we will refer to some others *seriatim* and in the order of hanging. Mr. 1,479: "A Doctor's House in the Country": Mr. E. Beckett Lamb. Why "A Doctor's House?" There is nothing specially doctoral in the architectural expression of the house, as far as we can see. It is a pretty rural house, with three gables or bays in a row, with windows above and below and white plastered panels between them: the mass of tiled roof rather over-weights the building. The drawing shows a clever treatment in colouring, to which perhaps it partly owes its position. A small plan is appended.

1,480: "Additions to 'Roxley'": Messrs. Wimpey & Arber. There is no plan, and nothing in the drawing to show which are the additions and which is the original part of the house; criticism is therefore impossible. The drawing, a pen-line one, shows a picturesque-looking L-shaped house with timber gables.

1,481: "Proposed House, based on Bramhall Hall": Mr. R. A. Briggs. This is an interesting experiment at reviving an ancient and very picturesque type of English house. In the plan as given here the hall seems rather too much cut up into recesses, and moreover the position of it is not quite expressed in the exterior design. We may observe however, in regard to any attempt to revive this type of house, with its large extent of timber and plaster work, that if this exterior finish is only added on the front of a brick wall it is rather a pretence; while, on the other hand, if it is fully carried out as what it appears to be, it makes a very cold house in winter.

1,483: "Woodcroft, Leek": Mr. Lamer Sugden. This drawing was published in the *Builder* of December 12, 1891. The grouping of the house is effective, but the plan seems rather like a studied aim at picturesque irregularity, in which practical convenience is to some extent sacrificed, as in the crooked in-and-out plan of the billiard room, certainly not the best shape of room for the purpose; and even on artistic grounds a billiard-room should be regular and rectangular in plan, to coincide with the necessarily rectangular lines of the billiard-table which is its *raison d'être*, and which fills up such a large part of the room.

1,484: "194, Queen's-gate, South Kensington": Mr. R. A. Briggs. A good specimen of a street house in brick, treated simply but with massive and substantial detail. The carved in-and-out lines of the bay and balcony on the second floor, however, though they serve to break the flat elevation, look as if more support was required underneath. The small panes and thick sash-bars are exaggerated (we hope) in the drawing, for effect; if they are executed as shown here, it is not a desirable make of window for a town where light is not too clear and abundant. No plan is given.

1,486: "New Chapel, The Cancer Hospital": Mr. A. Graham. A sepia drawing showing the chapel projected from the main building, as an obvious addition and with no attempt to combine it architecturally; it stands out as the chapel, separate from the hospital architecture. It is treated in a simple Gothic style. No plan.

Mr. W. Aikman. Three lights with square heads filled with a design showing the Marriage at Cana. It is powerful in colour and somewhat unusual in general effect and treatment: it escapes the "church furniture" style of glass design which is

too prevalent at present, and looks like the work of an independent artist.

1,488: "Design for St. Andrew's Church, Ayr": Messrs. Morris & Hunter. A cleverly executed tinted drawing of a church of Gothic style and with some special character in the treatment of detail. The carrying up of the spire lines quite plain till near the top, where the angles break out into crockets, is a pretty idea, and the whole design hangs together well. No plan is given.

1,489: "Extension of Church, West Dulwich": Mr. E. T. Hall. How much is "extension"? we presume it is the piece patched on in the foreground; there is no plan to show. The drawing is an effective one.

1,490: "New Church, Staines; interior looking east": Mr. G. H. Fellowes Pryne. The principal object of this drawing evidently is to show the form of built-up chancel screen to which its architect has directed special attention lately. Here the chancel arch is entirely occupied by a stone screen, forming an architectural filling to the opening. The lower portion consists of three lofty foliated arches or "lights," the shafts dividing them rising from bases on each side of the gateway into the chancel. Above the three main arches, which spring from the impost level of the chancel arch, the space is divided up by mullions into smaller openings in which figures are placed, standing free of the tracery. The effect of the whole is to produce a degree of monumental appearance and architectural unity which is not obtained, it must be admitted, by the introduction of a wood or metal screen which has no direct connexion with the structure of the building.

1,491: "St. John's Church, High Leigh, Cheshire": Mr. E. Kirby. This is a half-timber treatment of a country church, a kind of "chalet" church; not, we think, quite sufficiently ecclesiastical in character. It shows a rather across the end with a high hut-like roof, and a kind of bay window over it, and a bell-turret over that, all in timber work and somewhat too irregularly piled one on another. We cannot help thinking that it looks more like the back of a pavilion for a cricket-field or racecourse, where a special attempt at the picturesque had been made, than like a church: but this may be prejudice.

1,492: "New Church, Mission-house, and Schools for Italian Protestants, Clerkenwell": Mr. Alfred H. Tillman. A small pen drawing of a church with a detached campanile and a sloped cornice to the gable after the manner of Italian Gothic. It looks satisfactory and suitable for the purpose.

1,493: "North End of Bath Room, in Tiles, Mosaic, and Faience": Mr. C. Temple. This, we believe, really the design for a portion of the Chicago exhibit of Messrs. May & Co. It is a very pretty piece of work of its kind. There is a marble subbase supported by marble pilasters, between which the space is filled with conventional water-plants, in mosaic on a gold ground, and a grey conventional representation of water at the base; above the subbase are tiled walls divided into panels, which are occupied by figures and scroll-ornament of Renaissance type; a frieze of similar ornament drops down pendants which fill up the space between the panel-borders.

1,494: "House at Lismore": Mr. F. L. Pearson. A quiet country house with partially tiled walls and presenting no special feature to call for remark, which perhaps was the object of the designer. A small plan is added.

1,495: "Church, House, and Schools, Bexhill-on-Sea": Mr. Philip H. Tree. This is a very clever small pen-and-ink sketch, showing a picturesque design; in the treatment of the large window, with buttresses introduced at the principal mullions to give it support, the architect is rather palpably imitating a feature which has been seen in drawings by other architects, or by one other, in previous exhibitions. The upper and lower portions of the tower seem rather to want connexion, which might have been gained by carrying the lower buttresses up farther and working them into the upper portion. But as a whole this is a very good little drawing.

1,497: "New Entrance-lodge and Gateway, Welbeck Abbey": Mr. John Brooke. This is a good gateway design: it shows a curved fence-line on each side meeting at the central gate piers, which are happily treated as blocks of masonry worked into the form of a Roman Doric order, showing two columns on the face of each pier, and leaving a long pedestal or blocking over the cornice as the support for a heraldic animal placed sideways and facing towards the main gate. The design of the piers is carefully worked out, and the ironwork of the gates and fence railings is well

designed. The side entrances are formed through arches in the lower portion of the stone piers.

1,500: "Holy Women of the Old Testament: Part of a Frieze": Mr. N. H. J. Westlake. This represents a row of draped figures executed in pencil, and a continuation of the same design of which another portion was shown in a drawing in last year's Academy, and illustrated in the *Builder* for September 3, 1892.

1,501: "Design for the Church of St. Peter, Abbeydale, Sheffield": Mr. Sydney Vacher. This is one of the designs sent in for what appears to have been a rather important church competition. The drawing, which is a pen-line one, rather hard and mechanical in style, shows an interior with a wooden-pannelled roof in cants, and four-centred arches to the nave: the exterior view shows the east end with gables with traceried windows placed high up and a considerable space of blank wall below them. The treatment of this portion has breadth and character; we do not quite like the oblique buttresses to the centre aisle, which is very slightly projected beyond the side one, so that the buttresses seem almost to start out of the wall and leave an awkward inner angle; and of course buttresses are not in the least called for constructively where the wall projects so little beyond the adjoining walls—a mere break in fact. A plan of the church is added.

1,502: "Edinscourt, Disley, Cheshire": Mr. John Brooke. This is an unusual and characteristically treated front. The house has two similar gables, with a varied treatment of the architectural labels of the windows below them, one showing square lines, the other circular; the dining-room on plan shows a square-lined projecting bay at the left side of the façade, the drawing-room a circular one at the right-hand side; the general scheme of the house is symmetry in general lines with an appropriate variety in detail.

1,503: "New Entrance Gates and Lodge, Eaton Hall": Mr. R. W. Edis. A straight gate with large outer piers, and smaller ones on either side of the centre gate; the larger ones are treated in a French neo-Classical style, with a cornice and short thick angle balustrades worked out of the upper part of the pier; the whole in good taste but a little wanting in distinction for entrance to so important an estate.

1,504: "Compton Leigh, Froggall Gardens, Hampstead": Mr. James Neale. No plan; an effective pen drawing of a house partially tiled, and in which the principal feature is a large octagon angle-turret with wide-spreading eaves.

1,505: "Design for organ-front, St. Mary Abbott's, Kensington": Mr. J. Oldrid Scott. An interior of the church, in which the organ front seems rather a subordinate feature on the south wall of the chancel; what strikes us is that very little of the organ is in front, most of it is evidently in the aisle on the other side of the wall, and consequently to those who know what space an organ requires the impression is that this must be a very small organ, placed flat against the wall, which is hardly satisfactory.

THE NEW GALLERY EXHIBITION.

EVERYBODY is saying that Mr. Sargent's portrait of Mrs. Hammersley (128) is the work to see in the New Gallery, and everybody is right. It is a most brilliant performance, in the management of the difficult scheme of colour, a bright rose-coloured dress and greyish stuffs and curtains; the figure itself is full of spirit and charm; even the mastery way in which the carpet pattern is indicated without being too much emphasised should be recognised. We only quarrel with the perspective, the effect of which, from the position at least in which the picture is now seen, is to suggest the idea of a yacht's cabin with the ship heeling a good deal and the floor consequently sloping. Other portraits are, an admirable one of "Sir John Lubbock" (4) by Mr. Collier, balanced by an excellent work of the same class by Mr. Parker (20), remarkably fine in colour; Mr. Hacker's fine and effective portrait of a little boy (39); Mr. Shannon's "Miss Kennedy" (37), painted for Newnham College, and Mr. Sargent's "Mrs. George Lewis" (177).

Two painters of genius, Mr. G. F. Watts and Mr. Crane, have essayed to put into pictorial shape the fancy of the breaking waves as "Neptune's Horses." We do not know whether the idea can be called a very happy one; it is a fancy which falls to pieces when one tries to make it into fact, and accordingly Mr. Watts has been the most successful, in that he has kept the horse forms as misty and undefined as he could, merely suggest-

ing them indistinctly; at a little distance the picture (78) only suggests breaking waves; the clever manner in which they are made out into horses without forcing the forms too much on the eye is the real point of the picture. Mr. Crane has defined his row of sea horses, with prancing fore-legs, far too clearly (216); the best point in the picture is the crest on one of the more distant waves, which takes indistinctly the form of horses' heads just seen above the water, and appearing to hurry along with the advancing wave. "A Masque of Spring Flowers" (199) by the same artist is a charming fancy, in a form better suited for pictorial representation.

Mr. Burne-Jones is not at his best this year in his two works, "The Pilgrim at the Gate of Idleness" and "The Heart of the Rose" (64, 66); they are not (for him) very striking in colour and design, and the meaning of the last-named one is not very clear. Mr. Waterhouse's "Naiad" (40), who gets up out of a brook to look at a youth asleep on the grass, is a striking picture in colour and conception, and the Naiad looks damp and watery enough, but a little too human for a legendary being; there is an unhappy suggestion about it of a bathers whose clothes have been stolen. Mr. Strudwick's elaborate fancy of Love enthroned (19) is a fine decorative picture on a small scale; not more than that. Mr. Tadema's "Unconscious Rivals" (12) is one of the most interesting works of the year; the scene is a marble-railed gallery running across the impost level of a deeply-recessed arch in some Roman building, through which, as through a tunnel, we look out on the landscape, and two women lean against the railing; the decorated soffit of the arch is an admirable bit of architectural incident, which we have not before seen in painting. Mr. Watts's "The Open Door" (53) is an interesting work, a glimpse given into a stormy outside landscape through a door-way, which a woman opens for a moment to look out. Mr. Philip Burne-Jones has given a powerful illustration of that unhappy figure in the history of tyranny, "The Man in the Iron Mask" (103), which certainly gives a new reality to the story.

Of other figure pictures we may draw attention to a very fine half-length study by Mr. Jacob-Hood (147) of a lady in a velvet dress, a splendid bit of colour; Mr. Nettleship's large picture of a fight between a tiger and a python (157), not as real as his tiger at the Academy; Mrs. Normand's pretty figure under the title "Pats" (247); and Mr. Gere's "Finding of the Infant St. George" (251), an illustration of Spenser in which the painter has caught something of the mingled mysticism and naïveté of the "Fairie Queene."

There are some fine landscapes; including a beautiful broadly painted sea-side scene, "Breezy Pastures" (174), by Mr. Adrian Stokes; a rich but rather artificial wooded landscape by Mr. North (181); a Hampshire scene by Mr. D. Murray (168), notable for its beautiful and tenderly painted sky; a fine coast scene at "Skipness" (69) by Mr. R. W. Allen; a study of an effect of "Silver Mist" (37) by Mr. F. Hall; a little twilight landscape, "The Track of the Strayed" (15), by Miss A. Alma-Tadema, which is very original; and a beautiful spring landscape by Mr. H. W. B. Davis (220). Among architectural subjects Mr. Logsdail sends two pictures of bits of Venice (143, 190); Mr. Frank Dillon a view of the "Tomb of Theodorico at Ravenna" (224), and Mr. MacWhirter a view of Venice from the Sea (235).

Sculpture is not largely represented: the principal work is the vigorous life-size figure of "A Seytheman," by Mr. E. R. Mullins.

THE CONVERSAZIONE OF THE ROYAL SOCIETY.

THE *conversazione* held by the Royal Society in its apartments at Burlington House on Wednesday evening last was, as usual, well attended and full of interest.

As on previous occasions, a number of objects were exhibited, together with apparatus of various kinds illustrating recent advances in scientific knowledge. These were of a more representative character than they have been for the past two or three years, and it is noteworthy that the class known as "brilliant experiments" were fewer in number. This is decidedly a step in the right direction. The rooms could be filled with apparatus producing startling ocular results, but unless these were novel, and were of considerable scientific value, the fearful machines which produce

them should be rigidly excluded from the purview of the Royal Society.

Exceedingly few of the exhibits were of direct interest to architects. We might, however, instance that of Prof. C. V. Boys, who showed a device for drawing curves by their curvature. It consists of a transparent celluloid scale divided into equal parts, reciprocally (or in any special manner); a glass pen or a pencil at its zero point (which is in the centre, the divisions being carried each way) describes the short arcs, and a flat tripod, with three needle feet, two on the paper, and one on the centre line of the rule, fixes the centre of curvature. This instrument draws certain curves more smoothly, rapidly, and accurately than is possible using the same care in the ordinary way. Mr. Cecil Carus-Wilson exhibited an apparatus called a Sclerographoscope, for enabling lecturers to demonstrate with chalks in a darkened room. A lamp is placed inside a large box, the front of which is made of roughened glass with a sliding dark screen before it. On removing the screen the glass is seen to be illuminated, and diagrams can be drawn on its surface. The arrangement is an ingenious one, but we do not think it will be very extensively used. It is, of course, primarily intended to be used in conjunction with the lantern, for class lecture purposes. But it is impossible for students to make notes of what is shown or drawn in a dark room, and herein consists the disadvantage of this method of demonstration.

Messrs. W. Topley and R. Kerr exhibited maps and photographs illustrating the recent landslide at Sandgate. The maps showed the geology of the district and indicated the "slipped" areas; whilst the photos were views of the disturbed ground, and the damage done to houses and to groyne. Mr. E. T. Newton showed the remains of some remarkable fossil reptiles, discovered by him in the building sandstone of Cuttle's Hillock quarry, near Elgin; there were also several other exhibits in the domain of natural history.

The electrical exhibits claimed much attention, though there was nothing very novel. Tesla's experiments, and slight modifications thereof, have become the *répertoire* of nearly every popular lecturer on electricity, and there is no need to repeat them *ad nauseam*. There was a time, not long since, when people stood aghast at the bare idea of having powerful high-frequency currents of electricity passed through the body, and the experimenter was regarded in the light of a hero; but when it came to be generally known that such currents possessed but little physiological action, the illusion was dispelled. Many of those who saw Mr. A. A. Campbell Swinton's experiments on Wednesday evening, when the filament of an ordinary 5 c.p. 100-volt lamp was made incandescent with current conveyed through the human body, &c., &c., no doubt bore these facts in mind. Sir David Salomons showed one of a pair of tuning-forks, worked electrically, and made of platinum and gun-metal; a portable photometer; and a table polariscope. In conjunction with Mr. L. Pyke, he also exhibited, amongst other things, a one-million frequency alternator, and a small inductor dynamo and motor, in which the efficiency of the alternator exceeded 90 per cent., and at a speed of 2,000 revolutions per minute, the output of the machine is 1½ kilowatts. This great efficiency is ascribed to the close construction of the magnetic field, and to the fact that the whole of the metal subject to even the smallest variation of magnetic density is illuminated. Major Holden had instruments for indicating and recording the electrical pressure and current on alternating systems of supply; a self-recording pyrometer, &c.

Messrs. Baly & Chorley exhibited sodium potassium high temperature thermometers (range 0 deg. -620 deg. C.) and specimens of the alloy; Mr. H. L. Callendar, platinum thermometers and pyrometers, and galvanometers; whilst Prof. A. Smithells made some striking experiments demonstrating the structure of flames.

During the evening Mr. E. Wethered showed, by means of the electric lantern, the remains of some micro-organisms found in certain limestones, the function of which in forming coralline building stones has been previously adverted to in our columns. Lord Armstrong, in the same manner, conducted some experiments to show the nature of the electric discharge in air and water. Professor H. Marshall Ward threw on the screen a series of photographs demonstrating the action of solar and electric light on the spores of bacteria and fungi. Among other things he conclusively proved that sunlight kills the spores of bacteria and fungi; and that the action depends on the intensity of the light, and the time of exposure.

In some respects, this was the most interesting part of the *conversazione*, and it must have a material bearing on certain questions relating to water storage and water-supply generally.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

THE ANNUAL REPORT.

THE annual general meeting of the Royal Institute of British Architects was held on Monday, May 1. The Annual Report of the Council, which was adopted, contained the following passages:—

The Council, elected on June 13, 1892, have held twenty-one meetings; and since the publication of the last annual report on May 5, 1892, twenty-four meetings. The Professional Practice Committee of Council, the Finance Committee of Council, the Alliance Committee of Council, the Royal Gold Medal Committee of Council have met as usual; and the Rota Committees, composed of sections of the Council, have met periodically for the consideration of candidates' applications for membership.

During the official year 40 Fellows, 16 of whom were previously members in the class of Associates, and 57 Associates, have been elected. Though these figures compare unfavourably with those of 1891-92, when 66 Fellows and 51 Associates were elected, the number of Fellows (in spite of severe losses by death) is now 623, as against 610, and the number of Associates 814, as against 794, at the corresponding period last year. One Hon. Associate, Mr. T. H. Wyatt (who had resigned in 1890), and one Hon. Corresponding Member, Professor Babcock (Cornell University, Ithaca, New York State), have also been elected. His Grace the Duke of Devonshire, K.G., has been elected an Hon. Fellow.

At the opening meeting of the current session, Mr. William Emerson, a Member of Council, was elected Hon. Secretary, Mr. Aston Webb having resigned.

The losses by death in the class of Fellows have been:—Henry George Austin (Canterbury), William Allen (Boulton), Richard Herbert Carpenter, John Myrie Cory (Shanghai), Joseph Stretch Crowther (Alderley Edge, Cheshire), John Curran Elgood (Manchester), James Fowler (Louth), John Gibson, Philip Herepath (New Zealand), Richard Smith Lander, Joseph Peacock, Thomas Stone, Alfred Strong, Thomas Tillman (Sunderland), William Charles Tuke (Manchester), John Goldicutt Turner (Rickinghall, Diss), James Williams. In the class of Associates: George Canning Richardson (Llangollen, Wales). In the class of Hon. Associates: Matthew Wyatt (Winchfield, Hants). In the class of Hon. Corr. Members: George Snell (Boston, Mass.). In the class of Hon. Fellows: Walter Charles James, Lord Northbourne.

The Preliminary Examinations of November, 1892, and March, 1893, were held in London, Bristol, and Manchester, with the result that 169 gentlemen have been registered as Probationers. At the same time, Intermediate Examinations of 54 Probationers were held in London, with the result that 34 Probationers have been registered as Students. There are now 532 Probationers and 75 Students on the respective registers. The Examination qualifying for candidature as Associate was held in London only last autumn, and has been held this spring in London, Glasgow, Bristol, Leeds, Manchester, and Newcastle. Statistics of these Examinations follow:—

The Preliminary Examination.

Dates.	Admitted.	Not passed.	Relegated for periods.	Passed, and registered for Probation.
Nov., '92 ..	82	40 Exempted	2	75
March, '93 ..	110	51 Exempted	10	91
—	192	—	2	169

The Intermediate Examination.

Dates.	Probationers Admitted.	Not passed.	Relegated for periods.	Passed, and registered for Associateship.
Nov., 1892 ..	24	—	11	13
March, 1893 ..	10	—	9	21
—	34	—	20	34

The Examination Qualifying for Candidature as Associate.

Dates.	Applied	Admitted	Not passed	Re-elected for period	Passed
Dec., '92...	59	76	—	34	12
April, '93...	126	165	—	58	42
—	175	142	—	82	54

* Six, out of the 106 applicants admitted, did not attend.

The Council desire to record their indebtedness to the officers and members of those Allied Societies under whose charge examinations have been conducted during the official year; and their obligation to the Chairman and members of the Board of Examiners in Architecture increases year by year. Except in the case of the Preliminary Examination, in which a professional examiner is now employed to set the questions and mark the answers in six out of the eight subjects, the work of the examiners is entirely honorary.

Without dwelling on the fact of the large increase in the number of applicants for admission to the several examinations, it may be interesting to note that during the past official year there were 192 admitted to the Preliminary Examination against 146 during the preceding year, and 142 admitted to the Examination qualifying for candidature as Associate, the number in 1891-92 having been 121.

The Ashpitel Prize was awarded to Mr. Alfred C. Houston (Associate), as having most highly distinguished himself among the sixty-one candidates who passed the qualifying examination in 1892. An additional prize (value five guineas) was awarded, on the recommendation of the Board of Examiners, to Mr. Harold Brakspear (Associate).

A Statutory Examination for Certificates of Competency to act as District Surveyor in London was held last October, when five gentlemen presented themselves, one of whom—Mr. Watson Hall—passed and received his certificate. Another examination was held at the end of April, when five gentlemen presented themselves, two of whom—Mr. Albert William Cleaver (Associate) and Mr. Reginald Molesworth Gruggen (Associate)—passed, and Certificates of Competency to act as District Surveyor in London have been granted to them.

The Institute of New South Wales, established at Sydney in the year 1871, and incorporated in 1890 under the Companies Act, has been admitted to alliance with the Royal Institute of British Architects.

The Royal Gold Medal (1892) for the promotion of architecture was presented to Monsieur César Daly, Hon. Corr. Member (Paris), for his literary works in connexion with architecture, and acknowledged by him in an eloquent speech delivered in English at a general meeting of the Institute, held June 27, 1892.* The award of the Royal Gold Medal for 1893, to Mr. Richard M. Hunt, Hon. Corr. Member (New York), for his executed works as an architect, recommended by a resolution of the Institute passed on March 13, 1893, has been approved by Her Majesty the Queen.

The works submitted this year for the Prizes and Studentships have been exceptionally numerous, and generally excellent in quality. The annual deed of award was presented to the General Meeting of January 9 last, and at the presentation of prizes on the 10th of the same month an Address to Students on "Some Responsibilities of the Architect" was delivered by the President, and a "Review of the Students' Works" by the Hon. Secretary, Mr. Wm. Emerson. The exhibition of the drawings included a selection from the "Testimonies of Study" sent in by Probationers applying to be admitted to the Intermediate Examination. . . .

Not the least interesting event of the official year was the exhibition of the drawings of Palladio, Inigo Jones, Kent, and others, lent to the Institute by the Duke of Devonshire, and forming part of the famous collection made by the great Earl of Burlington. The portfolios containing the drawings of Palladio and others have been returned to the Duke, but the four boxes containing the drawings of Inigo Jones and others are still retained, by his Grace's request.

The amended Paper of Suggestions for the Conduct of Competitions, considered and adopted by the Institute at a General Meeting held in

March, 1892, was issued to Members last June, after it had been finally revised by the Council.

A Bill introduced into the House of Commons last session, intitled "A Bill to empower the City and South London Railway Company to make an underground railway to Islington, and for other purposes," menaced the removal of the Church of St. Mary Woolnoth, which was scheduled with the apparent intention of being acquired for the purposes of a railway station. The Council petitioned against the Bill as it stood, and they believe that the proposal to remove the Church has not been proceeded with.

Attention having been invited to an application made to the Privy Council by the Sanitary Institute, which is incorporated under the Companies Act, for the grant of a Royal Charter, the Council formulated objections to the extensive powers thus sought to be obtained; and a suggestion offered to the Sanitary Institute, that certain clauses of its draft charter should be modified so as to confine its examination to matters of sanitary knowledge, was accepted by the authorities of that Institute. No further opposition was consequently offered by the Council to the grant of the Charter sought for.

By the courtesy of the London County Council, the By-laws proposed to be made by that body under the Public Health (London) Act, 1891, have been considered and reported on by the Practice Standing Committee of the Institute; and the Report having been adopted by the Council, the same was duly forwarded as a series of suggestions for submission to the London Council.

The Appellate Tribunal, to which the Council of the Institute nominate a member, under the provisions of the London Council (General Powers) Act, 1890, is reported to have heard and determined fifteen appeals, which have resulted in the confirmation of nine of the Superintending Architects' certificates appealed against, and of the varying of six others. The tribunal consists of Dr. Longstaff, appointed by the London Council; Mr. Arthur Cates, appointed by the Council of the Institute; and Mr. C. J. Shoppee, appointed by the Council of the Surveyors' Institution; and Mr. Cates is the elected chairman.

The Council have had under consideration a proposal by Mr. Cates to divide the United Kingdom into so-called architectural provinces, of which the Societies now or hereafter allied to the Institute would be the respective centres; and they have conferred with the Allied Societies on this proposal and the manner in which it may be carried out, with a view to promoting, in Great Britain and Ireland, a comprehensive educational organisation, of which the Institute would be the head. In connexion with this subject, the expediency of extending the limit of the number of Presidents of Allied Societies who may sit on the Council, now restricted to nine, has been also considered, and the opinions thereon of the respective Societies have been asked for. Several suggestions have accompanied the replies forwarded by the Allied Societies, and the subject was discussed in Liverpool on the 21st ult., at a Conference* at which representatives from several non-Metropolitan centres attended, and at which the Institute was represented by Mr. Emerson, supported by Mr. Cates and Mr. Slater. The fact that this Conference discussed the educational results which might possibly be achieved under the auspices of each Allied Society at the centres respectively of the projected architectural provinces, rendered the gathering at Liverpool more than ordinarily interesting.

At the beginning of the current Session the Council took into consideration the desirability of memorialising the Royal Commission now sitting, and known as the Gresham University Commission, on the subject of the place to be given to Architecture in the scheme of a Teaching University for London; and the President, on behalf of the Council, addressed the Commission as follows:—

"MY LORDS AND GENTLEMEN,
On behalf of the Council of the Royal Institute of British Architects, I beg leave to ask that in any scheme for the establishment, under charter, of an efficient Teaching University for London, a definite and distinct place may be assigned to Architecture.

In assigning such position, it should be realised that Architecture is both an art and a science, and that it is impossible to divorce its artistic from its scientific attributes. Design in Architecture embraces not only the artistic arrangement of elevations, both external and internal, and the distribution of the whole plan, but also the scientific construction of an edifice.

The curricula established in London by the Architectural Association, and by King's and University Colleges—as well as the programmes of the Progressive Examination of the Royal Institute of British Architects—demonstrate the comprehensive character of Architecture;

while the experience of those of other great cities, both in Europe and America, shows that the idea of such comprehensiveness is neither exaggerated nor new.

The Examination programmes to which I refer are given on pp. 195-218 of *The R.I.B.A. Calendar* (1892-93), and the course or curriculum of the Architectural Association (London) is also given on pp. 141-146 of the same work.

I beg leave to add that, should the Royal Commission desire it, the Council of the Royal Institute of British Architects will be happy to afford any assistance that may be in their power towards defining the place which Architecture should occupy in any scheme for a new Teaching University.

I have the honour to remain, My Lords and Gentlemen, Your obedient servant,

J. MACVICAR ANDERSON, President."

The reply received from the Secretary of the Royal Commission—Mr. J. Leybourn Goddard—stated that the Commission would hear evidence on the subject from members designated for the purpose; and, at the request of the Council, the President and the Hon. Secretary, with Mr. Cates and Mr. Slater, attended a meeting of the Gresham University Commission and gave evidence accordingly.

Certain observations which were made by Lord Chief Justice Coleridge in summing up the case of "Burr v. Ridout," tried on February 21 last—which appeared to injuriously reflect upon the objects of the Institute, and to give an erroneous view of its Schedule of Professional Practice and Charges—were brought to the notice of the Council; and a letter addressed to his Lordship by the President has elicited an expression of regret which the Council have received with much satisfaction. The correspondence was published, with Lord Coleridge's consent, in the *Journal* of the Institute.

Two important constitutional matters have occupied the serious attention of the Council during the greater part of the official year, namely (1) the method of admitting and electing Fellows, and (2) their qualifications.

The solution of the first question was facilitated by the work of a special committee appointed pursuant to a resolution of the Institute passed at the annual general meeting of 1891. The report of this Committee, which was appointed to consider the provisions of By-law 9, having been adopted by the general meeting of June 13, 1892, the Council were then requested to prepare modifications of By-law 9 in accordance therewith, and to take the steps necessary to obtain the desired alterations. It was found, while considering the provisions of By-law 9 and the best means of modifying them, that other By-laws would be affected by the proposed modifications, based as they were on the clauses of the Report adopted by the Institute and referred back to the Council to carry out. A revision of By-laws 7, 8, and 9 became necessary, and these By-laws as proposed to be altered were submitted to the Institute on March 27, when the alterations were approved with but a slight amendment, and adopted. Certain Regulations made by the Council to carry out the altered By-laws 7 and 9 were submitted at the same time and confirmed by resolution of the Institute. The alterations, as adopted, of By-laws 7, 8, and 9 were confirmed by a Special General Meeting held on the 17th ult.

The solution of the second question was more difficult. Pursuant to the instruction of a General Meeting of the Institute, held on July 11, 1892, the Council took into consideration the whole matter of the qualifications for Fellowship, and submitted their report to the Institute at the general meeting of March 27. A portion of that report, containing a Regulation to carry into effect the Charter and By-laws concerning the qualifications of applicants for Fellowship, which the Council unanimously recommended for adoption, was approved by the Institute; and the Regulation was confirmed by Resolution. The latter portion, however, containing a Declaration under Section 3 of the Charter, as to the advisability of making which the Council were divided in opinion, was, after discussion by the General Meeting, withdrawn.

The report of the whole proceedings relating to the altered By-laws and the Regulations to carry them into effect, and also to the Council Report on the Qualifications of Fellows, appeared in the *R.I.B.A. Journal* of March 30. The same number contained the Memorials presented to the Council on the subjects above-mentioned. . . .

The Art Standing Committee report that they have held eight meetings since their election in June, 1892, making since the issue of the last report nine in all. The functions and scope of the Committee having been defined more precisely than heretofore by the Council, the Committee feel confident they may in future be able to report more satisfactory results of their labours. Subjects

November 21, 1892.

"MY LORDS AND GENTLEMEN,

On behalf of the Council of the Royal Institute of British Architects, I beg leave to ask that in any scheme for the establishment, under charter, of an efficient Teaching University for London, a definite and distinct place may be assigned to Architecture.

In assigning such position, it should be realised that Architecture is both an art and a science, and that it is impossible to divorce its artistic from its scientific attributes. Design in Architecture embraces not only the artistic arrangement of elevations, both external and internal, and the distribution of the whole plan, but also the scientific construction of an edifice.

The curricula established in London by the Architectural Association, and by King's and University Colleges—as well as the programmes of the Progressive Examination of the Royal Institute of British Architects—demonstrate the comprehensive character of Architecture;

* Reported in the *Builder* for April 29 last.

* A portrait of M. César Daly, with a full report of his speech on the occasion referred to, appeared in the *Builder* for July 2, 1892.

connected with London improvements have occupied much time of the Committee. The various authorities concerned with the reconstruction of Chertsey, Richmond, and Kew Bridges have been approached, and in respect to the two first satisfactory assurances obtained. The Committee also recommended that the Council should address the London Council upon the importance of the new Vauxhall Bridge being built entirely of stone, and advising that measures be taken by the London Council to obtain a design worthy to rank with London and Waterloo Bridges. The Council acted upon this recommendation, but have not received a satisfactory reply. Lincoln Cathedral Library and Cloisters, Emanuel Hospital, The Rolls Chapel, the Wellington Monument, street lamps, and Holy Trinity Church, Clapham Common, each received consideration from the Committee. The Committee strongly recommended the adoption of the proposal, then under consideration by the Council, that candidates for Fellowship should submit drawings and photographs of their executed works. . . .

The Literature Standing Committee report that they have held seven meetings since their election in June, 1892, making since the issue of the last Report eight meetings in all. . . .

The R.I.B.A. Journal of 1891-92 (Vol. VIII.) contained 436 pages, with a few illustrations in the text; and thirteen numbers of Vol. IX. have been published. . . .

The annual volume of *Transactions* (VIII. New Series) contained 434 printed pages and 180 illustrations in the text, and a frontispiece portrait of Professor Donaldson, President 1863-65.

The Committee have at the present time under their consideration, as a reference from the Council, a scheme for amalgamating the *Transactions* with *The R.I.B.A. Journal*, the general principles of which have been approved by the Council; and in view of the suggested alteration in the publications of the Institute and the necessity thereby created for receiving Sessional Papers in their complete form at least four weeks before they are read at a general meeting, the Committee have already in their hands the MSS. of some papers for the next Session, and have promises of several others.

In reference to the elimination from the Library of such books as do not fulfil the objects of an architectural library, the present Committee have continued the work inaugurated in the previous Session, and several volumes have been removed. An important increase has been thereby made in available shelf-room, while, in addition, new cases have been fitted up, from the designs of Mr. Aston Webb, in the old Council Room. The Committee appointed Professor Aitchison Chairman, and Mr. Alex. Graham Vice-Chairman. They also appointed Mr. R. Elsey Smith and Mr. A. S. Flower Hon. Secretaries. . . .

The Practice Standing Committee report that they have held three meetings since their election in June, 1892; and a Sub-Committee delegated for the purpose have also had two conferences with representatives of the Institute of Builders on the subject of the Conditions of Contract. The result of these conferences was embodied in a reprint of the Conditions, which, after adoption by the Committee, was submitted to the Council, and is still under consideration.

The Committee have also given careful consideration to the By-Laws proposed to be made by the London Council under the Public Health (London) Act 1891, and have reported to the Council, with suggestions for several alterations, giving the reasons for such suggestions.

The Committee appointed Mr. Henry Currey Chairman, and Mr. Arthur Cates Vice-Chairman. They also appointed Mr. Thomas M. Rickman and Mr. Edwin T. Hall Hon. Secretaries.

The Science Standing Committee report that they have held eight meetings since their election in June 1892, which have been attended, on the average, by twelve members. . . . The desirability of a code of sanitary regulations for the entire United Kingdom was considered by the Committee, but the subject belonging more exclusively to the Local Government Board, the Committee did not see their way to move in the matter. The general principles of the Report of the Committee on Light and Air were adopted at the business meeting of March 13, 1893; and, the reconsideration of details being now proceeded with, the Committee hope to report again to the Council at an early date. The Committee have had their attention directed to several inventions and new materials for building construction, but considered none of them of sufficient importance to demand a special report. . . . The Committee appointed Mr. Lewis Angell Chairman,

and Mr. P. Gordon Smith Vice-Chairman. They also appointed Mr. William C. Street and Mr. H. D. Seales-Wood Hon. Secretaries.

Early in the official year the Council obtained the assistance of a professional accountant, with a view to simplifying the accounts and amending the form of balance-sheets annually issued; and they received from him a report, on which they have advantageously acted. From January 2, 1893, a less complicated system of book-keeping than was hitherto employed in the Secretary's office has been in use; and a revaluation of the Institute property has been made by Mr. Wyatt Papworth and Mr. T. M. Rickman. The accounts of income and expenditure, and the Balance Sheets of the year ended December 31, 1892, have been prepared under the advice and with the assistance of Mr. Saffery, Chartered Accountant, before referred to. . . .

The sum of about 2,600*l.* has been expended during the four years 1890-93 on exceptional items—in other words, in the purchase of Architectural Union Company's Shares, in building, fittings, furniture, &c.—over and above the amount acquired from the sale of stock authorised in 1890. Of this sum an amount of about 1,000*l.* has been paid from ordinary income and entrance fees, during the four years alluded to; and the balance of about 1,600*l.* still remains unprovided for. The Council, therefore, on the recommendation of their Finance Committee, propose to sell stock to the amount of about 1,300*l.*, to meet the greater part of the anticipated deficit, and to leave accounts to the value of about 300*l.* outstanding—the same to be paid out of the balance of receipts over disbursements in 1894.

The large sum annually spent, for several years, upon the new series of *Transactions*, has not escaped the attention of the Council. They are of opinion that it may be considerably reduced, without seriously curtailing the amount of information now published by the Institute. To this end they appointed a Committee of their body, to consider the points raised by the President in the Address he delivered at the opening Meeting of the present Session, when treating of the *R.I.B.A. Journal* published fortnightly, and the annual volume of *Transactions*; and to report upon the whole question. The Committee found that the net cost of the two separate publications—the *Journal* and the *Transactions* for the two years 1891 and 1892 was in round numbers 2,750*l.*; and, after careful consideration, they reported that were the annual volume of *Transactions* to be merged into the fortnightly *Journal*, the latter might be published at a net cost of about 1,750*l.* for two years; this estimate including a sum for additional assistance in preparing the *Journal* for publication. An annual saving of 500*l.* would thus accrue; and the Council are so convinced of the necessity of effecting such an economy, that they earnestly recommend the Institute to allow the proposal to take effect at once. Several of the papers read at the general meetings of the current Session have already appeared in full, with illustrations, or in comprehensive abstract, in the *Journal*; and other papers read during the Session of which short abstracts only have appeared can be published in full in the remaining issues for 1892-93. Under these circumstances the Council have decided not to print a volume of *Transactions* this year, and they confidently advise the Institute to allow that publication to terminate with the volume last issued, which was the eighth of the new series.

Should this meet with approval, the first number of the enlarged *Journal* can be published at the opening of the next Session, and continue periodically, giving the full paper read at a general meeting, with the necessary illustrations and the discussion upon it; the issue to take place on the Thursday following such meeting.

If the outlay required for a volume of *Transactions* be excluded, the receipts for 1893 may be expected to show a margin of between 600*l.* and 700*l.* in excess of disbursements; but it should be clearly understood that that balance has been already appropriated to partly paying off the exceptional expenditure of the last four years, 1890-93.

The Income and Expenditure Account and the Balance-Sheet of Ordinary Funds for the year ended December 31, 1892, were appended to the Report.

NEW ACADEMICIANS.—At a general assembly of the Academicians and Associates of the Royal Academy on the 4th inst., Messrs. John MacWhirter, Henry Woods, and Henry Moore were elected Academicians, and Mr. John W. North, painter, an Associate.

COMPETITIONS.

THE SMALLWOOD HOSPITAL, REDDITCH.—In a limited competition the design of Mr. William Henman, architect to the New General Hospital, Birmingham, has been selected, on the recommendation of Mr. Alexander Graham, F.R.I.B.A., to whom the designs were submitted under numbers, and Mr. Henman has been appointed by the trustees to carry out the work.

PUBLIC LIBRARY, HIGH HOLBORN.—We are informed that the Commissioners for Public Libraries for the St. Giles's district have just concluded an examination of designs which have been submitted in competition for the erection of a Public Library in High Holborn. The designs will be open for inspection at the offices of the Commissioners, 197, High Holborn, Monday, Tuesday, and Wednesday next, between the hours of 10 a.m. and 4 p.m.

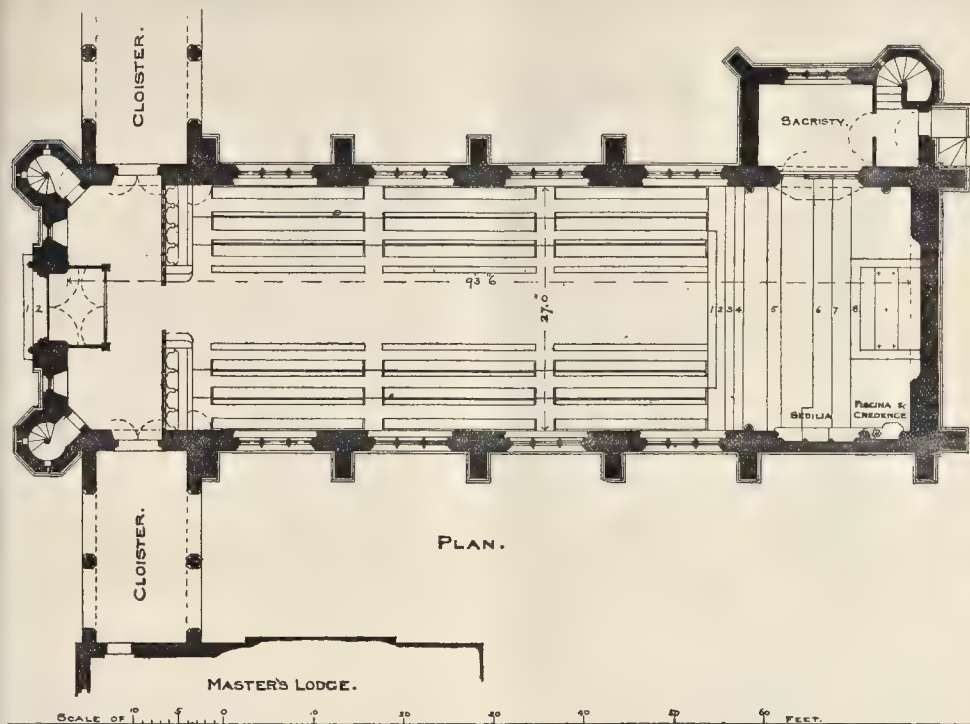
WALSALL WOOD DISTRICT SEWERAGE.—The Brownhills Local Board recently selected four engineers to submit schemes of sewerage and sewage disposal for the districts of Walsall Wood, Shelfield High Heath and Clayhanger, comprising a population of about 6,000. The Local Board has decided in accepting the scheme prepared by Mr. H. Bertram Nichols, C.E., of Birmingham, who, at the last meeting, was appointed the engineer to carry out the works. It is intended to proceed with the works immediately. The cost of the schemes is estimated at 9,000*l.* The other schemes submitted were those of Mr. J. E. Willcox, C.E., Birmingham, Mr. W. H. Radford, C.E., Nottingham, and Mr. W. Perry, C.E., Lichfield, all of which received close attention, but the scheme of Mr. Nichols being more comprehensive and more suitable to the requirements of the district, decided in his favour.

ARCHITECTURAL SOCIETIES.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—The sixth annual meeting of this Society was held at the School of Art on Tuesday evening. Mr. Innocent, the retiring President, presided, and there were present also Mr. T. J. Flockton, Mr. J. B. Mitchell-Withers, Mr. E. M. Gibbs, Mr. C. Hadfield, Mr. W. F. Hemmell, and many of the members. The reports of the hon. secretary and treasurer were read and adopted. From them the Society appears to be in a flourishing condition, and the classes for the study of design, architectural history, and sketching, inaugurated in the early part of the session under the management of Mr. Gibbs and Mr. J. R. Wigfull, were attended by a good number of young architects, supplying a much needed educational want in the City. A beginning also had been made towards the formation of an Architectural Library. A ballot took place for the election of President, Vice-President, officers, and Council for the ensuing session, Mr. T. Winder and Mr. C. Gibson being the scrutineers, with the following result:—President, Mr. E. M. Gibbs; Vice-President and Treasurer, Mr. J. B. Mitchell-Withers; Hon. Sec., Mr. C. Hadfield; Council, Messrs. T. J. Flockton, F. Fowler, C. J. Innocent, J. Smith, and W. C. Fenton. A vote of thanks was awarded to the retiring President, Mr. Innocent, for his two years' services. Mr. C. Hadfield, Hon. Sec., then read an interesting paper on "The Church of St. Peter at Rome, or the Vatican Basilica," which he had visited during the recent Papal Jubilee in February last. The architectural history of this celebrated building was carefully reviewed in detail and the lecture well illustrated by lime-light views.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Under the leadership of Mr. John McLachlan, architect, Edinburgh, the members of this Association, to the number of twenty, visited on the 6th inst. Nunraw Castle, Haddingtonshire, the property of Mr. Wingate Gray. Mr. McLachlan, in his descriptive account of the castle, said that Nunraw, as its name indicated, was a nunnery before the Reformation, and was an appanage of the Abbey of Haddington. One of the most recent members of the house, in 1860, determined to restore the building to the condition in which it originally had been, but it remained a question whether the restoration had not been over-done. Scarcely a vestige of the original building remained visible. On behalf of the Association, Mr. Robertson, the President, thanked Mr. and Mrs. Wingate Gray for their kind reception and hospitable entertainment.

GLASGOW ARCHITECTURAL ASSOCIATION.—The usual monthly meeting of this Association was held in the Rooms on the 2nd inst., when a



Chapel, Selwyn College, Cambridge.

Illustrations.

THE CHAPEL, SELWYN COLLEGE, CAMBRIDGE.

THIS Chapel, now in progress, from the designs of Sir A. Blomfield, A.R.A., is one of the group of buildings forming the original plan made for the College in 1879. When complete they will enclose a quadrangle 213 ft. by 202 ft. The west end of the chapel will be the central feature of the eastern side facing the entrance gateway. Like the rest of the College, the building is of red brick and Ancaster stone. The roof will be of oak, open timbered.

The present contract only includes the shell of the building, without fittings.

Messrs. Cornish and Gaymer, of North Walsham, are the contractors.

The drawing is exhibited in the Royal Academy.

THE ROYAL UNITED SERVICE INSTITUTION, WHITEHALL.

This building is now in course of erection at the south end of Inigo Jones's Banqueting Hall in Whitehall, which has been lent by the Queen to the Institution for the accommodation of their very interesting naval and military museum.

The Banqueting Hall itself remains practically unaltered, but the crypt below, which is brick-vaulted, and had been much cut up with caretakers' rooms, coal-cellars, &c., has been cleared out, the windows (which were blocked up in the beginning of this century) opened out, and the wall and piers lined to the springing of the vaults with oak panelling. This crypt will be used for the exhibition of the heavier objects in the museum, for which it is admirably adapted.

The new building will contain a lecture-theatre to seat about 500 people, and a large reference-library over, both of which face Whitehall Gardens; a large reading and writing-room, and a similar room for maps, &c., and for the game of Kriegspiel; also a Council Room, Secretary's and clerks' rooms, large newspaper room, caretakers'

quarters, &c., and a passenger lift. The accompanying plans will explain the arrangements.

Care has been taken that the new building should not interfere with the architectural effect of the Banqueting Hall, and with this view the building is set back a distance of 8 ft., where it adjoins the Banqueting Hall, on both elevations, this portion being left perfectly plain, so as entirely to detach the new work from the old; this setting back has the additional advantage of leaving the return pilasters of the Banqueting Hall untouched.

The Whitehall front is in Portland stone, with a plinth and entrance doorway of granite, and the enriched frieze and other sculpture will be executed by Mr. Frith. The elevation towards Whitehall Gardens is of Portland stone and white Suffolk bricks. The building is fireproof throughout, roofs and floors. The contractors are Messrs. Mowlem & Co., and the clerk of works is Mr. G. Berry. Messrs. Aston Webb and E. Ingress Bell are the architects.

We hope to publish later the enlarged elevation, which, together with these views, is now at the Royal Academy.

The memorial stone is to be laid on June 6, by H.R.H. the Prince of Wales.

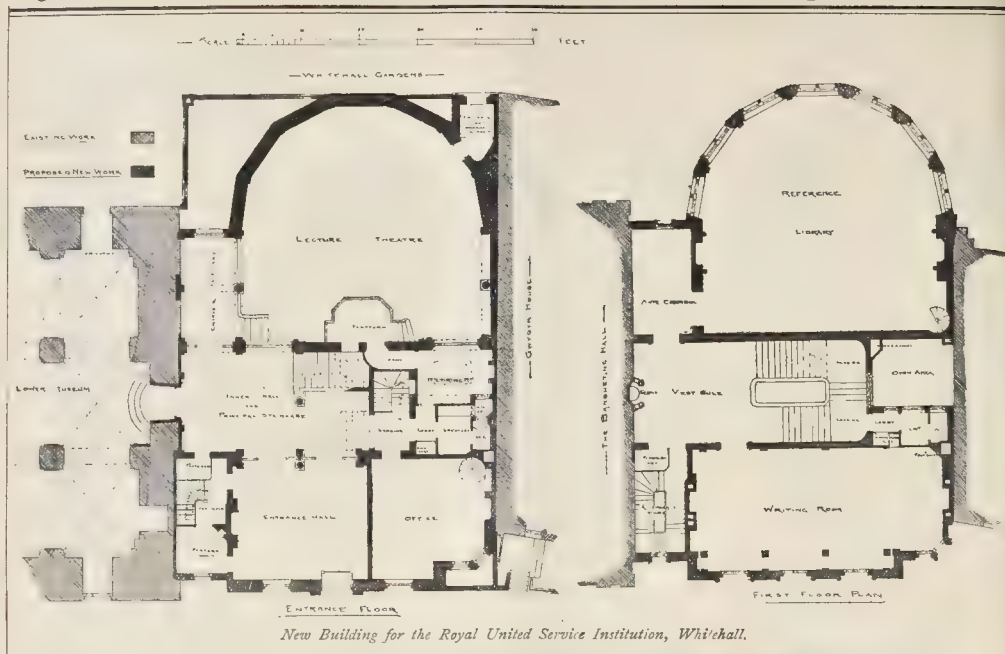
"QUARRYDENE," WEETWOOD, NEAR LEEDS.

"QUARRYDENE," the residence of Mr. J. Rawlinson Ford, J.P., is situated at Weetwood, a favourite suburb rather more than three miles distant from the centre of Leeds.

The house and stables are built of local stone, and are slated with green Westmoreland slates. All the interior fittings were specially designed by the architect. The drawing-room is provided with an "angle-nook" with settees on either side of the fireplace. The walls are divided into bays with Ionic pilasters, and a deep frieze is carried round the room, with modelled ornament in relief, the ceiling being panelled and enriched with moulded ribs. The dining-room is wainscoted to within 2 ft. of the ceiling, and is painted wall-flower colour, and above it is a deep amber-toned frieze. The large bay windows are all fitted up

paper was read by Mr. John A. Macara, M.A., B.Sc., on "Monuments and Memorials of the Dead." Dealing with the subject in an historical manner, the lecturer described in detail and by means of lantern slides a great variety of tombs and monuments of the different periods of architecture. Egypt was first noticed, and an account given of the Pyramids and other commemorative monuments of that country. Passing on, he alluded to the monumental remains of Assyria, Greece, and Etruria. Roman remains of this kind are also very numerous, and exhibit many points of interest to the architectural student. Touching briefly on the monumental art of Medieval and Renaissance times many interesting examples were shown. A short discussion followed, and at the close a hearty vote of thanks was awarded the lecturer.

ALTAR, ST. DAVID'S CHURCH, PANTASAPH, FLINTSHIRE.—On the 4th inst. the Rev. Dr. Scarisbrick consecrated, at St. David's Church, Pantasaph, near Holywell, a new high altar which has been erected to their father's memory by the children of the late Earl of Denbigh, the founder of the church, and of the adjacent Capuchin monastery. The tabernacle is of alabaster, with brass ornamental doors. Above the tabernacle the throne is supported by eight angels, also in alabaster, the pillars supporting the canopy over the throne being of Devonshire marble; and at the points of the throne canopy are four other figures of angels. Two further canopies, surmounted by a spire, finish the erection. Open buttresses support the canopies on either side, the character of the whole being Gothic, Early English Decorated, and worked in Caen stone, the height from pedala to finial being 20 ft. Two super-altars have also been added, of Pandemar marble. The large crucifix previously fixed above the screen dividing the sanctuary from the friars' choir has now been removed, and depends from the apex of the arch at the entrance to the sanctuary. The work has been carried out by Messrs. Boulton & Sons, sculptors, Cheltenham, from designs prepared by Mr. Purdie, architect, Chelsea. Within the sanctuary there has also been erected by the Dowager Countess of Denbigh, to the memory of the late earl, a monument, surmounted by a recumbent statue of the Earl of Denbigh. The statue is worked in Portland stone.



New Building for the Royal United Service Institution, Whitehall.

with window seats, with hot-water piping underneath. The floors of the hall and the reception-rooms are finished in oak. The stairs window is filled with stained glass by Messrs. Shrigley & Hunt. Since the erection of the house, some of the rooms have been decorated by Miss Agnes Garrett, of London.

The illustration shows the garden front of the house. The work was designed and carried out by Mr. William H. Thorp, architect, Leeds.

GATE-LODGE AND STABLING, CHERTSEY.

THIS building, which was executed by Messrs. T. Knight & Sons, of Chertsey, consists of gate-lodge and coachman's house of two stories in front, with stable yard and coachhouses, and stabling in rear, with hayloft and pigeon-cote over washing box.

The ground floor story is faced with red brick, and the upper part of lodge is in the old half-timber style, with Broseley tile roof, and lead glazed windows.

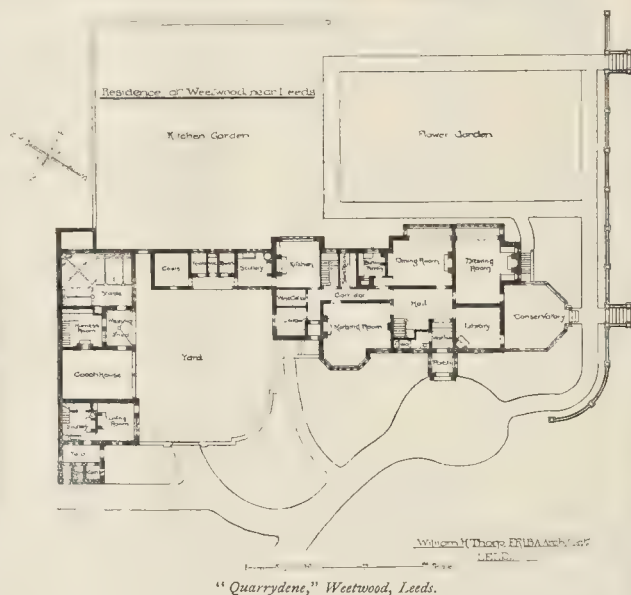
The stable fittings were supplied by Messrs. Musgrave, of Belfast.

The architects are Messrs. Wimperis & Arber.

STATION HOTEL, FLEET, HANTS.

THIS hotel has been erected for Mr. Thomas Kenward, of Winchfield, in a commanding position immediately opposite the station, and contains on the ground floor a large dining-room, bar, parlour, a spacious hall, lavatory, and w.c., with the usual kitchen offices; on the first floor, six good bed-rooms, bath-rooms, and w.c.; on the second floor, six bed-rooms and a w.c. The basement contains large beer and wine cellars. There is erected, adjoining it, stabling to accommodate fourteen horses, with good coach-house and covered shed for visitors' traps, &c. It is intended to make extensive tennis courts and pleasure gardens at the rear of the hotel. The materials used are red bricks and tiles, supplied by Messrs. Thomas Lawrence & Sons, Bracknell. The whole of the exterior walls are built hollow. The buildings have been erected at a total cost of about 2,650*l.* by Mr. G. Brown, builder, Bracknell, under the superintendence of the architect, Mr. F. H. Tulloch, of Westminster.

REMOVAL.—Messrs. Horne, Son, & Eversfield announce the change of their City address from 84, Basinghall-street, to 85, Gresham-street, as their present premises in Basinghall-street are required for an extension of the City of London Court.



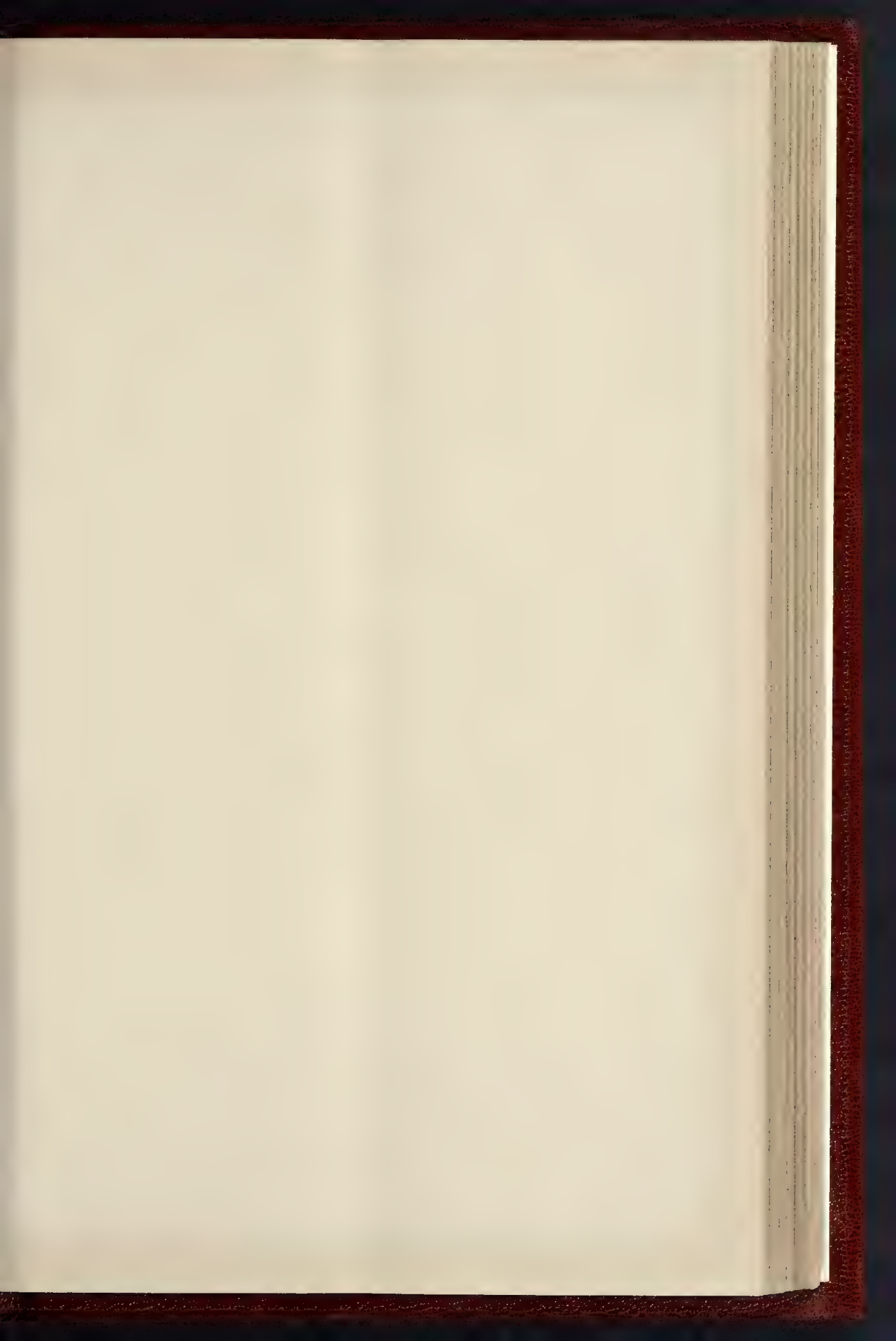
INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS: MEETING AT MANCHESTER.

ON Saturday last a very successful meeting of the members of this Association was held at Manchester, under the auspices of the Lancashire and Cheshire District.

Assembling at 11 a.m. in the Mayor's Parlour of the Manchester Town Hall to the number of about 120, the members were formally received and welcomed by the Mayor (Mr. Alderman Marshall), who remarked that Manchester had made and was making great strides in its various sanitary works. The new main sewerage works which the members were to visit were approaching completion. They had cost a large sum, but it

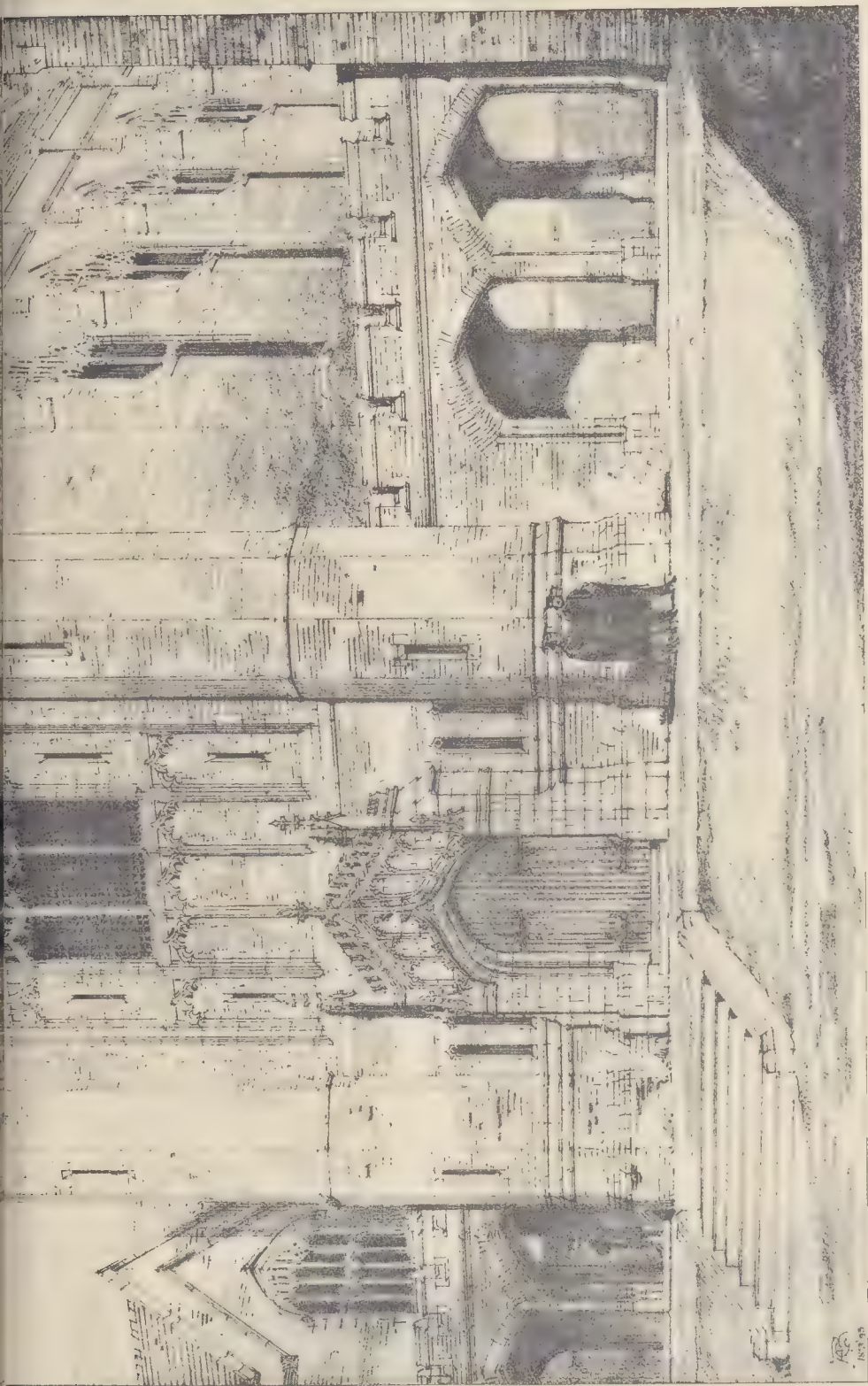
was believed that they would confer great benefit upon the city. So far, thanks to the care and ability of the City Surveyor, the Corporation were able to congratulate themselves upon the successful way in which those works had been carried out. He trusted that what had been done would commend itself to the approval of the body of experts whom he saw before him, and they would be glad, as they always were, to give any information on points of detail. The Mayor having vacated the chair, it was taken by Mr. J. Cartwright (Borough Engineer of Bury), President of the Association, who, on behalf of the members of the Association present, thanked the Mayor for his hospitable welcome.

On the motion of the President, seconded by Mr. McBeith, and supported by Mr. Wilson,



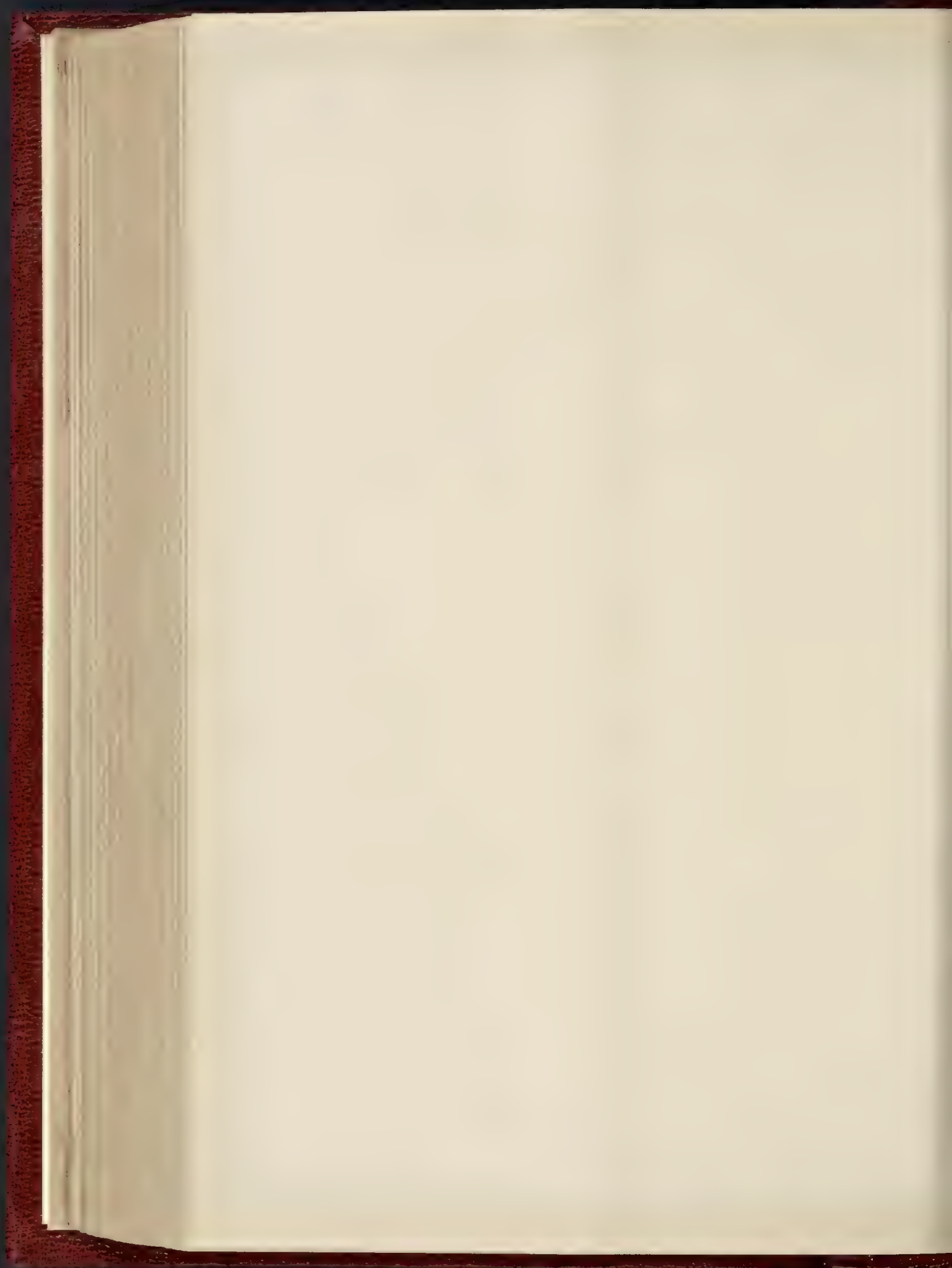
THE BUILDER, MAY 15, 1903

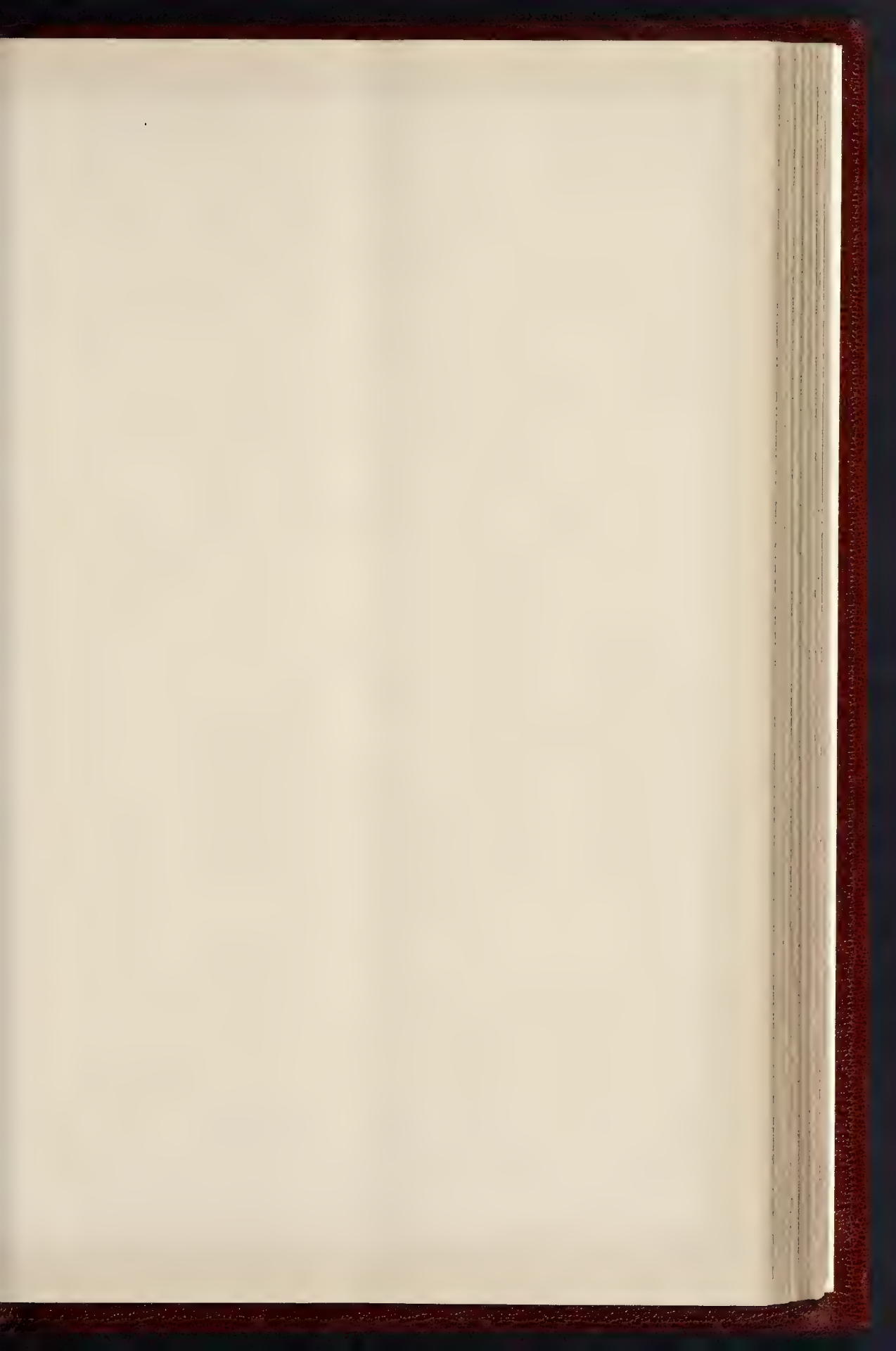




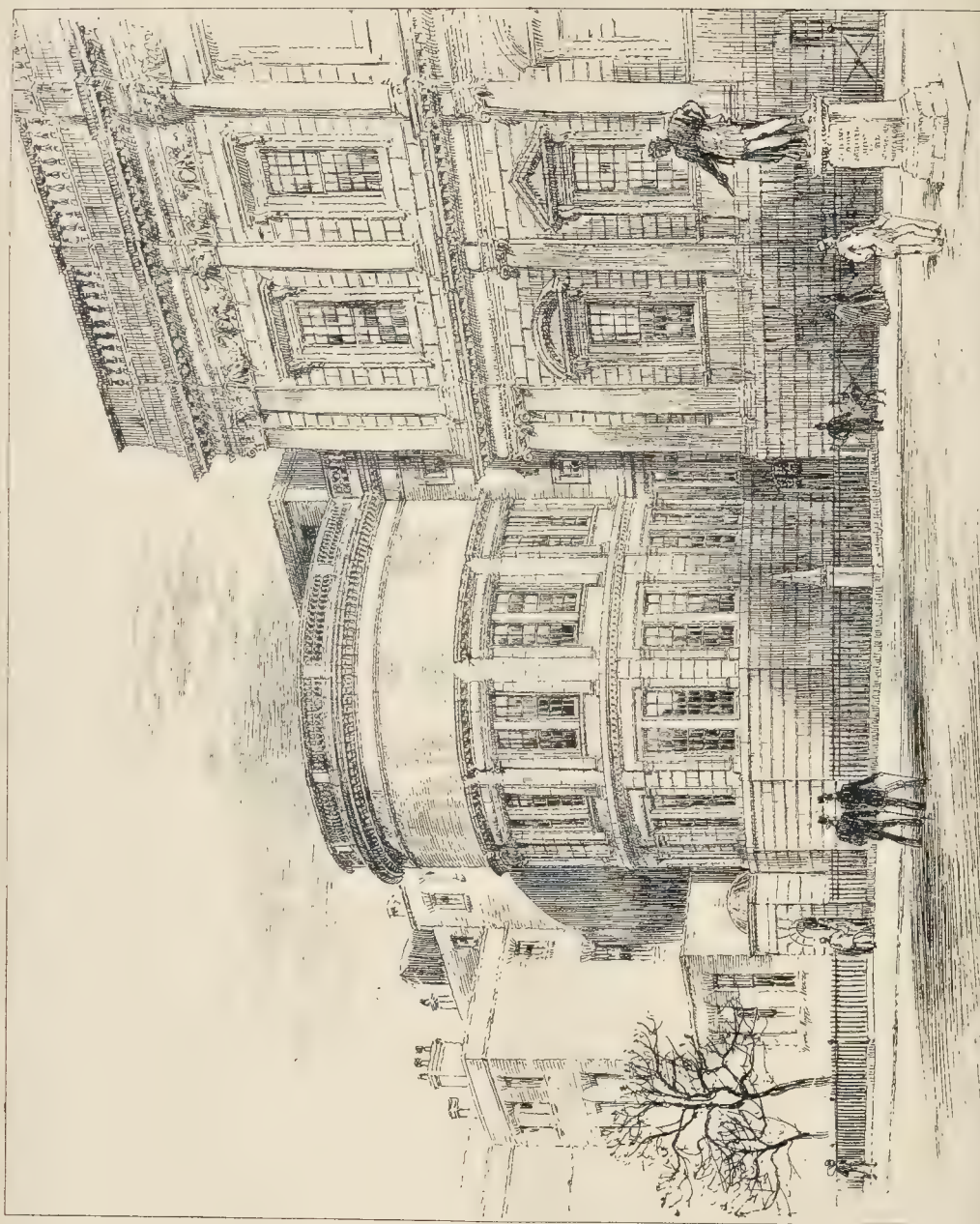
CHapel SELWYN COLLEGE CAMBRIDGE. See also W. B. Woodcut, AKA. Anon.

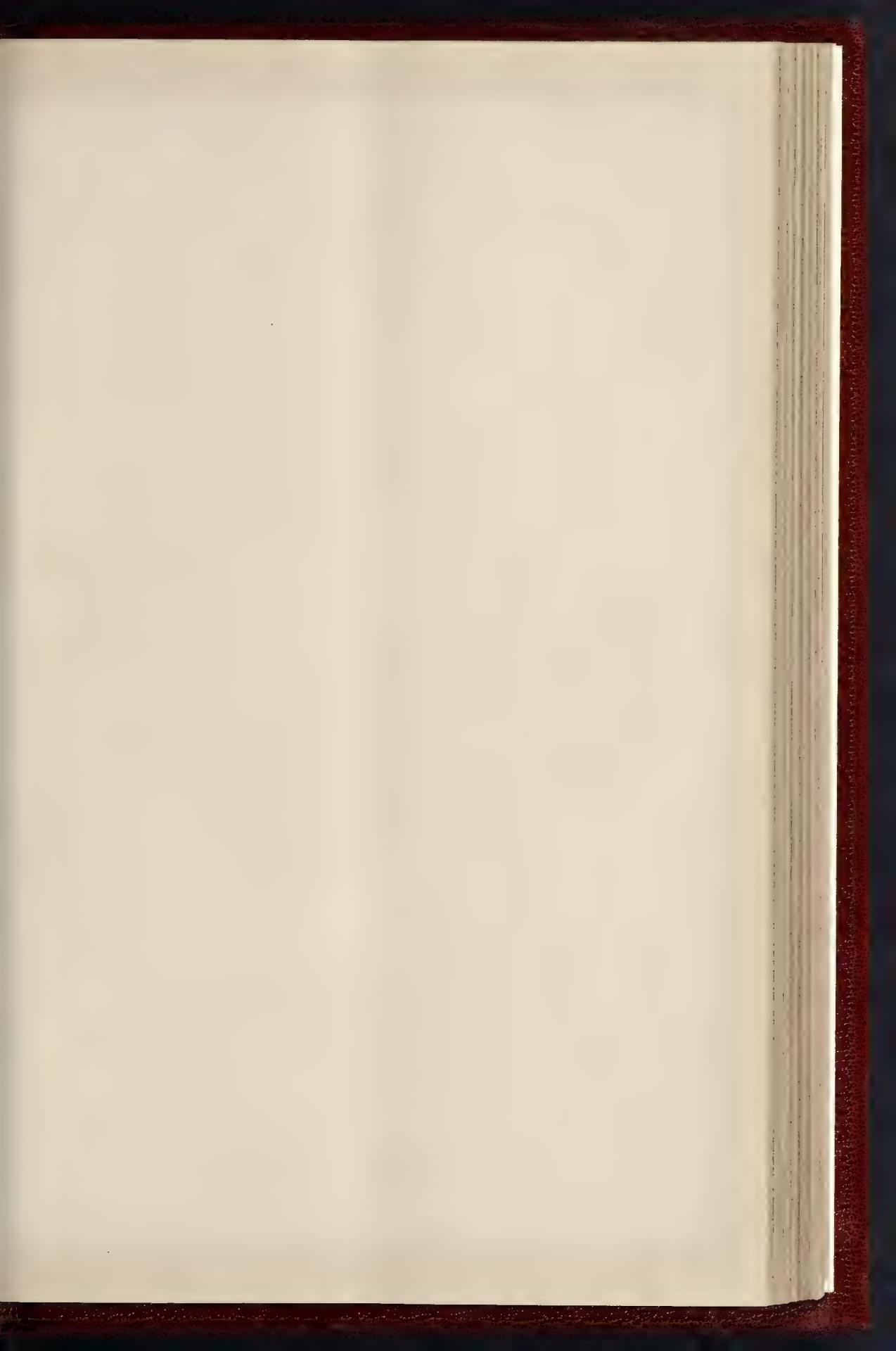
Rev. J. J. Smith del. in 1893





THE BUILDER MAY 13 1893

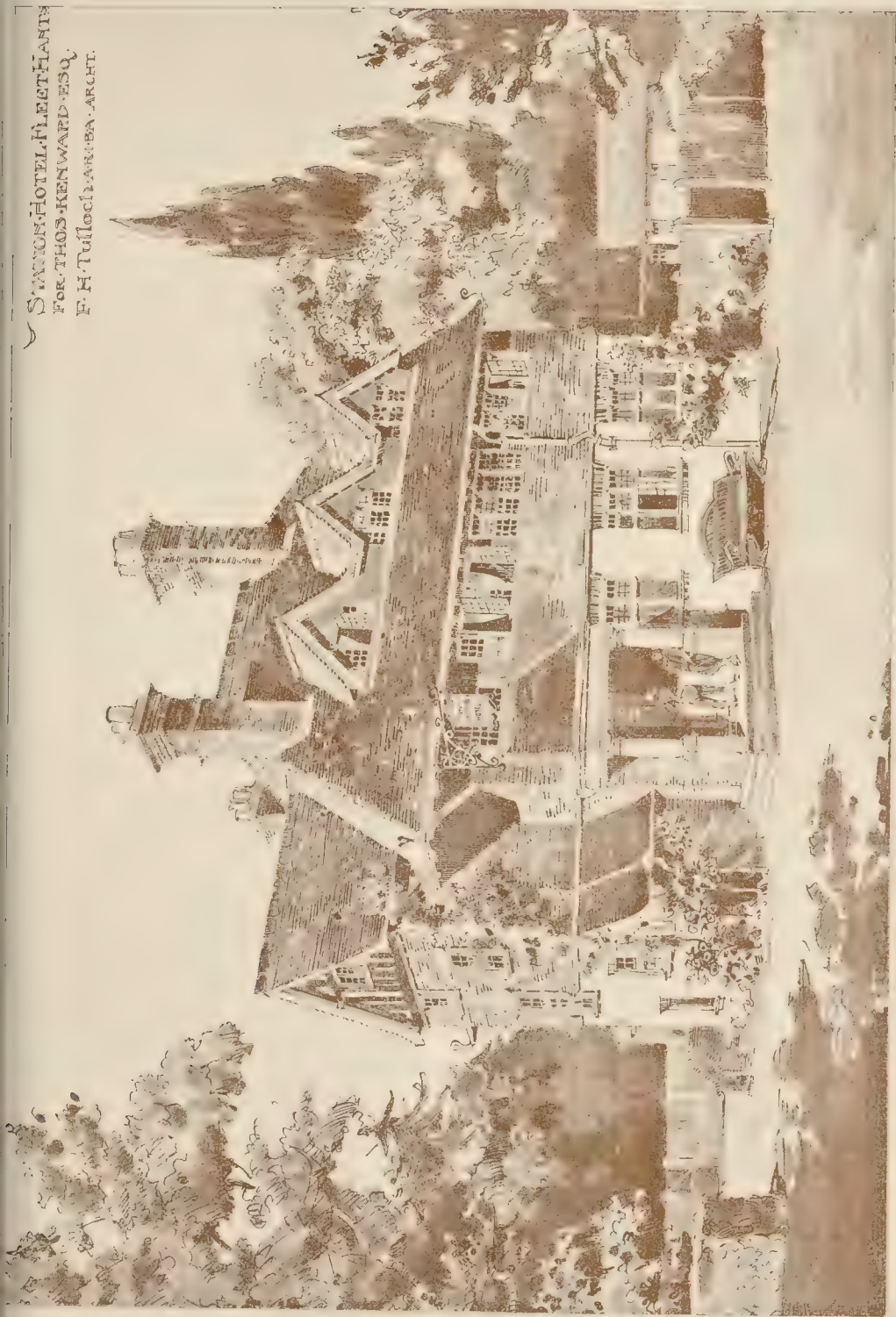




THE BUILDER. MAY 13 1891



STATION HOTEL, FLEETHAM
FOR THOS. KENWARD ESQ.
E. H. TULLOCH & CO. ARCHT.





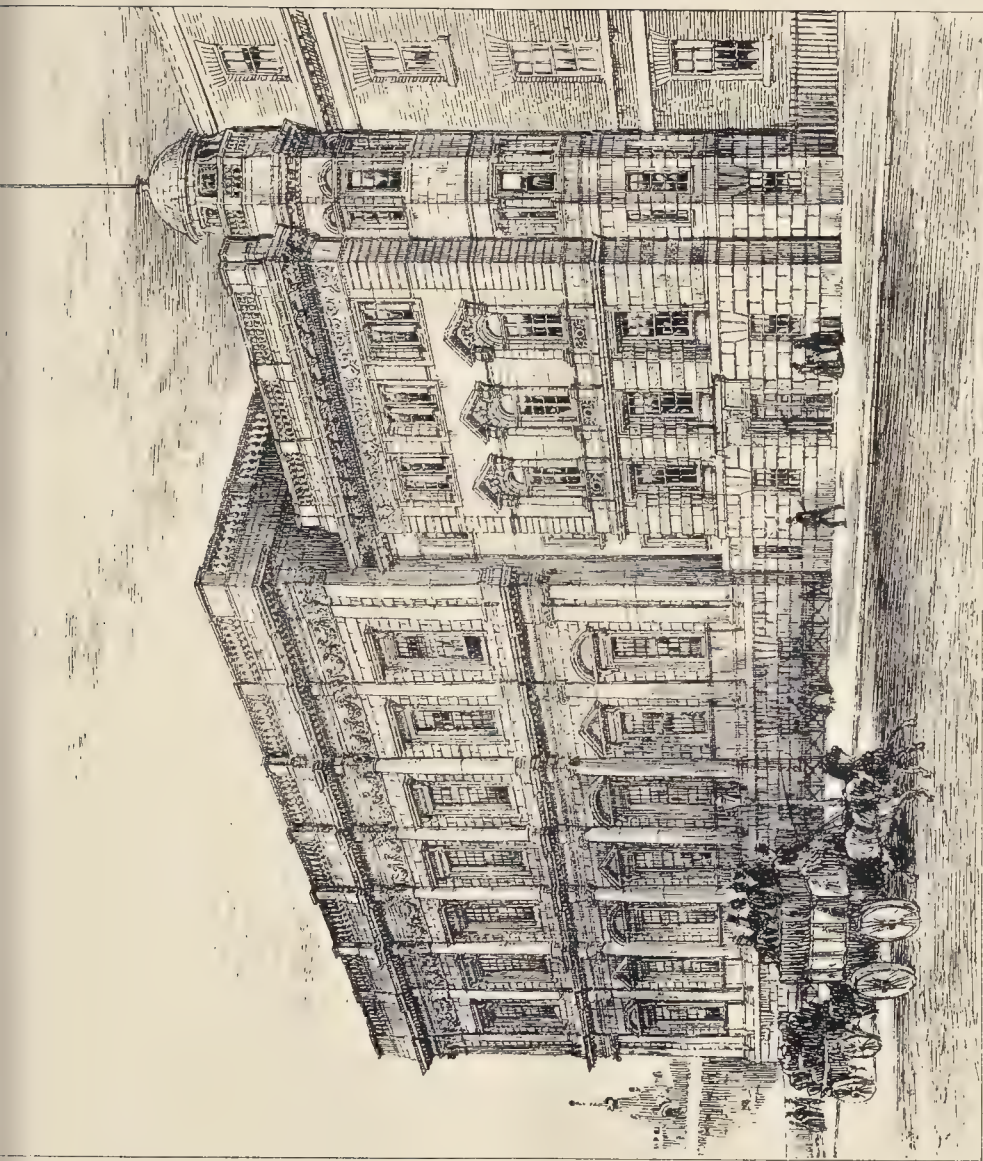


QUARRYDENE WEETWOOD, LE



124 PHOTO SPRUCE & CO. 48 N. EAST HURD. ST. LOUIS, MO.

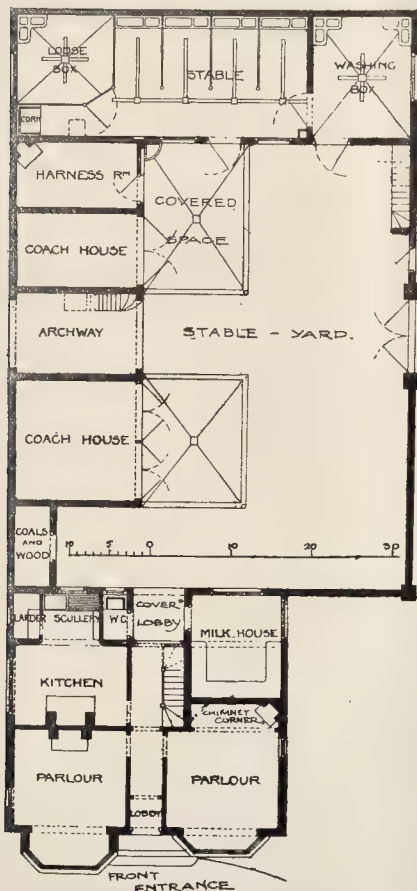
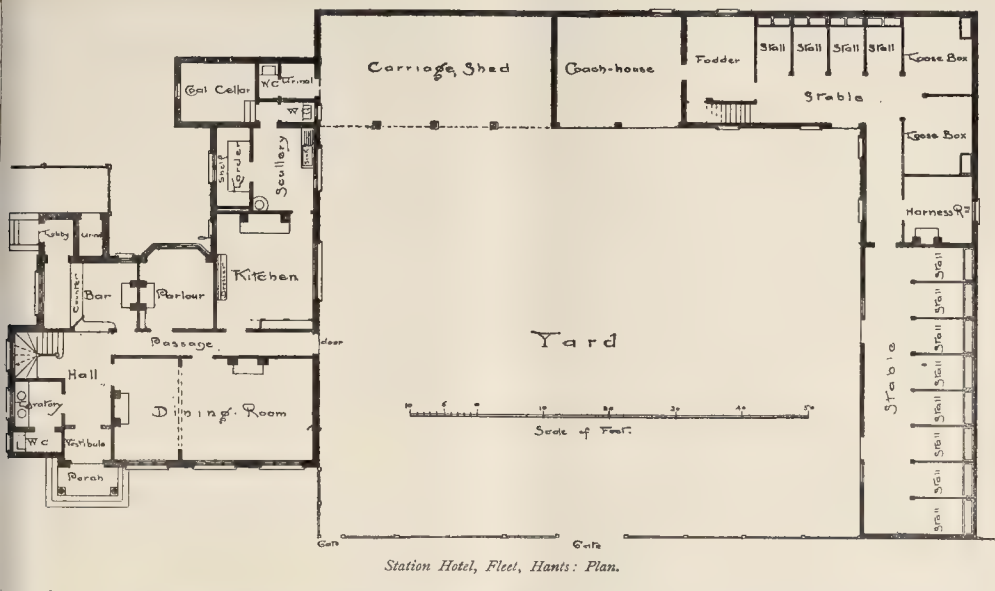
H. THORP, F.R.I.B.A., ARCHITECT



ROYAL UNITED SERVICE INSTITUTION: VIEW OF NEW BUILDING AND BANQUETING HOUSE FROM WHITEHALL.

MESSRS. ASTON WEBB & INGRESS BELL, ARCHITECTS

Royal Academy Exhibition, 1893



Mr. S. S. Platt, Borough Surveyor of Rotherdale, was re-elected Hon. District Secretary, warm acknowledgment being made of his untiring energy in the discharge of the duties of that office.

The Manchester Main Drainage Works.

Mr. Allison, the City Surveyor, then read the following paper, describing the salient features of the new main drainage works. He said:—

Previous to 1885 the boundaries of the City of Manchester were exceedingly limited, having only an area of 4,294 acres, and a population of 341,414; and allowing about 300 acres unbuilt upon on the northerly side of the City, and about 300 acres for shop and warehouse property in and near the centre of the city, where there is no resident population, the residential area would be reduced to about 3,694 acres, which averages ninety-two persons per acre. In 1885 two Local Board Districts and one Rural Sanitary Authority were added, increasing the area to 6,927 acres; and again in 1890 by Provisional Order other six Townships were added comprising an area of 6,861 acres, so that to-day the total area of the City is 12,788 acres, and the population about 515,600.

Manchester has for a very long time been credited with a high death-rate, and possibly you will agree with me that after allowing for the area covered by streets and passages this number of persons per acre could not be considered a satisfactory condition of affairs. During the past four years the Sanitary Committee have had under consideration the over-crowded condition of the old city, which is mainly due to narrow streets in the working-class districts, such streets ranging from 12 ft. to 24 ft. in width, the back passages having an average width of from 3 ft. to 3 ft. 6 in. very few indeed measuring 4 ft. wide. In this crowded area also there were about 9,240 back-to-back houses abutting upon these narrow streets; and so impressed were the Sanitary Committee with the evils arising from this class of property that they resolved some three years ago that something must be done to give freer ventilation and improved sanitary accommodation, and they have accordingly within that period dealt with about 1,100 of these dwellings, 340 of which have been entirely demolished, and the remainder altered to suit the Committee's requirements, or closed as dwellings. There still remain about 8,000 to be dealt with.

Originally Manchester might be considered a privy and midden town, but in 1871 the Health Committee adopted the pail-closet system, which, no doubt, was a great improvement on the old midden system; but even with this system there are many objectionable features, as the pails can only be emptied on an average of say twice a week, and as the contents are stored up in these small yards and narrow

passages, it cannot be considered healthy for the people who live constantly amidst such surroundings. In view of all this, the Corporation have determined to convert Manchester into a water-closeted town, and the present drainage scheme has been sanctioned and the greater part of it already carried out. At present the whole of our domestic sewage, with the exception of that removed by the pail-closet system, finds its way by the street sewers into the various rivers and streams which flow through the city, and the scheme now being proceeded with is an intercepting scheme whereby the new main sewers are as far as practicable carried along the valleys at such depths as to intercept the existing sewers and convey all the sewage into one main outfall, and forward to the sewage works now being constructed on the westerly side of and about five miles distant from the city.

In designing and finally settling the main features of the scheme, my first object was to avoid, if possible, pumping, and this has been accomplished, so that the whole drainage of the extended city will eventually find its way by gravitation to the outfall works. The cartoon plans exhibited show the general line of drainage. It is not, however, my intention to go minutely into detail, as at a later period of the present year, when the works will be formally opened, a much fuller report will be required. Commencing with the outfall sewer at the works, this is a 10 ft. circular sewer constructed in three half-brick rings, set in Barrow hydraulic mortar, the invert to half springing height being formed of blue brick, and the remainder in good sound common bricks. This sewer extends for a distance of about 4,250 lineal yards towards the city, and the greater portion of it has been done in open cutting, one half the length being about 15 ft. in depth to the invert, while the remaining length nearer to the city is at a depth of from 18 ft. to 35 ft. At the point where this sewer terminates a storm overflow chamber has been constructed, as, owing to the very flat character of the district, only a very small percentage of the storm water can be got quit of before reaching this point. This chamber serves a double purpose; it gets rid of a large volume of storm water in time of flood, and it has enabled me to reduce the size of the sewer below this point, and at the same time reduces the volume of flood water to be dealt with at the works. The storm overflow chamber, which is intended to be inspected to-day, measures 51 ft. 6 in. by 27 ft. 2 in., and a crest or weir the full length is formed along the side of the sewer, so that in time of flood all the storm water delivered by the larger sewer, when running at a depth of more than 6 ft., will overflow and find its way along the storm overflow to the Ship Canal below the Mode Wheel Locks, where the surface of the water in the Canal is lowered to the extent of 13 ft. The water passing along the storm overflow being so largely diluted, will be allowed to be passed into the Canal without chemical treatment.

In the construction of the 10 ft. sewer few difficulties were encountered, except in carrying it under the Bridgewater Canal at two different points, and in both cases the work was done in open cutting. In order to enable the canal traffic to be carried on continuously, the work in each crossing was done in two sections, by means of coffer-dams, and it was found necessary to widen the canal temporarily in order to obtain sufficient width for the barges to pass. Owing to there being insufficient depth between the bed of the canal and the upper surface of the work, I had to construct the work with cast-iron cylinders in five segments for the 10 ft. sewer; and in the other case, where there was still less depth, two cast-iron tubes 8 ft. 9 in. diameter, in segments, had to be introduced. To-day, facilities will be given for you to examine this work, and also the storm overflow chamber, so that further description is unnecessary.

On the city side of the storm overflow chamber a much larger sewer has been constructed, and in order to avoid pumping, and to secure sufficient carrying capacity at a low level in the sewer (and also to get under three railways and various sewers), a special design had to be resorted to, so that instead of carrying forward a circular sewer, it has been carried out more of an oval shape, the internal dimensions being 14 ft. long by 10 ft. 6 in. The length of this sewer from the storm overflow chamber to the city boundary in Stretford-road measures 3,535 yards, the depth for the entire length varying from 37 ft. to 45 ft., two-thirds of it being carried out in tunnel and one-third in open cutting, all being constructed with similar materials to the 10-ft. sewer, except that this

sewer being of larger dimensions it was constructed in four half-brick rings instead of three as before. I may here mention that the ground throughout (with the exception of a few pot-holes of dry sand) was excellent, being chiefly of stiff dry clay, and except at the canal crossings little or no water was found in the tunnel, the only water found being in the shafts at a depth of about 10 ft. from the surface, where gravel or sand for this depth overlay the clay.

In having to cross under the three railways, special works were necessary, and very great precautions had to be taken, as the traffic on those three main lines, viz.: the Cheshire Lines for Liverpool, the Main Midland London and local lines, and the South Junction lines, had all to be maintained; and notwithstanding that the upper surface of the brick work of the sewer was nearly within 2 ft. of the sleepers, not a single accident took place; and although the trains had in all cases to slow in passing over the work while it was being constructed, I am not aware of them being delayed for a single minute at any time. Both the 10-ft. sewer and this are carried out with a gradient of 2 ft. per mile. The 10-ft. sewer will convey to the outfall when fully at work and in time of flood, about 100,000,000 gallons in twenty-four hours; the larger size sewer will carry forward to the storm overflow in time of flood about 170,000,000 gallons in twenty-four hours. Sewers of this size are not often met with in Municipal work. [The diagrams exhibited showed the work in all stages, from first sinking the shafts, driving the headings, extending the same until the full width was obtained, as also the mode of timbering, drawing the timber, &c.]

I now propose to give a very general outline of the works at the outfall. There are at present provided eleven tanks, each 300 ft. long by 100 ft. wide, having an average depth of 6 ft., equal to a water surface area of 7½ acres in the tanks, and a holding capacity upwards of 12,000,000 gallons. It is intended to use sulphate of alumina and lime as precipitants, but of course the tanks can be worked by any other precipitant which may from time to time be of a more suitable character. These tanks are constructed upon the continuous flow system, but unlike many others constructed on this principle, each tank is worked independently, and if all the tanks were at work simultaneously the sewage would be flowing over a crest 1,100 ft. in length. In dry weather the effluent water will, after leaving the tanks, be passed over about 300 acres of land, part of which the Corporation have already secured, and which will be properly drained and used for filth.

The sludge from the tanks will be conveyed into the works and dealt with in eight presses provided for the purpose, each press containing forty-five chambers, with plates 41 in. square, and said to be capable of turning out 1½ tons of cake per hour.

The cost of the entire scheme now in hand is estimated at about half a million sterling, but as several townships have been added to the city since the scheme was passed by the Local Government Board, about 100,000l. extra will be required to sewer these new districts. In concluding these remarks I have to add that I have been assisted by Mr. W. T. Olive, acting as Resident Engineer, with an efficient staff of assistant engineers and clerks of works.

In the course of a brief discussion which followed,

Mr. A. M. Fowler (Stockport), in moving a vote of thanks to Mr. Allison for his paper, said it was very satisfactory to learn that the Corporation of Manchester was abandoning the tub or pail system and adopting the water-closet system. The result could not but be beneficial, not only to Manchester itself but to the surrounding districts, who would all no doubt sooner or later follow the example set by Manchester. The partial continuance of the pail system was, he thought, the only blot on the sanitary scutcheon of Manchester.

Mr. W. Santo Crisp, Assistant-Engineer to the London County Council, seconded the motion. He said that he had been much interested in the description which had been given by Mr. Allison of these large and important works, which, he thought, were of ample capacity. He found that the capacity of the Northern Outfall Sewer of the Metropolitan Main Drainage system was much greater than its calculated capacity. Designed to discharge 300,000,000 gallons a day, it was capable of discharging nearly 400,000,000 gallons. He found that Kutter's formula was more accurate than Eytelwein's and he believed, from his experience, that the new Manchester Outfall Sewer would be capable of discharging

140,000,000 gallons a day instead of 100,000,000 gallons.

Mr. Allison said that the discharging capacity of the outfall sewer had been calculated by Beardmore's formula, according to which the discharging capacity of the sewer would be 129,000,000 gallons a day.

Mr. Mawbey (Leicester), in supporting the motion, said that Manchester was setting a salutary example to other large towns in abolishing the pail system. He regretted to say that the pail system still largely obtained in Leicester, where they had six or seven thousand pails in use. They would be glad to abolish them altogether, and they were now refusing to allow any more to be used. Unfortunately they had at present no powers to abolish them entirely. One of the strongest possible arguments in favour of the abolition of the pail system in Leicester was contained in the fact that the Sanitary Committee, after collecting the pails at enormous expense, had on two or three occasions asked permission of the Highways and Sewers Committee to discharge the contents into the sewers.

The vote of thanks having been put from the chair and passed by acclamation, Mr. Allison briefly replied.

The visitors then adjourned to the Banqueting Chamber of the Town hall, where they were entertained at luncheon by the Mayor, who was warmly thanked for his hospitality. They afterwards started in brakes to visit the sewage and Ship Canal works. Driving along the Stretford-road, the first stoppage was made at a point near Erskine-street, where most of the party descended into the new sewer to inspect the bell-mouth junction, where two sewers, respectively 9 ft. and 7 ft. diameter, joined the large one measuring 14 ft. by 10 ft. 6 in. Resuming the carriages, the visitors were driven through Trafford further towards the outfall, and at one of the points where the sewer crosses under the Bridgewater Canal they again descended into the works, and inspected the flood-gates, sluices, and storm overflow-chamber. Again taking to the carriages, they were driven to the extensive precipitation works at Daythorne, which were very fully inspected. The works seem to be very complete in themselves, but several of the visitors expressed it as their opinion that the area of land acquired for purifying the effluent is too small.

The Manchester Ship Canal.

The visitors after leaving the sewage works walked across a field to Barton Locks, on the Ship Canal. They first passed over the flood sluices, which are situated across the bywash channel of the Canal, and consist of four large wrought-iron sluice doors, each giving a clear opening of 30 ft. wide, and holding up a depth of water of 26 ft. These will be used for passing the flood water flowing down from the drainage area of the river Irwell. The sluices are built to Mr. Stone's design, the water pressure being supported on live rollers running between iron rails. The weight of the doors being counterbalanced, the sluices can be regulated by hand-power. The locks are of massive construction, consisting of one lock 600 ft. in length between the gates, 65 ft. in clear width, with inner gates to reduce the length to 450 ft.; also a smaller lock, 350 ft. between the gates, with inner-gates to reduce the length to 230 ft. The water-level here is raised 15 ft. The gates, capstans, lock sluices, &c., will be worked throughout by hydraulic power. Leaving here the party walked for about a mile along the bank of the Canal to Barton. Here the old stone bridge over the river has been replaced by a steel swing bridge spanning the Canal. This structure weighs 600 tons, revolving upon a broad race supported by sixty-four rollers. Two Hyde engines are in the foundation for turning the bridge. The roadway is paved with wooden sets, and a footway is provided on each side. The bridge is carried on a pier in the centre of the Canal. The swing portion is 196 ft. in length, affording two clear openings for vessels 90 ft. and 60 ft. in width. Founded on the same central pier is the swing aqueduct, which will be shortly used to carry the Bridgewater Canal over the Ship Canal, the difference of water levels being 27 ft. 6 in. The visitors passed under the existing stone aqueduct, the achievement of Brindley one hundred and twenty-five years ago. This is an admirable piece of engineering, but it must shortly be removed, and the boat traffic conducted through the new approaches and swing aqueduct. The swing portion is constructed of wrought iron, is 235 ft. in length, and weighs when full of water 1,400 tons. At the centre it is supported

partly by sixty-four rollers running on a wide circular race, and partly by a Hyde press. The bridge carries a waterway of 10 ft. in width and 6 ft. depth of water, and the towing-path is carried by a kind of gallery. In order to allow vessels to pass up the Ship Canal, the operation of swinging this aqueduct is simple. The water-gates on the abutments of the approaches are closed, also the gates at each end of the swing portion; the watertight stop-piece forming the intermediate connexion at each end is raised; the swing portion is thus disconnected from the abutments, and the aqueduct will swing over the central pier, affording two ample openings for vessels go ft. wide each up and down the Canal. Both the bridge and aqueduct will be operated from an elevated lever box on the central pier. It is intended, after the removal of the old aqueduct, to erect on the site an hydraulic lift for the transference of barges from the higher to the lower canal, or *vice versa*.

Mr. E. Leader Williams, the Chief Engineer, was unable to be present at the time of the visit. The party were met at Barton Locks by the Resident Engineer of the District, Mr. C. D. N. Parker, who accompanied them, and explained the details of construction and the method of working the swing viaduct and aqueduct.

The visitors were much impressed by the monumental character of the work, which is now so far advanced that it is confidently hoped that the Ship Canal will be completed and opened for traffic throughout in February next. After warmly thanking Mr. Leader Williams and the Ship Canal Company for kindly allowing the members to visit the works, and Mr. Parker for his kindness and courtesy in explaining them, the proceedings of the meeting terminated, and the party drove back to Manchester.

We propose, on an early occasion, to give some further details of this great work.

THE LONDON COUNTY COUNCIL

The usual weekly meeting of this Council was held on Tuesday afternoon last at Spring Gardens, the Chairman, Mr. John Hutton, presiding.

Proposed Improvement near Waterlow Park.—On the recommendation of the Parks Committee, it was resolved, after a long discussion,—

"That the Vestries of St. Pancras and Islington be informed that in the event of their proceeding, under the terms of Michael Angelo Taylor's Act, to acquire a strip of Waterlow-park for the purpose of widening Dartmouth-park-hill, the Council will make a nominal charge only for the land, and take down the existing boundary wall and erect railings in its place, subject to the Vestries agreeing to pay the cost of the alterations and to make up the road and footpath to a total width of 115 ft. to maintain the same, and to acquire and add to the road the portion of the forecourt of St. Joseph's Retreat as shown on the plan submitted to the Committee."

The opposition to the project was based on the objection to surrender even a small strip of park land for a street improvement.

Precautions against Cholera.—The Public Health Committee reported that they had been in communication with the Medical Officers of Health of the various sanitary districts within the County of London with respect to the hospital accommodation that would be available in their districts in the event of prevalence of Cholera in London during the present year, and they had been asked whether certain vacant land belonging to the Council in London would be available for temporary hospital purposes. As they considered it desirable that the Council should render any assistance possible in case of a cholera epidemic, they recommended—

"That, subject to the particular sites being approved by the proper Committees, the Council approve of facilities being given in case of necessity for the erection of temporary cholera hospitals on land in its possession."

This was agreed to without discussion.

Rates of Wages and Hours of Labour.—There appeared on the agenda (not for the first time), the following Report of the Special Committee on the "Fair Wages" Clause in Contracts:—

"We have further considered the proposed Standing Order for securing trades union rates of wages and hours of labour under contracts for the supply of raw material or manufactured articles, preferred back to us by the Council on December 15 last. In view of the conditions as to order and delivery embodied in most of the Council's contracts or the supply of stores, it might not be practicable to make the proposed standing order operative with regard to all such contracts, especially in cases where goods to be supplied might be manufactured in small quantities and at different places. We have accordingly endeavoured to modify the proposed standing order in the direction of making the conditions of its application more elastic, while keeping in mind the desire of the Council, as indicated by the terms of our reference, that the payment of

recognised trades union rates of wages and the observance of trades union hours of labour should be as far as practicable required from all the Council's contractors. If this standing order be adopted, it will be necessary to amend Standing Order No. 1 by adding to it words providing for the compilation of a list of wages and hours of labour to be observed by contractors for the supply of raw materials and manufactured articles. With these considerations in view, we recommend—

"(1.) That the following be No. 4 of the Council's Standing Orders with regard to rates of wages and hours of labour, viz:—

"In all contracts for the supply of raw material or manufactured articles, other than general contracts for the supply of stores to be used in maintenance, a condition shall, whenever practicable, be inserted that, with respect to all materials or articles produced or manufactured or supplied by the contractor, the contractor will in the production or manufacture or supply thereof (as the case may be) pay and observe the following rates of wages and hours of labour, viz:—

(a) Where the production or manufacture or supply thereof is carried on within twenty miles of Charing-cross, the rates of wages and hours of labour recognised and in practice obtained by the trade unions of the district where it is carried on.

But any committee shall have power to insert the said clause in any contract for stores when the conditions of purchase will allow it."

(2.) That, for the purpose of carrying into effect the above Standing Order, the following words be added to Standing Order No. 1, "and by contractors in respect of the supply, manufacture, and production of any raw material or manufactured articles, except contractors for the supply of stores to be used in maintenance."

The consideration of these recommendations was adjourned.

Limit of Height of Buildings.—The consideration of the Special Report of the Building Act Committee on this subject, printed by us a fortnight ago (p. 326, ante), was again postponed.

Whitsuntide Holidays.—On the motion of Dr. Collins it was unanimously resolved.

"That the Council at its rising on Tuesday, May 16, do stand adjourned until Tuesday, June 6, and that there be no meetings of Committees after the day of adjournment until Wednesday, May 31, unless in a case of urgency which will not admit of delay."

After transacting other business, the Council adjourned at half-past seven.

MAGAZINES AND REVIEWS.

THE *Gazette des Beaux Arts* contains an interesting article by M. Marcel Raymond on "Florentine Sculpture on the Duomo." M. Jules Guiffrey concludes his article on "Clodion and his Work." M. L. Falize contributes an article on the "Renaissance des emaux peints," dealing however rather with old types than new work; and there is a short review of an English work on Reynolds's notes of his Italian tour, under the title "Reynolds en Italie."

In the *Art Journal* Mr. Walter Armstrong continues his criticism of pictures in the Tate collection. The Meissonier Exhibition is treated by Mr. G. Berne-Bellecour, with illustrations from some of Meissonier's studies, and Mr. Lewis F. Day gives a description, under the title "A Kensington Interior," of the beautiful house of Mr. Ionides. Among the illustrations to this article is shown an effective arrangement of Tanagra figurines on an overmantel of miniature Greek architecture. "A Note on Modern Indian Pottery," by Mr. G. F. Strange, is illustrated with some very characteristic examples.

The *Magazine of Art* contains an article on the Academy Exhibition, with some most interesting reproductions of studies by Sir F. Leighton for "Rizpah." "British Etching" is the subject of an article by Mr. Wedmore, and there is a very interesting one on "The Art of Khuenaten," by Mr. Flinders Petrie. We have also Part I. of a special publication of the Royal Academy Pictures, as a supplement to the *Magazine of Art*.

The *Studio*, a new art magazine, of which the April, not the May number, has been forwarded to us, seems to be devoted to novelties in art a good deal, and contains an article on "A New Illustrator," Mr. Aubrey Beardsley, some of whose work we noticed in the New English Art Club's Exhibition, and who unquestionably is a book-illustrator of very original power, though in an eccentric fashion. An article on "Bookplates" gives some interesting illustrations. The articles in the *Studio* are mostly short, and of considerably varied interest, and by writers who have something to say on the subjects of which they treat.

The *Architectural Review* continues a series of articles on "Historic Styles and Modern Architecture," and gives some good geometrical illustrations of the Bargello at Florence, and the façade of the Hôtel Beaugency, Paris. The *Architectural Review* appears to be very French in its leanings, in

the style of its illustrations (which are of excellent quality), and also in its curious irregularity of appearance. It professes apparently to come out eight times a year, but it does not seem to matter when.

The *Architectural Record* continues shamelessly to annex Professor's Aitchison's lectures on "Byzantine Art," printed in our columns; a double robbery of him and of ourselves, which however, to the American editorial conscience seems a perfectly natural and even praiseworthy proceeding. The same number contains a good article (not stolen) by a young English architect, Mr. Banister F. Fletcher, on "The Influence of the Early Renaissance on Sculpture."

The *Quarterly Review*, a very good number in a general sense, contains no article of special interest to our readers, in regard to subject, but that on "Literary Discoveries in Egypt" touches on a good many points which are of interest in relation to relics of Egyptian art also.

The *Edinburgh Review* includes a most interesting and picturesquely written article on "Fontainebleau," dealing with the architecture as well as with the personal memories of the palace, and an article on "Mashonaland," in which the writer touches on Mr. Swan's theories in regard to the orientation of the so-called temples, and takes the same view that we did, that these theories in regard to the architectural remains of Mashonaland are fanciful and untenable, or at least based upon nothing worth calling proof. The writer observes that it is convenient for those who have a passion for establishing orientation theories in regard to ancient ruins that "there are always plenty of stars to choose from."

In the *Century* Mrs. Van Rensselaer writes a short article on "The World's Fair," the chief interest of which consists in the illustrations, which are very effective, though somewhat misty in execution. Then we have an article on some of the decorative painting, by Mr. Melchers and Mr. MacEwen, at the same place, with illustrations of some large decorative paintings in lunettes, which look well in engraving. "Personal Impressions of Nicaragua," by Mr. G. Gaul, will be of interest at a time when so much attention is being directed to this region as the possible site of an interoceanic canal.

Scribner's Magazine comes out with a specially designed cover as what is called an "Exhibition Number," in which, strange to say, there is nothing about the exhibition at all, the aim having only been, apparently, to make an unusually varied and readable number. In this sense it may be a success, but from our point of view it is a less valuable number than usual, consisting mainly of stories, the only article on art being one on "An Artist in Japan," by Mr. R. Blum, with very spirited illustrations by the author.

Harper's Magazine, on the contrary, contains a special article on the Chicago Exhibition, under the title "A Dream City," by Miss (or Mrs.) Candace Wheeler, with a number of illustrations of the sculptural decoration of the Exhibition. Judging from this, there seems to be a good deal of highly respectable sculpture, but not of the first order, to be seen at Chicago.

In the *Nineteenth Century* Mr. A. Raymond Dowling, under the heading "A Walk in Alexandria," combines some description of the present city with a sketch of its past history.

In the *Westminster Review* Mr. J. T. Blanchard deals with the eight hours question, which he sums up as impracticable, pointing out that in the State of Massachusetts, where apparently there has been an attempt to regulate hours of labour by law, the law is constantly and deliberately evaded.

The *Gentleman's Magazine* includes an article on "Memories of Old St. Paul's" (more social than architectural) by Mr. W. C. Sydney, and one on "The Rise and Fall of Millbank Prison" by Mr. G. Rayleigh Vicars, who speaks strongly in regard to the utter practical impossibility of the plan of the building for its purpose, especially in regard to the proper overseeing of prisoners.

Longman's Magazine includes an article by Mr. R. H. Scott on "The Study of Weather and of Climate."

The *English Illustrated* contains an article by Mr. Harry Quilter on "The Royal Academy Exhibition, its Making and Makers," with sketches of some of the pictures of this year, and containing some critical remarks on painting, adapted to the art capacity of general readers. His suggestion of a rule for determining whether any work of art were good or indifferent, to see "if you can trace throughout any informing purpose by which the various details of the picture appear to have been governed," is admirable. The same number contains an article on the Imperial Institute by Sir Somers Vane, with various illustrations, and

one on a trip "From Queenstown to Sheerness in a torpedo boat." There is a frontispiece illustration of Sir F. Leighton's Academy picture, "Hill."

The *Cornhill* contains an article on the Scilly Islands and their inhabitants, which gives some very picturesque impressions of the places and people.

The *Essex Review* continues its notes on "Essex Churches," dealing in this number with All Saints', Purleigh, of which a sketch is given.

In the *Antiquary* the "Researches in Crete," by Professor Halbherr, are continued; other articles are on "Richborough," by Mr. A. Hall; "Inventories of Church Goods made temp. Edward VI.," by Mr. W. Page; "Holy Wells of Scotland," by Mr. R. T. Hope, &c.

Correspondence.

To the Editor of THE BUILDER.

NEW CHRIST'S HOSPITAL.

SIR,—I have seen with great interest the paper on "Hygiene and its Application to the Arrangement of Buildings," read by Mr. P. Gordon Smith, the Architect to the Local Government Board, before the Architectural Association, and published in your issue of 6th inst.

As the result of extended experience in various classes of buildings, the paper in question appears to me to be a most valuable contribution to our knowledge of the hygienic conditions arising from the aggregation and segregation of the dwellers or occupiers of such buildings.

One of the highest medical authorities, quoted by Mr. Gordon Smith, has stated in no uncertain terms that "there is danger in the collection beneath one roof of a number of persons exceeding those of an ordinary family," and other medical men, also quoted by the author of the paper above referred to, aver that aggregation of large numbers in schools tends to spread ophthalmia, diphtheria and allied throat affections, and the truth of these statements is fully borne out by the facts mentioned by Mr. Gordon Smith.

Hence it follows that it is of immense importance to apply most fully the principles enunciated in the paper referred to in designing schools—where large numbers of children are assembled together daily for so many consecutive hours—and it is interesting to inquire how far these principles are to be carried out in the instructions to architects for the New Christ's Hospital. In this instance there does not appear to be any limit as to the cost of the buildings, and the school is evidently intended to be a model one.

How, then, is it proposed to provide residential accommodation? This is to be in fourteen houses of fifty boys in each. Now, although it is very satisfactory to find that the corridor plan with a range of dormitories on either side is not to be adopted, and that a distinct step in the right direction has been made, yet it is to be regretted that so large a number as fifty should have been fixed on for each house when it is found there are several pauper schools with less than thirty in each house or cottage, and in Dr. Barnardo's village homes there are only ten to twelve in each, but it is to be more regretted that the competing architects should be asked to send in an alternative plan "for a block of three houses arranged on the flat system of fifty each." This practically means a block to contain 150 boys—an alternative which, it is to be hoped, will not be adopted. That such an aggregation would have a serious effect on the health of the boys anyone who has followed Mr. Gordon Smith through his paper cannot fail to conclude.

With regard to the educational part of the proposed school buildings at Horsham, thirty class-rooms are required; no mention is, however, made in the instructions as to whether these may be arranged one above the other in buildings of two or three stories high, but there is mention of a drawing class-room which "may be on the top-floor," and in the absence of any restriction as to height or number of stories it may be inferred that more than one storey is anticipated. With so large a site as that of the proposed buildings one would have expected that it would have been stipulated as a matter of importance that the class-room blocks should not be more than one storey in height; it would doubtless improve the hygienic conditions if connecting corridors were dispensed with and the class-rooms entirely isolated and at some distance apart.

It is now generally conceded that what is

requisite in a hospital building to secure the recovery of patients is equally necessary in the school, the habitation, and the factory, to maintain the inmates in health. Whilst, therefore, one must regret that hygienic conditions have not been more fully recognised in the preparation of the instructions to architects for the Christ's Hospital competition—yet it is a great encouragement to those who have progress in accordance with the laws of hygiene at heart to find that the end-to-end corridor is not to be adopted. VIATOR.

"SUSAN AND ROBERT" TO THE RESCUE.

SIR,—If, before criticising your art critic would only go and inquire how a lifeboat is launched, he will find that the helpers pull up the beach on the launching rope, which, as it passes through a sheave on the opposite end of the carriage, launches the lifeboat out to sea. The wreck from which I painted was really a little closer in, and yet no attempt was made to sling the people ashore. I would not have painted a subject of this sort without taking pains to make the details correct. W. L. WYLLIE.

* As to the matter of the lifeboat, we ought to have said more clearly what we meant, which was that we had no doubt Mr. Wyllie was right as to the action, but that we could not make it out from the picture, after more than one close examination with that object. We have far too much respect for Mr. Wyllie's thoroughness as a painter of shipping to suppose that he would make a serious blunder. As a matter of fact, the writer of the criticism is most interested in all matters connected with the sea and shipping, but he never happened to see a lifeboat launched, and is obliged to Mr. Wyllie for an explanation which will probably be needed by a good many others who look at the picture.—ED.

PLANS OF CARLISLE CATHEDRAL.

SIR,—A note on the plan of Carlisle Cathedral (published with your issue of last week) states that the plan is from an outline plan made by me forty years ago. This is an error. The first plan I made of the cathedral was made in or about the year 1870, and it seems probable that the reference should have been to the plan made by the late Mr. Billings in 1850, which your plan closely follows.

My plan was revised up to last year. It showed the whole of the site, with the remains of the monastic buildings, the full extent of the nave (from a survey made when the west wall was uncovered), and the apse to the east of the north transept laid bare last year. CHARLES J. FERGUSON.

Carlisle, May 9.

LOW SIDE WINDOWS.

SIR,—Without wishing to needlessly reopen a question that has already been under discussion, i.e., "Low Side Windows," I should like to draw attention to the fact, which has recently come under my notice, that these windows, in many cases, opened into those curious little cells built against the walls of the chancel and inhabited by those solitary fanatics called "Ankers," or in modern terms—anchorites, whose rules and regulations are so vividly put forth in the "Ancren Riwle," of the thirteenth century.

In the practically inaccessible retreats afforded by the hilly fastnesses of the north and the watery fens of the east, religious solitudes found, if not peace, at least seclusion. In the fertile lowlands this was well-nigh impossible; cultivation claimed the land for other purposes so that other means of solitude had to be found. Permission was obtained from the Bishops of the various dioceses to erect against the walls of the Parish churches small lean-to buildings or cells in which the anchorites could carry out their vow of solitary meditation and conflict with the powers of evil. Ducange goes so far in his Glossary as to lay down the dimensions and method of constructing these curious excrescences. They were built either against the north or south wall of the chancel preferably for obvious reasons the latter—and were, according to Ducange, to be 12 ft. square with three openings, one into the church for participation in the Mass, a second for light, while through a third the unfortunate occupant was supplied with his daily need. The strictest ankers were *inclusi*, i.e., "walled in," and it was customary for them to prepare their own graves. Women, as well as men, thus shut themselves away from the world, and it was evidently considered by the Church as a matter of some moment, as a regular service was composed for the walling-in of an "anker." Yet they were not altogether solitary, these men and women with diseased ideas of religion, for in many cases round their little cells the villagers gathered and discussed the local news, and gossiped of their neighbours' shortcomings. The sanitary state of these wretched dwellings may be imagined, and

* Published by the Camden Society, 10, CECIL STREET, + Vide Salisbury Manual and the "Pontifical" of Lacy, Bishop of Exeter, in the first half of the fifteenth century.

when the Reformation swept them away, we must feel that it, anyhow, did a good work. Traces of the cells have been practically obliterated. Being built after the church, their walls would not have been bonded into those of the building they abutted against, and their removal was an easy matter. At Benges church, near Hertford, Mr. J. T. Micklethwaite, F.S.A., discovered the remains of an anker's cell against the north wall of the chancel with its recesses and sockets for the roof-beams, and published an interesting account of this ankerhold in the *Archæological Journal* Vol. xlv. No doubt many of these low windows were used for confessional purposes, as the late Mr. Math. Bloxham fairly established, but that they were used for burial purposes, or to enable lepers to attend Divine service, seems to me a somewhat far-fetched idea, unsubstantiated by documentary evidence of oral tradition. PERCY G. STONE.

The Student's Column.

CHEMISTRY.—XIX.

Smelting of Iron Ores (continued).

THE limestone burns to lime, which, as in the case of cements, combines with the clay (silicate of alumina) to form silicate of lime and aluminate of lime, which, being readily fusible, melts and sinks to the lower part of the furnace, while the metallic iron, which is fairly pure when first formed, also gradually sinks to the lower part of the furnace, combining, of its way, with small quantities of carbon, silicon, phosphorus, and sulphur. It is protected from becoming oxidised by the blast of air, by the coating of slag which covers each particle of iron. The molten metal being heavier than the molten slag, sinks through it, and collects in the bottom of the hearth, or "crucible" as it is termed, from which it is periodically tapped and run into sand moulds to form the "pigs" of commerce. The slag which floats on the molten metal flows out at a hole specially provided for it, and when cold forms a hard, glassy substance.

Cast or Pig Iron.

Commercial cast or pig iron manufactured in the manner described above always contains more or less carbon, silicon, sulphur, phosphorus, and manganese, and usually many other elements in very small quantities. Although these substances may be regarded as impurities, some of them have a beneficial effect upon the physical properties of the iron. The quantity of carbon, especially, which is present in the iron has a marked effect upon the physical qualities of the metal. Thus, in the three commercial forms of iron, viz., cast iron, steel, and wrought iron, carbon is present in greatest quantity in cast iron and least quantity in wrought.

Cast iron contains from about 2 to 6 per cent. total carbon.

Steel contains from about 0.15 to 1.8 per cent. total carbon.

Wrought iron contains from about nil to 0.2 per cent. total carbon.

The following table shows some analyses of cast iron, steel, and wrought iron:—

Authority.	Cast Iron.			Wrought Iron.	
	Grey.	Mottled.	White.	Swedish.	Thorpé, Thorpe.
Iron	92.24	92.51	92.68	92.5	92.51
Carbon	1.5	1.7	1.6	1.054	1.401
Free carbon	2.01	1.11	0.76	—	—
Silica	0.08	0.17	0.13	0.008	0.10
Sulphur	0.14	1.42	0.52	0.033	0.002
Phosphorus	0.04	1.17	0.04	0.008	0.06
Manganese	0.03	1.0	2.72	—	0.144
	92.86	98.63	100.46	100.000	100.000

The free carbon is usually present as graphite (see carbon, Paper VIII.). Cast iron is obtained in any desired shape by remelting the bars termed "pigs," and running the molten metal into moulds.

The colour of the freshly-fractured surfaces of the various cast irons depends upon the amount of carbon in them, and the rate at which the iron was cooled. In white pig, moreover, the carbon is nearly all present in the combined condition, while in grey pig the carbon is mostly present in an uncombined state.

Grey cast iron has a higher fusing point than white pig, is not so strong as the other varieties of cast iron, and is comparatively soft. It melts to a considerably thinner fluid than the other varieties of cast iron, and is therefore used for

sharp, delicate castings that are not required to possess great strength.

White cast iron is very hard and brittle; it fuses at a lower temperature than the grey variety, but it never becomes so fluid, and hence is not used for castings, except those of the roughest kind. White cast iron can be converted into grey cast iron by melting it, and allowing it to cool slowly, and grey cast iron can be converted into a granular white cast iron by melting it and suddenly cooling it. This latter fact is taken advantage of in *chill casting*; for instance, in the moulds for the wheels of railway carriages, cold iron of suitable shape, having a thin coating of loam, is placed along the interior sides in order to rapidly chill the molten metal coming in contact with it. In this way the running surfaces of the wheels are made of hard white iron, while the remaining portion of the wheel is composed of the softer but tougher grey variety.

Wrought Iron.

Wrought iron is the purest commercial form of iron. It is usually prepared from the cast pig-iron by "puddling" it in a reverberatory furnace (Fig 15)

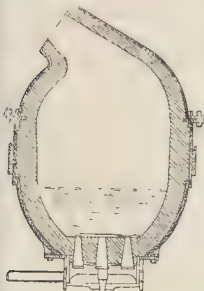


FIG. 15.

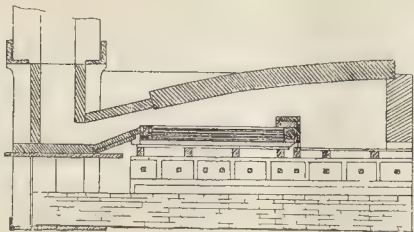


FIG. 15

while in a molten condition. In the furnace, the iron is subjected to a strong current of air and the heat of the flame, but it is not brought into contact with any fuel. Previous to being puddled or stirred, the pig-iron is mixed with some oxidising substance, usually a basic silicate of iron, which is termed hammer slag. The carbon in the impure iron then combines with the oxygen in the oxide of iron to form CO, which burns with a blue flame on the surface of the metal, and the silicon also combines with oxygen to form silica, which combines with another portion of oxide of iron to form a fusible slag which is easily separated from the metallic iron. Upon losing its impurities the molten metal becomes less fluid, and by the time its constituent carbon has become reduced to about 1 per cent., the metal will have assumed a pasty consistency. The temperature is then increased and the mass thoroughly stirred, the greater portion of the remaining carbon and phosphorus being removed at this stage. The metal has now become so thick that it can easily be worked into balls, termed *puddle-balls*. These balls, which often weigh $\frac{1}{2}$ cwt. or more, are placed under a hammer, the blows of which force out the slag and give the metal coherence. Finally, while still red-hot, the metal, which by hammering has become shaped into slabs, is passed between rollers which convert it into *puddled bars*. These puddled bars form the lowest class of wrought iron. The metal thus produced is converted into the better classes of wrought iron by being piled, re-heated in a mill furnace, and re-rolled one or more times. The finest qualities of wrought iron are obtained by refining the pig-iron before subjecting it to the "puddling" process. Refining consists in preserving the pig-iron in a molten condition mixed with coke for about two hours with a strong blast of air playing upon its surface. The chemical reactions produced are very similar to those which take place in the "puddling" furnace.

The "Bessemerising" process for producing wrought iron from cast iron consists in oxidising the impurities by blowing fine streams of air through the liquid metal.

The effect of rolling wrought iron is to squeeze out any slag it may contain and to increase its fibrous character. By subjection to constant vibration or concussion, wrought iron loses its fibrous character, sometimes becomes crystalline, and has its tensile strength greatly decreased.

Steel.

Formerly steel was made from wrought iron by surrounding bars of the iron with charcoal and heating them for several days to a bright red heat in a closed furnace. This is known as the *cementation* process, and produces *blister steel*, a name derived from the appearance of the bars, which become blistered through the liberation of CO from their interior. The steel thus produced is not uniform in its composition, but this defect may be remedied by melting the steel and re-casting it.

Bessemer Steel is made from pig-iron. The cast iron is melted and run into a furnace termed a "converter" (Fig. 16), which is a vessel composed of wrought iron and lined inside with fire-brick, fireclay, or "ganister," a powdered sandstone. The whole is hung on trunnions so that it can be tipped by hydraulic power into any position. A blast of air is introduced at the bottom of the converter and blown through the molten metal, causing practically the whole of the carbon to be removed in a very short time. The blast is now stopped, and a charge of from 5 to 10 per cent. of spiegeleisen (an alloy of iron and

manganese containing much carbon) is added to the contents of the converter.

Sufficient carbon having thus been added to convert the iron into steel, the product is run off into a ladle and thence into moulds. In order to eliminate the objectionable impurity, phosphorus, from the steel, the Thomas-Gilchrist improvement is adopted. It consists in substituting "basic" lining for the ordinary fireclay lining of the converter. This basic lining consists of bricks made by heating a mixture of ground magnesians limestone and pitch.

By the Bessemer process, six tons of pig-iron can be converted into steel in twenty minutes.

Siemens-Martin process. In this process a quantity of highly heated pig-iron is prepared upon the open hearth of a regenerative gas-furnace, and three or four times its weight of wrought iron or scrap steel melted or dissolved by placing it in the molten pig-iron. When the mixture is completely fluid and has become of uniform composition throughout, samples are drawn from it to ascertain the amount of carbon remaining in the metal, and hematite iron ore is added in small quantities until the carbon is reduced to the desired proportion. Finally, siliceous iron, spiegeleisen, or ferromanganese is added and thoroughly mixed into the molten iron in such proportion as will produce steel of the required strength.

Krupp's Cast Steel, which is used for guns, &c., is manufactured by heating spathic iron ore and hematite with coke in a puddling furnace. Before being cast the metal is fused in plumbago (carbon) crucibles. Many other processes for producing steel are known, but most of that used in commerce is obtained either by the Bessemer or Siemens-Martin process.

Whitworth's Compressed Steel is obtained by subjecting molten steel to a pressure of from six to twenty tons upon the square inch, the pressure being maintained during the solidification of the metal. Ordinary steel, when first cast, is full of small cavities, which have to be removed by hammering before a first-class steel is obtained, but if the steel is subjected to Whitworth's compression process these cavities are not found.

Puddled Steel is an inferior steel produced by the imperfect refining of pig-iron. It is obtained by treating pig-iron to the process adopted for preparing wrought iron, but the puddling process is stopped when from 3 to 10 per cent. of carbon remains in the iron, instead of removing the whole of the carbon.

Mild Steel differs from hard steel in containing less carbon. Its chemical composition does not differ very largely from wrought iron, but it is greatly superior in many ways to wrought iron, being more ductile and elastic, and possessing a greater tensile strength. It is largely used for boiler plates and shipbuilding, and is also employed for steel rails, and many other purposes. Manganese, which is always present in more or less quantity, increases the tensile strength of steel, but at the same time hardens it and tends to render it less ductile. In common commercial steel the amount of manganese varies usually from .25 to 1 per cent., and the brittleness of the steel increases until the percentage of manganese is $\frac{1}{2}$ per cent. Steel containing $\frac{1}{2}$ per cent. manganese can be reduced, like glass, to a fine powder by striking it with a hammer, but as the amount of manganese is increased beyond this point, the metal becomes less brittle. *Manganese steel*, containing about 14 per cent. of manganese, is a hard and tough alloy, possessing many valuable properties.

Hardening and Tempering of Steel.—If ordinary steel is heated to redness and plunged into cold water while still red hot, the steel becomes extremely hard. As, however, this process renders the steel very brittle, it is frequently necessary to temper it; a process depending upon the fact that if the steel is reheated and allowed to cool slowly it loses its hardness to a certain extent, but at the same time becomes less brittle. The higher the temperature to which the steel is reheated the less will be the brittleness of the tempered steel. As the steel is heated it becomes covered with a film of oxide, which becomes thicker and changes in colour as the temperature increases. Consequently, the colour of the oxide film is an indication of the temperature of the steel. The following table shows the temperatures at which various implements are tempered, and the various colours of the oxide films produced:—

Temperature.	Colour.	Implements tempered.
220° C (428° F)	Pale yellow	Surgical instruments, razors, &c.
245° C (473° F)	Straw yellow	Wood cutting tools, dies, &c.
255° C (491° F)	Dark yellow	Chisels, shears, &c.
265° C (509° F)	Brown	Axes, clasp knives, &c.
275° C (527° F)	Purple	Table knives.
295° — 320° C	Blue	{ Saws, watch springs, sword blades, &c.
565° F—608° F		

GENERAL BUILDING NEWS.

NEW BUILDINGS FOR THE LEEDS CO-OPERATIVE SOCIETY.—On the 6th inst. the memorial-stone of new buildings for the Leeds Co-operative Society was laid in Albion-street, Leeds. The area of the site contains 1,260 square yards, the greater portion of which will be covered by the new buildings, which will have a frontage of 80 ft. to Albion-street. The basement floor, having an area of about 900 yards, will be mostly used for furniture store-rooms and furniture show-rooms. In addition, room is provided for special ventilation arrangements, and for the electric light, if required. Under the basement is a sub-basement, with boiler-house and air-trunks and receivers. The ground floor will be divided, with a two-thirds frontage to Albion-street for drapery and one-third for furniture. Each department will be approached through the large central entrance. A parcel room, storeroom, &c., are also provided, and special provision is made for the loading and unloading of goods. The first floor will be divided similarly to the ground-floor, but with rooms for reserve drapery in addition. The second floor will contain rooms for fur goods, &c., and a part will be occupied by the educational department of the society. The third-floor will be devoted to work-rooms and stock-rooms. The elevation to Albion-street will be of stone, from the Halifax district, and the elevation to Upper Mill-hill of pressed brick, while white glazed bricks are used for the other elevations. The rooms are lofty and carried on iron columns, with English steel and iron beams and girders. As far as practicable, each floor will be fireproof, with iron and concrete construction, and finished with wood block flooring on the top and cement-panelled ceilings on the underside. The goods will be delivered from each floor by a hydraulic hoist, supplied by Messrs. Tannett, Walker, & Co., of Leeds. The ventilation and warming will be carried out by Mr. Edwin Oldroyd, of Leeds. For the purpose a special sub-basement floor is provided for the warm air, to be carried to the various rooms in the thickness of the walls, and also for the mechanical arrangement to draw and force the foul air out of the building. The contractors are, for the brick and stone work, Mr. C. Myers, Leeds; iron roofs, girders, and columns, Messrs. Bagshaw & Sons, Batley; concrete fireproof flooring, Messrs. A. & P. Wheeler; plasterers' work, Mr. Thomas Moore; and the slaters' work, Messrs. Worsnop & Co., all

* Prof. Lewes' "Service Chemistry."

of Leeds. The society will carry out the carpenter and joiner work, the plumber and glaziers' work and painting, providing their own workpeople, who will be under the management of Mr. Philemon Rump, the building manager and clerk of works. The plans and designs have been prepared and carried out under the supervision of the architect, Mr. W. S. Braithwaite, Leeds.

CATHOLIC CHURCH, HANDSWORTH, BIRMINGHAM.—On the 8th inst. the Bishop of Birmingham laid the foundation-stone of a new Catholic Church in the name of the Blessed Trinity and in honour of St. Francis, on land at the junction of Hunter's-lane and Wretham-road, Handsworth. According to the *Birmingham Gazette*, the Rev. A. C. Scoles, of Yeovil, who was by profession an architect before admission into orders, and who has designed several buildings for the Church, drew the plans for the present edifice. It is of Early English type, and will be built of brick and stone. All the stonework outside the building, the dressings, doorways, and windows, will be in Hollington stone, and the interior dressings Bath stone. The nave and aisles will be 30 ft. long, the width of the nave being 25 ft. and the aisles 11 ft. There will be four sacristies and a Lady Chapel. The sanctuary has a measurement of 30 ft. by 25, and will be in three levels, the uppermost for the officiating priest and deacons, the second for the choir, and the third for communicants. The east window is a treble lancet, high up, so as to allow of a high reredos under it. Over this sacristy will be the organ-loft, with large openings into the sanctuary. The west window will be a double lancet, surmounted by a small sun window. At the top of the building will be a statue of St. Francis of Assisi. Entrance will be gained by a main Gothic portal opening upon a porch that will extend the whole breadth of the building. There will be small doors on either side, one for use when the main entrance is closed, the other for professional and other purposes. The seating accommodation will be for 600 persons. The building contract has been given to Messrs. Harley & Son, of Smeethwick. The estimated cost of the church is 4,000l.

RESTORATION OF THE PARISH CHURCH AT LLANGYNYD, GLAMORGANSHIRE.—On the 3rd inst., says the *Western Mail*, the ancient parish church at Llangynydd, under undergoing renovation at the expense of Miss Olive Talbot, London, was reopened by the Lord Bishop of Llandaff. The principal entrance to the church is through the south porch. This has been arched by massive blocks of Quarell stone (Bridgend). Around the principal entrance are pateras of shields and monograms of the Talbot family and arms of the diocese. In the canopy is the figure of St. Cynwyd, from whom the church and the parish derive their names. The western tower, 60 ft. high, has been restored, and is ornamented by four pinnacles with carved crockets. The six bells in the tower have been hung, and a new framing constructed. Light iron screens separate the belfry from the church. The aisles have been boarded and have seats of solid oak, and the nave contains a heating apparatus. The pulpit is of solid oak, carved with emblems of Faith, Hope, and Charity. The chancel is paved with tessellated tiles. The reredos, which is of oak from the roof-loft of the old church, is divided into panels, and when completed the panels will contain paintings of different sacred subjects. In the chancel is a monument raised by public subscription over the grave of the Maid of Cefn Ydfa. The piscina, which was found a mere fragment, has been placed on a column and base in the south aisle of the chancel, just as it originally stood. The floor is of solid oak. The east end window has cost about 300l., and is the gift of Mrs. Jenkins, Gelly. The west window has been placed by the parishioners in remembrance of the generosity of Miss Olive Talbot. The architect was Mr. G. E. Halliday, and the contractor, Mr. W. Clarke, of Llandaff.

CHURCH HALL, FAIRFIELD, LANCASHIRE.—The memorial stone of the new church hall in connexion with St. John the Divine, Fairfield, was laid on the 4th inst. The total cost of the site, building, and furnishing will be about 2,500l. The architect is Mr. Charles E. Deacon, and the contractors are Messrs. Raffle & Campbell.

NEW BUILDINGS, CAMBRIDGE SANATORIUM.—At the invitation of the Chairman of the Cambridge Sanatorium Committee (Councillor T. Hyde Hunt), many members of the Cambridge Town Council assembled at the Sanatorium, Mill-road, Romsey Town, on the 3rd inst., to inspect the wards and the new administrative buildings. The unoccupied wards were first visited, and the plan on which they are built was explained by Dr. Annington, the Medical Officer of Health. Each of the wards accommodates eight beds and two cots. From the nurses' rooms a full view of the interior of the wards can be obtained. The new administrative building, has been erected from the Borough Surveyor's plans by Messrs. Coulson & Lofts, for the sum of 1,368l. It has three entrances, and consists of a dining-room, bedrooms for matron, four nurses and servants, matron's sitting-room, bath-room, kitchen, scullery, larder, pantry, store-room, coal-places, and wood-store. The corridor which runs through the building is lighted by a lantern in the centre. The building is built with white bricks, and the walls are distempered terra-cotta. The whole of the paint-

ing inside is varnished. The mantelpieces are built with iron and stone, hot and cold water are laid on in several of the rooms, and the whole building is lighted with gas. The foundation of the building is in cement.

PROPOSED PUBLIC HALL FOR WITHAM, ESSEX.—According to the *Essex County Chronicle*, Mr. E. J. Dampier, architect, of Colchester, acting upon instructions from the directors of the Public Hall Company, Witham, has prepared plans for a proposed hall to be erected on a site in the Collingwood-road, to the north of the water-tower. The size of the hall will be 60 ft. by 40 ft. In front there will be a verandah with a balcony. On either side of the main entrance there will be a cloakroom and a ticket office, over which a gallery will be built to accommodate 130 people. The floor of the hall will seat 470. At the back it is proposed to build a committee-room 38 ft. by 20 ft., and this will be used for small meetings. There will also be dressing-rooms and lavatories, and a kitchen with a copper, &c. Space is reserved on the site for the erection of other buildings at any time.

WESLEYAN CHAPEL AND SCHOOLS, WEST AUCKLAND, DURHAM.—New Wesleyan Chapel and Schools have just been erected at West Auckland. The new buildings are constructed of stone. On the north side there is a transept divided from the chapel by means of Stone's patent swivel partition, whereby the whole of the school can be added to the chapel, thus giving 150 to 200 extra sittings, on any special occasion. This portion of the building has a separate entrance porch. The internal fittings are carried out in pitch-pine. The windows are filled in with diamond quarry glass, the east and west windows being executed in cathedral lead glazing. The heating is by hot water on the low pressure system. These buildings comprise a chapel to seat 250 adults, Sunday-school, minister's vestry, and a room in the basements for tea-meeting purposes. The architect is Mr. J. W. Taylor, of Newcastle-on-Tyne.

RESTORATION OF THE CRYPT OF ST. NICHOLAS' CHURCH, BRISTOL.—According to the *Bristol Times and Mirror*, a dual work is being executed at the Church of St. Nicholas, Bristol, and will be completed in the course of a month. The slice of graveyard on the south side being required for street improvement, the vicar and churchwardens embraced the opportunity of the acquisition of the space by the city to have the crypt of the church renovated. The work is being carried out by Mr. Humphries, under the superintendence of Mr. Saunders. The graveyard has been lowered 8 ft., and cut back to within 3 ft. 9 in. of the church. A stone porch has been erected over the entrance to the crypt, and a dwarf wall, with ornamental iron railings, is constructed on each side. The soil and human remains from the churchyard have been deposited in the crypt, and over them has been put a flooring of concrete and tiles. In the crypt were found several mural and other monuments, which have been restored, and a couple of stone coffins, one bearing date 1371. An ancient fire-engine had also been preserved in the gloomy vault. The groining and bosses of the ancient part of the crypt have been restored, and the spaces between them have been filled in with stucco of a warm tint. The new portion of the crypt is being converted into a choir vestry, for which purpose the south wall has been pierced and windows inserted. The floor is to be laid with wood blocks, and the apartment will be fitted up for the convenience of those who hereafter use it. A flight of stone steps leads from the entrance to the crypt at the south-east corner. When completed the renovated crypt will be a most interesting feature of one of our old city churches.

TECHNICAL SCHOOL FOR WIDNES.—On Tuesday the Widnes Town Council authorised the expenditure of 10,765l. in erecting a technical school, to include the free library, according to the plans of Messrs. Woodhouse & Willoughby, architects, of Manchester. The original estimate was 6,000l.—*Manchester Guardian*.

SCHOOL BUILDINGS, NEW BRIGHTON, CHESHIRE.—On Monday last the foundation-stone was laid of new infant and boys' schools in Egerton-street, New Brighton, connected with the parish church. The building when completed will accommodate from 120 to 150 children, and the cost of erection will amount to 700l. Mr. C. F. Allender, Liverpool, is the architect, and Mr. W. Paterson, Liverpool, is the builder.

SANITARY AND ENGINEERING NEWS.

SEWERAGE, WEYBRIDGE AND OATLANDS.—The Chertsey Rural Sanitary Authority, at a meeting on April 25, accepted the following tenders for the sewerage and sewage disposal works for Weybridge and Oatlands.—Mr. John Jackson, The Laurels, Broadway, Plaistow, London, E., for the general contract for the construction of sewers, pumping-station, and precipitation tanks (26,500l.); The Stanton Ironworks Co., Ltd., near Nottingham, for the supply of iron pipes, special castings, and other ironwork in connexion with the above works (6,710l. 11s. 8d.); Messrs. Davey, Paxman & Co., Colchester, for the boilers and pumping-engines (2,900l.); Messrs. Manlove, Alliott & Co., Ltd.,

Nottingham, for the mixing and pressing machinery at the disposal works (1,514l. 2s.). The total amount of the contracts is therefore 37,624l. 13s. 8d. There are thirteen and a half miles of earthwork, seven and a half miles of iron pipe sewers, and five and three-quarter miles of iron pumping main and pipes conveying flushing water. The whole of the sewage will gravitate to one pumping-station on the banks of the Thames, and the sewage will be pumped a distance of about three miles, to a site of twenty-eight-and-a-half acres, where it will be purified by precipitation in tanks, followed by land filtration. The sewage mud will be pressed. The scheme includes pumping 30,000 gallons of water a day, and distributing it to automatic flushing chambers at the heads of all the sewers. The district is immediately above the London Water Companies' intakes, and therefore the most modern system of sewage disposal was required. Hassall's pipes will be used in some waterlogged streets; and iron pipes in others. The works are ordered to proceed immediately. Mr. W. H. Radford, of Nottingham, is the engineer to the works.

PROPOSED NEW OUTFALL SEWER, GRANGE-TOWN, CARDIFF.—A meeting of the Cardiff Public Works Committee was held on the 27th ult. at the Town Hall, Cardiff. Mr. Harpur, the Borough Engineer, submitted completed plans, drawings, and estimates of the proposed new outfall sewer at Grange-town at an estimated cost of 70,000l. The sewer will be capable of extension from time to time to meet the requirements of the whole of the western district. The main trunk reservoir or sewer is to be 12 ft. in diameter. The Committee approved of the plans, and made application to the Local Government Board to borrow the money.

SEWERAGE AND SEWAGE DISPOSAL, EATON AND ECCLESTON.—We are informed that Mr. Albert Wolheim, acting under instructions from the Hon. Cecil T. Parker, agent to the Duke of Westminster, has prepared plans for a scheme of sewerage and sewage disposal at Eaton and Ecclestone. This work will be commenced immediately.

SEWERAGE WORKS, DEVONPORT.—A Local Government Board inquiry was held at Devonport Guildhall on the 4th inst. by Colonel J. Orde Hasted, R.E., into the application of the Council to borrow 23,000l. for new sewerage works in the Morice Town district.—The Town Clerk, Mr. J. J. E. Venning, explained that the district of Morice Town was thickly populated, and there was not much land available for new buildings. The houses, chiefly occupied by the artisan class, had been drained hitherto by cross-drains, connected with very imperfect sewers, constructed many years ago. Within the last twenty years considerable additions had been made to the buildings in the district, and it became absolutely necessary to provide properly constructed sewers. In laying down a new system of sewers, it would be necessary to rectify the system of house drainage. There were two outfalls. The chief one was by means of a large iron pipe at the southern end of Keyham-yard, and carried out into deep water. One part of the sewer discharged at the head of Moon Cove. It was proposed to bring the drainage of the new district into that outfall. Another outfall at present discharged into Hamoaze, near Pottery Quay, and it was proposed to extend it 40 ft. into deep water.—The Borough Surveyor, Mr. J. F. Burns, then explained in detail the works it was proposed to carry out. In some cases in Albert road, after a heavy flood, the sewers had broken away and the contents of the houses with them. Temporary repairs had been made, but it had not got so bad that nothing short of re-sewering the whole district would answer the purpose. In this district he had very difficult gradients to deal with. The old drains would be filled up with the rubble excavated for the new sewers.—The Inspector then considered a further application to borrow 550l. for the improvement of the eastern entrance to Fort street.—The inquiry closed with a vote of thanks to the Inspector, on the proposition of the Mayor, after which Colonel Hasted visited the districts proposed to be dealt with.

STAINED GLASS AND DECORATION.

WINDOWS, ARMYN CHURCH, GOOLE.—Stained glass has been inserted into the two chancel windows of Armin Church, Goole, in memory of the late Mr. Wells, of Booth Ferry House. The windows are the gift of her children. The parishioners and friends have also filled one of the nave windows with stained glass illustrating the Resurrection, and Old Lord's Charge to St. Peter. The work has been carried out by Messrs. Powell Brothers, of Leeds.

MEMORIAL WINDOW.—TROSSACHS PARISH CHURCH.—A large three-light window, occupying the east end of Trossachs Parish Church, has just been unveiled. It is placed in the church in memory of the late Mr. Alexander Dunsmair, Glenbrach, Callander. The subjects selected are three illustrating the good Samaritan, with the figure of Christ occupying the upper portion of the light. The window is from the studios of Messrs. Ballantyne & Gardner, Edinburgh.

WINDOW, ROBERTSON MEMORIAL CHURCH, EDINBURGH.—A two-light stained glass window has been placed in this church. The subjects selected are two scenes from the life of Timothy. The win-

down is presented by Mr. A. B. Armitage, treasurer of the church, and occupies a position in the south transept. Messrs. Ballantine & Gardner, Edinburgh, supplied the window.

FOREIGN AND COLONIAL.

FRANCE.—The Municipal Council of Paris has postponed till December the removal of the artistic treasures of the city to the pavilion on the Champs Elysées, and up to that date the public can again visit the galleries of the Museum of Autel, which had been temporarily closed.—The subject in architecture set for the Prix de Rome, is Un Palais de Sociétés Savantes. The other subjects are, for painting, Samson at the Mill; for sculpture, "The Age of Gold" (period of Hesiod) for medallions, Orpheus charming Cerberus to sleep. The Académie des Beaux-Arts has classified the candidates for the post left vacant by the death of Cabat in the following order of precedence: MM. Benjamin Constant, Aimé Morot, Roybet, Joseph Blanc, de Curzon, Harpignies, and Maillart. The election is to take place to-day (Saturday). The Académie has elected Mr. A. Waterhouse, R.A., a foreign corresponding member in the section of architecture.—

The Government has just published, in the *Journal Officiel*, the programme of the competition for the rebuilding of the Opéra Comique, and fixed July 9 as the day for sending in designs, which will be exhibited both before and after the award. The author of the design classed first will have three months in which to prepare a final set of plans with an estimate of the cost, which is not to exceed £20,000 francs. The ground on which the new building is to stand is a rectangle about fifty-two metres long and thirty wide.—In August next the new bridge over the Marne at Bonneuil is to be opened.—On July 1 the new railway from Limoges to Brive (via Uzerche) will be opened.—Next month the new Salon of the Union Libérale des Artistes Français is to be opened in the Central Dome of the Champ de Mars.—M. Honelle, director of the excavations undertaken at Delphi by the French School at Athens, has telegraphed to the Minister of Public Instruction the discovery of more than one hundred inscriptions.—The official opening of the Port of Antwerp is fixed for May 28.—An art exhibition is to be opened at Arras on June 1.—The art exhibition at Auxerre will be open from July 20 to July 30.—The art exhibition at Angoulême, which opened on the 9th, is to close on July 9.

BERLIN.—Owing to the alterations of the high-water level of the river Spree, the terrace at the back of the Royal Castle has had to be rebuilt. The new terrace, which has 4,200 square metres, 120 metres, will now be an important architectural feature to the rear facade of the castle. It will show careful architectural treatment, the materials used being granite and bronze. Two landing places have been arranged for the royal flotilla.—Much difficulty is apparently being experienced with the emotions of the old "Don". After the several unsuccessful attempts at blowing up the building, the block collapsed from after effects of the shocks, but in such a way that the old materials are so tightly wedged together that it seems nearly impossible to loosen them or break them up by manual labour. The laying of the foundations for the new theatre will have to be postponed, and it seems likely that the Emperor William's commands as to the date of consecration will be obeyed.—Owing to structural alterations in the Royal Theatre, the company had to migrate to a private establishment known as the "New Theatre." The public soon noticed that the acting of the company on the smaller stage was far better than in the larger one, and the local press is now calling for a new Court Theatre for dramas or comedies with small casts, whilst our technical contemporaries comment on the dimensions of play-houses in general. We hear that the Royal Theatrical Office will probably lease the "New Theatre" for some time before deciding as to building the new play-house asked for. Prior to building a third theatre it would surely be better to rebuild the hideous and dangerous Royal Opera House.—There has been much feeling in Berlin as to the opening of the Royal Museums and Picture Galleries on Sunday afternoons. The Government has now promised to keep these places open as desired, and has this month started with the collections of the National Gallery, which can be visited from noon until 6 p.m. on the day in question.—The International Art Exhibition is to be opened with much ceremony on the 14th inst. We understand that the exhibition will be remarkable for a fine show of monumental sculpture.

MISCELLANEOUS.

THE IMPERIAL INSTITUTE.—The opening of the Imperial Institute by the Queen has been the event of the week in London. We have already on various occasions (notably in our number for June 25, 1892) devoted so much space to the description and illustration of this building that it is not necessary to add anything now. We may mention, however, that the following illustrations of the building have appeared in the *Builder* on the dates named:—Mr. Colcott's design, as submitted

in competition, July 2, 1887; plans and detail of facade, July 9, 1887; large perspective view, January 5, 1889; and a large coloured view of the central tower, June 18, 1892.

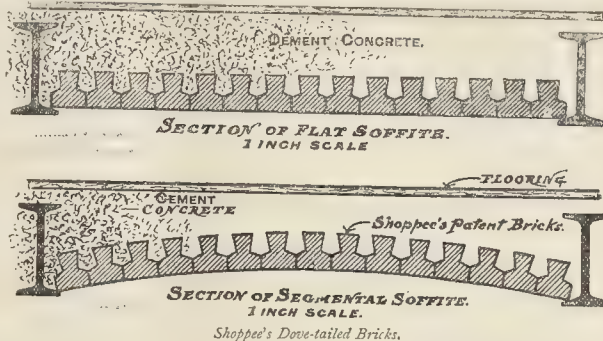
DE FOE'S COTTAGE, Tooting.—De Foe's cottage on the Mitcham-road, Tooting, standing in 2½ acres of ground, is to be sold. It is, we believe, the second of the two houses occupied by him when, just before the Revolution, he removed to Tooting. There he formed a congregation of Dissenters, with Joshua Oldfield, D.D., as their first pastor. The chapel was built in 1765-6, and in 1875 the Memorial Manse was erected. A cut of the house, and of some relics from the old meeting house, is given in Mr. William Lee's "Daniel Defoe," Vol. I. (1869). That work, too, contains an interesting account of a visit made by its author, in 1860, to Tilbury, upon the completion of the London, Tilbury and Southend Railway. There he found a deep trench had been cut through a plot of land on the west side of the station. This trench, made to drain the Company's estate and the railway servants' garden plots, had laid open the whole of De Foe's brick and pantile works (1668-1703), showing the drying floors, claypits, kiln foundations, and so on.

SHOPPEE'S DOVETAIL BRICKS.—These bricks are intended both to lighten the weight of bricks, where it is desired to use brick for the underside of

necessity for some such improvement, and we recommend it to the notice of builders and others who are in the habit of using the ordinary loose trestles.

CAPITAL AND LABOUR.

THE CARDIFF BUILDING STRIKE.—The announcement, says the *Western Mail*, that the Cardiff building strike has been finally disposed of, is, unfortunately, only partially true. The masons, it is true, have declared the strike at an end. The Master Builders' Association, however, will not concede the old rules, and in their last ultimatum specified that they would not agree to the retention of the note prohibiting piecework and sub-contracting, and that the rule relating to the importation of worked stone should read—"That no worked stone be brought into the town for the purpose of being used on contract work, excepting landers, steps, plain and chamfered coping, and Yorkshire paving; also granite and marble," instead of the old one—"That no worked stone be brought into the town, excepting landers, square steps, and Yorkshire paving." The advance in wages of 4d. per hour was mutually agreed upon some time ago, there being 3d. extra for fixers.

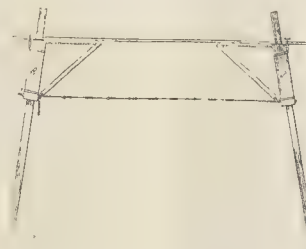


Shoppee's Dove-tailed Bricks.

concrete flooring, and give a better bond into the concrete. The bond is of the same value, also if they are used as facing-bricks for vertical walls. The accompanying cuts show their use.

HOUGHTON'S PATENT WINDOW.—This is one of the innumerable inventions for turning sash windows for cleaning, which has some special merits of its own. It is very simple in its action, does not rob the window opening of any light, or increase the substance of woodwork in the sashes, and the stiles are not weakened by cutting down or jointing. By turning a bolt which works into the sash-frame, the sash can be raised sufficiently to clean the lower beading, and is then swung inward on a pivot. A thin metal strut may be used to support a heavy sash in its place while cleaning; the objection to this, however, is that the strut, which when not used fits into a slit in the frame, must rather spoil the appearance of the frame, as it cannot entirely escape observation. Instead of this, however, a hook and suspending cord may be used, which can be applied to each window in turn. The arrangement can be applied, without much trouble or cost to existing sashes.

AYLING'S PORTABLE SCAFFOLD.—This is to take the place of the high trestles often used by painters, with a loose board put across them. It consists of four round legs and two frames, which slide up and down the legs, and can be fixed at any point by means of set screws on the outsides of the frames. The planks are fixed to the frames, and



the whole thing is safe. It can be used on a staircase or on ground which is not level, as each of the legs can be raised or lowered separately. As we not long since saw a bad accident from the fall of a board from two of the ordinary high trestles, by which an unfortunate painter came down on the pavement and broke his thigh, we have been practically impressed with the

MEETINGS.

FRIDAY, MAY 12.

Architectural Association.—Mr. E. Guy Dawber on "The Stone Buildings of the Cotswolds." 7.30 p.m.

SATURDAY, MAY 13.

St. Paul's Ecclesiastical Society.—Visit to the Church of St. Bartholomew the Great, Smithfield. 3.30 p.m.

MONDAY, MAY 15.

Royal Institute of British Architects.—Professor G. Baldwin Brown, M.A., on "How to use Vitruvius." 8 p.m.

Society of Arts (Cantor Lectures).—Mr. C. Harrison Townsend on "Mosaic: its History and Practice." 11. 8 p.m.

TUESDAY, MAY 16.

Institution of Civil Engineers.—Mr. C. J. More on "Weir-Raising in the River Thames." 8 p.m.

Royal Statistical Society.—Mr. H. Higgs on "Workmen's Budgets." 7.45 p.m.

WEDNESDAY, MAY 17.

Architectural Association.—Members' Soirée, to be held at the Westminster Town Hall. 7.45 p.m.

Carpenters' Company, Carpenters' Hall (Lectures on Carpentry and Joinery).—Mr. Thomas Blashill on "Doors, Windows, and Ornamental Joinery." 8 p.m.

British Archaeological Association.—Mr. E. P. Loftus Brock, F.S.A., on "The Excavation of the Site of Winchester Abbey." 8 p.m.

Society of Arts.—Mr. F. E. Ives on "Composite Heliochrony." 8 p.m.

Royal Meteorological Society.—Three papers to be read. 7 p.m.

Society of Biblical Archaeology.—4.30 p.m.

THURSDAY, MAY 18.

Society of Antiquaries.—8.30 p.m.

SATURDAY, MAY 20.

Incorporated Association of Municipal and County Engineers.—Midland Counties District Meeting, to be held at the New Waterworks of the Long Eaton Local Board, Stanton-by-Bridge, near Derby.

Glasgow Architectural Association.—Visit to Hawkhead Asylum.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

11,593.—WALL VENTILATORS: F. Ballard.—This improved wall ventilator is composed of two sections of galvanised iron tube. The end of the lower one is perforated, and the upper one has a damper, and on the top is firmly arranged a portable wooden shelf, also perforated. This is draped with passmenterie or leather, so as to conceal the upper section, which is inside the room, and it is studded with brass or gilt studs. The latter is firmly secured to the wall by slight ironwork, the lower section being laid in the brickwork with cement. This invention is particularly applicable for ball or public rooms, also dining, drawing, bedrooms, stair-cases, or over doors.

17,344.—PARQUET FLOORING: H. Siechelschundt.—The object of this invention is to construct the tesserae from sheet metal, or a similar rigid material, so that they shall

678, J. Weil and others, Non-bursting Water-pipe and Unbreakable Gas-pipe, 3,198, F. Stokes and others, Chimney-pot, Cow, or Ventilator, 5,711, R. Strong and A. Gordon, Artificial Stone, 6,315, R. Froude, Sash fastener, 6,414, G. Henn, Window-sash-fasteners, 7,095, B. & A. Dicksee, Flushing Water-closets, 7,148, C. Keithworth and R. Robson, Fire-grates, 7,155, D. Heppel, Window-sash-frames, 7,425, F. Willis, Fire-proof Floors, 7,447, J. Sellars, Applying Cement, or Anagalous.

Edwards	£402	Sanders & Son	£415
Heath	475	Watts & Co.....	409
W. Helling	467		

LEITCH—Accepted for the erection of a new public house, &c., on the Clarendon Estate for the Bristol, L., & G. Co., Ltd. Mr. H. H. L. Mitchell, surveyor, 25, Moorgate-street, E.C. 4.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

LONDON—For alterations to the "Two Brewers" public house, Goswell-road, E.C. 1, for Mr. J. Bailey, architect.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

LONDON—For erecting a laundry centre in connexion with the St. Paul's-road School, Bow Common, and for other works, for the School Board for London. Mr. T. J. Bailey, architect.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

LONDON—For pulling down and rebuilding the "Police Regal" public house, Goswell-road, E.C. 1, for Mr. W. M. Bruton, architect.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

LONDON—For alterations to the "Two Brewers" public house, Goswell-road, E.C. 1, for Mr. J. Bailey, architect.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

LONDON—For building new skittle-alley at the "Olive Branch" public house, Southampton-street, Strand, for Mr. W. M. Bruton, architect.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

LONDON—Accepted for alterations to dining-rooms, Broad-street, Stratford, E., for Mr. Smith. Mr. W. M. Bruton, architect.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

LONDON—For alterations to the "Adam and Eve" public house, High-street, Hoxton, for Mr. James Hall. Mr. W. M. Bruton, architect.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

LONDON—Accepted for gasfittings to the "Crystal" public house, Rotherhithe, for Mr. W. M. Bruton, architect.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

MATLOCK BRIDGE—For the erection of police-buildings, lock-up, &c., for the Standing Joint Committee of the Derbyshire County Council. Mr. J. Somes Story, County Surveyor, Matlock, Derby.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

MORPETH—Accepted for the erection of twenty-eight houses, Tynemouth, for the Tynemouth and Bedlington Urban Sanitary and Operative Society, Limited. Messrs. Boulds & Hardy, architects, 25, Abchurch-lane, E.C. 4.

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Killingback	1,430	0
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Rogers	1,430	0

ROCHDALE—Accepted at per schedule of prices for the sewerage works required in Salford-street, Rochdale, for the Corporation of Rochdale. Mr. S. S. Platt, Borough Surveyor, Town Hall, Rochdale.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

SOUTHAMPTON—Accepted for the enlargement of infant school buildings at Pear Tree Green, for the Southampton, for the St. Mary's Extra School Board. Messrs. W. H. Mitchell, Son, & Gutteridge, architects, Southampton.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

SUTTON COLDFIELD—For sewerage (in part) levelling, kerbs, &c., for the Corporation of Sutton Coldfield, for the Corporation of Sutton Coldfield. Mr. C. F. Marston, C.E., Sutton Coldfield.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
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Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

SWALEY—Accepted for the erection of seventeen houses at Swanley Junction, Kent. Mr. St. Pierre Harris, architect, and surveyor, 1, Basinghall-street, E.C. 4.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

WAKEFIELD—For the construction of a main sewerage line, Crofton Village; and another (360 yards) at Crofton Lane End, for the Union Rural Sanitary Authority. Mr. Stanley Masle, C.E., Telly House, Kirkgate, Wakefield.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

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Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

WANSTEAD (Essex)—For making-up part of Spratt Hall-road for the Local Board. Mr. John T. Bressy, Surveyor, Local Board Offices, Wanstead.

Leitch & Co.	1,430	0
Killingback	1,430	0
Crown	1,430	0
Pell & Sons	1,430	0
Rogers	1,430	0

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The Builder.

VOL. LXIV. NO. 2561.

MAY 20, 1893.

ILLUSTRATIONS.

Ingle-Nook and Decoration of Billiard Room, Bungay.—Mr. Bernard Smith, Architect	Double-Page Photo-Litho.
Alterations, Itton Court, Mon.—Mr. E. Guy Dawber, Architect	Double-Page Photo-Litho.
Stone Buildings in the Cotswolds: Illustrations to Mr. E. Guy Dawber's Paper	Double-Page Ink-Photo.
House and Studio, "Bournemead," Bushey.—Mr. J. M. Brydon, Architect	Single-Page Photo-Litho.
Village Hall, Forest Row.—Mr. J. M. Brydon, Architect	Single-Page Photo-Litho.

Blocks in Text.

Tomb of George Villiers, Duke of Buckingham, in the Chapel of St. Nicholas, Westminster Abbey.—Drawn by Mr. F. D. Bedford	PAGE 388
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French Art of the Year.



It is curious to notice how completely the two French exhibitions, though larger in scale than ours, run on the same comparative lines. As with us the Royal Academy represents the more multifarious and popular exhibition, and the New Gallery that of a smaller and more select minority, so in Paris it is with the old Salon and the new. The former is an enormous collection of pictures representing no predominant aim, and appealing in a great measure to popular tastes; the latter a smaller collection representing a more definite theory of art, and appealing on the whole to the more cultivated and thoughtful section of the public. It seems therefore that there is in both countries some kind of public demand for these two types of exhibition, and that their parallel existence in the two capitals is the result of something more than a mere accident of circumstance. One very important distinction between the two exhibitions in Paris is, that while in the larger one the works of artists with almost all kinds of different aims are strung up pell-mell, with no attempt at grouping either in regard to artist or subject, or to any other consideration than the relative sizes of the pictures and their most convenient arrangement on the walls, in the new Salon the works of separate artists are all grouped together, so that one can study each painter's work collectively and form a distinct idea as to his method and object. In the old Salon, with its immense areas of wall space to be covered, any such grouping would be all but impossible; while this attention to grouping in the new Salon is the result of something more than a mere consideration of convenience or symmetry; it is the outward visible sign of the view which regards a painting as the expression of the mind and method of

the artist rather than the mere illustration of a scene or an incident.

Architecture at the new Salon, which we are bound to notice first in order, is however a very unimportant section of the exhibition, and the formal announcement that architecture was to be represented this year at the Champ de Mars has resulted in nothing more than a small room-full of drawings containing nothing of the first order of interest. There are, however, one or two unusual and characteristic exhibits. Among these may be specially mentioned the collection of drawings, models, &c., of which M. Baudot, in collaboration with MM. Delaherche, Delon, and Guérard, has endeavoured to give a pretty complete illustration of the design and decorative treatment of a "Petite Habitation Parisienne," by means of drawings and photographs of the house, along with pieces of executed ornamental work belonging to it—a door with panels decorated in burnt charcoal on the plain surface of the wood; a stained glass window, a chimney-piece, pieces of exterior decoration in stoneware (rather too ponderous in detail), and interior decorative faience. This is a new and praiseworthy innovation in the illustration of architecture in exhibitions, worth attention and imitation. M. Paul Gout also goes a little out of the customary path in showing not only detail drawings of fragments of his "Lycée Racine," but a model also of the iron construction supporting the façade of the gymnasium building above an open stage on the ground story. M. Benouville's "Maison de Campagne" shows a quieter taste and less of the "spiky picturesque" than is usual in this class of French designs. M. Cuvillier's "Château de Montmorency (Seine-et-Oise)" is we suppose a new mansion, as we know of no ancient château of that name, though the drawings look rather like an imitation of a French seventeenth-century château; this is a building of considerable importance and some merit. His design for a "façade en céramique," called a "Maison de Rapport," is a very clever and pleasing design for the treatment of a street façade in coloured tiles combined with brickwork. M. Guillemonat's

various bits of too fanciful decorative design have a good deal of ability; that for the gate of the furniture department in a Musée des Arts Décoratifs, though sadly wanting in restraint, is really clever in the way in which it conveys at once the idea that it is an entry to a furniture gallery; at least, if we knew there was a furniture gallery in the supposed museum, we should certainly go that gate for it. His idea for a monument to Columbus, built out in the sea, is at any rate by no means commonplace. Then we have also some drawings by M. Boileau called "Études d'Architecture Nouvelle," which seems to represent a glorified greenhouse style, and of which the less said the better. Nothing in the room is more interesting than the illustrative drawings by M. Vincent of the Château de Dampierre-sur-Bouton, a delightful old building with a double loggia with thick and lumpy cylindrical piers, looking like a Gothic conception of the Classic column, with arch-mouldings growing out of them half way up, and circular stunted angle-towers with walls much battered, and high conical roofs which look like a huge extinguisher on a short remnant of candle; indeed, the first glance at these suggests the idea that the ground has been raised and that only half the turret remains above it, though the rest of the façade contradicts this idea. On the whole, though, as we have said, there is nothing of first-rate interest, the quality of the small collection of architectural exhibits stands in very fair relation to its quantity.

The class of "Objets d'Art," which was first introduced as a novelty in the Champ de Mars Salon—an intimation that there was something else in art besides pictures and statues, and which at first was a very small and feeble show, has developed a little more, and now includes a certain amount of good work, mostly arranged in the gallery round the staircase hall. Pewter work seems to be occupying a good deal of attention, and is treated not by any means as a base material for plain objects of a cottage style, but as the vehicle for very refined and graceful design and decoration, as witness the work of M. Charpentier, the vase with sirens by M.

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Engrand, and the case of "Mes Étais" by M. Desbois. In one of these latter an effective and delicate ornamentation is produced by a merely indented (rather than incised) line; a method exactly in keeping with the nature of the material. The collection includes various statuettes, enamels, furniture, &c.; among the furniture a curious carved chair by M. Carabin, which rests on nude figures doubled up beneath and behind it, while the arms consist of carved cats, characteristically placed facing opposite ways, one to the back, one to the front. One of the most remarkable pieces of workmanship is the "Panneau d'Orfèvrerie" by M. Vernier, belonging to the Department of Public Instruction, and symbolising "L'Orfèvrerie Française," with a gilt figure in bas-relief in the centre and a number of emblems around the frame. A wrought iron knocker, by M. Damp, in the Sculpture Court, is a vigorous bit of work, but not sufficiently like a knocker, a class of article in which many mistakes in design have been made. The striking portion of a knocker should always appear as if specially suited, in idea and construction, for knocking, which it often is not. The Sculpture Court contains little that is of much value, except a fine crouching figure of Eve by M. Injalbert, and two spirited bas-reliefs, "Suites des Poèmes Idylliques," by the same hand.

But the paintings contain much that is of high interest. It is a satisfaction to find Mr. Burne Jones represented, in a central position, by three of his best works, "Perseus and the Graia," a well-known portrait of a child, and "The Depths of the Sea," which latter work appears to excite much admiration. Mr. H. W. B. Davis too is well represented by four very good works, if not of his very best. His landscapes, in their delicate and finished workmanship, contrast curiously with the prevailing tone and manner of French landscape; on the other hand one cannot but recognise in some of the more broadly (might we say coarsely?) executed French landscapes, as in M. Courtens' "Soleil de Septembre" and Mr. Eliot's "Midi sur l'Eau," a reality and intensity of sunlight effect which rather kills the English painter's less bold workmanship.

The large decorative work by M. Puvis de Chavannes, which has always been a leading incident at the Champ de Mars Salon, is this year a painting representing "Hommage de Victor Hugo à la Ville de Paris." The picture, in the artist's usual flat style and faint key of colour, represents Paris as a draped figure seated under a canopy of classic architecture, and attended by three other female figures standing behind and holding a crown over her, while the poet, in ample and finely designed drapery, approaches her, supported in his turn by angels blowing trumpets in the air behind him. Some other figures behind the Paris group complete the composition, which is dignified and large in style, but not so attractive as some of the artist's other decorative compositions, into which the element of landscape enters more or less. It is not stated for what position the picture is intended. Among other of the larger works at the Champ de Mars we may recognise the prevalence of an effort to use the nude figure not as a merely realistic study, but as an element of poetic expression in compositions which are treated in a conventional tone and manner entirely removed from actual nature. A prominent example of this is M. Aublet's "Juillet," a scene in which woods and water and figures are treated in low and almost flat tints, and which might be called an idyllic vision, unfortunately marred by the commonplace head of the central seated figure. M. Boutet de Monvel in the same spirit treats "La Jeunesse de Diane," a side elevation (one might almost call it) of a youthful nude figure running across a background of conventionally coloured foliage; the pinkish tints of the flesh are conventional too, and the whole work suggests a cartoon for tapestry, in which medium it might be a fine and effective piece of decora-

tion. Those who tire of these rather shadowy and dream-like nudes may find compensation in M. Courtois' "Inquietude Humaine," which does not exactly explain its title, but is a fine and monumental-looking group of a noble-looking man, standing and as if looking away to the distance, and a woman seated at his feet; a picture which in its fine and carefully-studied composition recalls the old "Classic divinity" type of French subject, but with a more refined conventionalism of execution, midway between the purely conventional and the realistic. M. Dagnan-Bouveret treats realistic types of modern figures with a painter's conventionalism in his group of peasants seated in a cleared space "Dans le Forêt," a picture in which the figures and costume are entirely realistic but are seen, as it were, through a veil which reduces the colouring to demi-tints, and renders the work an impression (in the best sense) rather than an actual scene: the expression and character of the heads is most carefully studied. M. Frappa's "Le Rhône et la Saône," in which figures of a peasant man and peasant woman disembark from their boats and meet on the last point of land dividing the two rivers, with a kind of "glad-we-have-met" manner, is a fair though rather amusing specimen of the style of semi-allegory so popular in France for public buildings decoration; it is intended for the new Préfecture du Rhône. M. Max Leenhardt's large painting for the Salle des Fêtes of the University of Montpellier, representing the celebration of the sixth centenary of the "Faculté de Médecine" of Montpellier in 1890, is a representation of a real scene treated decoratively, adequate to its purpose but not very interesting.

M. Carolus-Duran brings us to the very furthest extreme from decorative or ideal painting, and it is difficult to understand his place in the Champ de Mars Salon, with the general tendencies of which he seems completely out of sympathy. His portraits are hardly as impressive as usual this year, chiefly because he has not been very fortunate in his sitters (as a French catalogue never gives the name of the sitter, there is no personality in the remark). The costumes of "Mme. C. B." and "Mme. C. D., the latter a kind of claret-coloured dress not very grateful to the eye as a piece of colour, are treated with great effect; the most pleasing picture of the set is the seated portrait of "Mme. la Comtesse de P." in a dark velvet dress with a grey-lined cloak. There is a portrait of M. Guillaume, the architect to the Louvre, rather hardly painted though a good likeness; but there is nothing this year to rival one or two of the painter's brilliant performances of previous years. Among other portrait painters there is M. Eugène Carrière, who paints portraits with the outlines fading off in a mist after the manner of M. Henner's figures; M. Blanche contributes a good set of portraits, including a charming half-length called "Ketty" (Kitty?); M. Courtois, whose principal work we have already referred to, sends a remarkably able portrait, "Mrs. Kreissmann," a lady with her back to a door and her small head full of character and expression. M. Baud-Bovy's "Le Jeune Homme" may perhaps be classed among portraits, but it is something more—a kind of type of thoughtful youth, meditating on life. M. Rixens and M. Gervex also contribute well to portraiture.

The Champ de Mars Salon has its eccentricities, though less of them than formerly; among them M. Frédéric's "Salutation Angélique" (a kind of modernised Botticelli) and his rather repulsive studies of ugly half-veiled nudes under romantic names; and Mr. Dannat's studies of Spanish heads and figures, clever but extravagant and ugly to a degree. Another French-American artist, Mr. Harrison, shows very well this year with some sea-side moonlight studies, and also three "études de nu," small figures in landscape, which are among the cleverest things of their kind in the exhibition. M. Kaemmerer's study of an ivy-cinctured Roman

youth looks like an imitation of Mr. Tadmara, and a very clever one. There are few landscapes which stand out as specially fine, beyond those we have mentioned; but among the best are to be recognised those of M. Barau, M. Damoye (small works in a broad free style), M. Firmin-Girard; M. Mesdag's "En Danger," a really fine sea piece; those of M. Menod; M. Muenier—his large picture of "Villefranche au Crépuscule" has been bought by the State, but is not a very remarkable work. A large interior of Notre Dame by M. Helleu may be noted as an architectural picture, but the architecture is not well treated.

Coming to the vast array of pictures in the old Salon at the Palais de l'Industrie, we can but attempt to give a few indications of the leading works and the general character of the exhibition. In M. Roybet's picture of "Charles le Téméraire à Nesles," in the vestibule, we are at once confronted with one radical distinction between the prevalent aims of the old and new Salons. For this is nothing more or less than a cabinet picture magnified to an enormous size; a *tour de force* of sheer realism of a very commonplace order, in spite of its glaring brilliancy of execution. M. Munkacsy's still larger canvas, "Arpad" receiving the homage of the Carpathian tribes (Salle 16), is less flashy in execution than Roybet, but it shows little sense of decorative effect, and is but a piece of cleverly-painted commonplace on a gigantic scale. It is intended for the Hungarian Parliament House, and is in fact a kind of picture very well suited to please popular feeling as a national and patriotic painting. Of other works of the largest scale in the same room, is M. Schommer's picture in commemoration of the visit of the President to Boulogne; the official tours of M. Carnot furnishing a favourite subject to the painters who delight in stupendous canvases. This is a large flatly painted picture of the *plein-air* school, showing the reception of the President by the Municipal authorities, and from a pictorial point of view about as uninteresting as it well could be. A comparatively small *genre* picture by M. Vallet, in the same room, "Grande Marée," a little girl standing on a jetty overlooking a windy sea, is worth the whole of it. Among the large works, one with an idea in it is M. Danger's of Christ walking sadly among the corpses on a battlefield, with the quotation, "This is my commandment, that ye love one another" (30). Unfortunately a fine subject is here spoiled by cold colour and rather hard execution, but it is a picture to be noted. So is M. Chalon's "Hélène Dévastatrice" (30), a colossal painting of Helen of Troy walking amid the carnage and flames of the city which has been ruined for her sake; a picture which again is remarkable rather for a powerful idea than for artistic balance of treatment. In fact, this is one of the most marked distinctions between the old Salon and the new, as between the Royal Academy and the New Gallery—that in the former the subject seems the prominent interest, in the latter the artistic treatment. There are exceptions of course in each case; a brilliant one at the Palais de l'Industrie is M. Henri Martin's "Les Troubadours" (15), a scene in a forest, with two or three red-cloaked Medieval-looking figures on the ground and certain angels hovering above them among the trees, whose figures seem actually to radiate a mild supernatural light. The object here is the effect of light, colour, and texture; the story or meaning is indeed very obscure, but the painter's method is extraordinarily interesting, and the patience with which this large canvas has been gone over, touch by touch, to obtain the desired effect, cannot be too highly appreciated.

M. Bouguereau's "Offrande de l'Amour" (20), charming in its way, looks like a picture of

* We give after each picture, in brackets, the number of the room in which it is hung, as this may be of use in enabling any of our readers who may visit the Salon to find the pictures referred to. The catalogue number of the picture, as every one knows, affords no clue as to where it may be found, the numbers following no order whatever.

Stothard's magnified to life-size, better drawn than Stothard could draw, and even more superficial in style and sentiment; the very type of academical finish and shallowness, executed to perfection in its own way. M. Du Mond makes an effective picture out of the subject of Columbus ridiculed by the Council of Salamanca when explaining his projects to them (38), remarkable for the able study of a number of heads expressing various phases of spite and foolishness; the picture is effectively grouped also. In painful contrast to this dignified historical subject is another large picture "Chez Marseille" (35), showing a number of what the French now call "the Highlife" seated as spectators of a boxing-match, a painting which has nothing whatever to recommend it except the vulgar realism which is one of the blots of a section of modern French painting. The State in its purchases seems rather to favour realistic subjects, but generally those with a moral, as in M. Geoffroy's "La Prière des Humbles" (31), a praiseworthy and serious painting, both in idea and execution. M. Guthertz has attempted the mystical, not without some effect, in his "Le Soir du Sixième Jour" (26), where Adam and Eve kneel in the foreground before a sky and earth crowded with re-joining angels. M. Sinibaldi's "Aurore" (14) is a pretty ideal picture on a large scale, where a troop of idealised maidens in long draperies walk out in procession to greet the morning, which shines with a somewhat *clinquant* effect on the landscape. This is a monumental style of subject which will bear a pretty large canvas. In some other cases one is astonished at the scale on which realistic incidents are painted. M. Princeteau's "Préparatifs du Départ" (15) shows the interior of a cowhouse with two or three oxen standing harnessed, and one couchant in the foreground—painted life-size, and as if with a brush the size of a house-painter's brush; there is a great power about it, but what can be done with it, except as a decoration for an agricultural hall, it is difficult to say. Mr. Smith-Lewis, again (one of the French-Americans), paints "Les Bains de Dinard" (14), a sea-shore scene, with two young women in bathing costumes in the foreground, and an expanse of sea with other bathing groups in the shallow water; it is a really clever picture, full of the look of open air and bright daylight, but the foreground figures are life-size and the whole thing as big as the side of a room. We can fancy some English painter of sea-side scenes making a pretty picture of this kind on a cabinet scale; but why paint such a thing as this on such a scale? It is too large for any private house; it is not monumental or decorative enough in subject for a public building, and it would be curious to know what is the feeling or ambition which drives clever French painters to paint pictures of this kind, absolutely devoid of incident or sentiment, on such an enormous scale. Is it the pure pleasure of "painting big"? No one surely can buy them; at least, we can imagine no possible destination for this one except perhaps the entrance hall of a large "établissement des Bains."

As usual, the Salon is pretty full of what Mr. Stevenson tells us (*vide* "The Wrecker") the French student calls "conscientious nudes," a good many of which hardly justify their existence either by great excellence of execution or by any poetry of conception, but are simply studies, more or less good, sometimes more or less bad, and at times suggesting a sense of the ridiculous in their absolute lack of any logical relation to their title. Who would expect to find "Dans les Dunes" (18) three modern ladies in amicable converse without their clothes? The painting, by M. Berthault, is a good one, if he could only have found a better *raison d'être* for it. M. Henner indeed is a painter of true poems in this class, though in his "Dormeuse" (23), he has exaggerated his trick of "losing the outline" until his figure

almost suggests the idea of being in the process of being dissolved away by some acid. Two other pictures which fully justify themselves are the "Artemis" (12), of M. Wencker (a pupil of Gérôme), a figure in the woods, stooping to put on a sandal, and which is a splendid piece of painting and draughtsmanship; and, in a higher style, M. Leroy's "Une Jeune Fille" (25), a half-length seated and nearly turned away from the spectator, which both in execution and the indefinable sentiment which pervades it, is a real picture in the highest sense of the word, and one of the best things in the vast collection.

In portraiture the Salon can boast one of the grandest works of the year, M. Benjamin-Constant's superb portrait of Lord Dufferin (20), and very fine and interesting too is his other portrait of Lady Hélène Vincent (20), treated as a "panneau décoratif"; the lady is represented as a goddess seated on a throne with a gold shield forming a kind of nimbus behind her head; she faces the spectator, and the upright lines of the throne and the figure are contrasted by the folds of a mantle which is thrown over the throne in an oblique line behind the figure and droops down on one side. This is a new idea in the treatment of portraiture. Among other portraits which we may just name are M. Benner's "Mme. Ch. B." (20), M. Bonnat's two portraits of ladies (20); M. Chartran's "Baron H. de B." (32); M. Clairin's "Mme. Sarah Bernhardt" (36) in the part of Cleopatra; M. Comerre's portrait of a little girl in a long dress (36); M. Debat-Ponsan's "Portrait de Mme. A. R."; and M. Desvallières's "Mme. F. des P." (33), a portrait of unusually spirited treatment, if a little theatrical in action.

Landscape is never the strongest point of the Salon, and tends to run rather into conscientious topographical representation, or careful painting of scenes which have little beauty in themselves. M. Quignon's "Les Sainfoins," (9) for instance, is good work, but a very uninteresting picture. The State has purchased M. Kerdreoret's "Au Mouillage" (33), a quiet good little harbour scene, and M. Simonnet's "Ville d'Avray—Effet de Neige" (12), a good painting, but rather of the topographical order, to which official taste seems to incline. It is difficult to select any from among the landscapes as of special value or beyond the general level, though it must be admitted that the best and truest landscape hardly gets fair play in this immense collection of pictures often of very startling and pronounced colour and subject, and some which produce little effect here might be regarded very differently if seen under less distracting conditions.

We may mention a few other works which should not be passed over: M. Cain's "Napoléon après l'Abdication" (36), which includes part of the Palace of Fontainebleau as an architectural background; M. Calbet's "La Musique" (30), a decorative panel; M. Debat-Ponsan's "Avril" (38), cattle and figures; M. Demarest's "Aux Péris en Mer" (36); M. Guedry's "Une Distribution de Secours" (37); M. J. P. Lauren's "Saint Jean Chrysostom" (21) and "La Petite de Bouchamps" (23); M. Le Roux's "Sedilia" (25), a child in front of the stalls of a cathedral; M. Loir's "Avant l'Embarquement" (19), a good military picture; M. Monginot's "Au Chaud" (17), a remarkable still-life painting; M. Morot's "Rétraite de St. Jean d'Acre" (13); M. Sergeant's "Kleber à l'Assaut de St. Jean d'Acre" (14), perhaps the best battle picture of the year; and M. Eugène Claude's "Chez ma Fruitière" (37), a splendid piece of still-life painting.

Of sculpture we can only say a word; the works are as numerous as usual, but amid the usual high average of French sculpture, there are fewer works than usual which can be selected as of special excellence and interest, and on the whole the year is not one of the best in sculpture. M. Falguière's "Poésie Héroïque" however, which faces the main entrance at the spot usually devoted to his principal work, is in his best

way, and is remarkable not only for the beauty and spirit of the figure but for that air of intellectual distinction and character in the head, in which M. Falguière's ideal figures stand almost alone in modern sculpture. M. Godet's "La Fable et la Vérité," is, after this, one of the most striking and expressive works in the exhibition. There is plenty of fine modelling to be seen, and many works which have their special interest; but we do not find so much as on some former occasions of that intellectual thought embodied in sculpture which is rare enough indeed anywhere, but certainly in general less rare in French sculpture than in that of any other school or country at the present moment.

NOTES.

IT will be a great relief when the disastrous dispute at Hull is finally settled, although a certain feeling of uneasiness must prevail as to the future. This will be due partly to the distrust manifested by the combatants at different stages of the struggle as to the *bona fides* of their opponents; and also to the possibility, always present, of a suspicion that the spirit of the terms of settlement is being evaded should the relations of the disputants again become strained from any cause. Judging by past experience, it cannot be relied upon that an agreement like the following—the letter of which is perfectly explicit—will effectually prevent friction unless distrust is banished. The proposed basis of settlement provides that the British Labour Exchange in Hull be kept open, but that "neither registration at the Exchange, nor membership in any union, shall in itself carry with it either preference or prejudice in regard to employment. It is not for a moment suggested that either party would enter upon this agreement with any intention of evading it. The probability is that any future dispute will turn upon a preference or prejudice having no connexion whatever with membership in either of the rival combinations being alleged, nevertheless to constitute an infringement of the clause just quoted. Once such a position is taken up by either side and resisted by the other, war may be declared again, and for this reason it is most desirable that a properly qualified tribunal should be in existence to which such a dispute may be referred at the outset. Capable and earnest mediators have intervened during the present struggle, but disputants should not be left in uncertainty as to where they should look for impartial arbitration when they have found it impossible to come to terms.

IT appears that both our architectural societies, the Institute and the Association, are suffering from a diminishing attendance at their meetings. The attendance at the last meeting of the Institute was very poor, and it is not very creditable to the members of the Institute, or that proportion who profess to make a practice of attending the meetings, that so able a man as Professor Baldwin Brown should have been left to read a paper on so interesting a subject, the attempt to estimate the genuine value of Vitruvius to the modern architect, to a room with half the benches empty. At the Architectural Association the epidemic of non-attendance appears to have become so severe that special reference is made to it in a recent official circular, and suggestions are invited for remedying this state of affairs. We may suggest that, for one thing, the hour of meeting is an awkward one. The Association set out, if we remember right, with 6.30 as its time of assembling, which gradually shifted to 7 p.m., and now to 7.30 (not very punctually adhered to sometimes). Now 7.30 is neither one thing nor another. The old early hour was intended probably for the convenience of pupils and draughtsmen who came straight from their offices, when the Association was a

small affair only. But it is in a very different position now; it is a large and influential society, though a junior one, and will probably do well to accommodate itself to the usual hours of large societies meeting in London. 7.30 is an inconvenient hour; it is too late for those members who do not dine late, it is early for those—an increasing number probably—who habitually dine late. The confirmed late-diner can get to a meeting at 8 by anticipating his usual dinner-hour a little, but he cannot get to one at 7.30, and he does not want to upset all the usual arrangements of his household once a fortnight for the sake of the meeting. 8 p.m. is a normal hour for meetings, and the Association had better accept it.

THE International Art Exhibition which was opened at Berlin with much ceremony on Sunday last, is apparently exciting more interest in Germany than an exhibition of this kind has ever done before. The three great schools of painting of the German Empire are apparently competing for honours, and art critics are busy deciding as to the various merits of works by the members of the Prussian Royal Academy, those from the hands of the "progressive" Society of Berlin Artists and the radical "impressionist" section of the Munich painters. According to the *National Zeitung*, the official catalogue gives the titles of nearly 2,500 works, of which some 1,700 are oil paintings. Sculpture is said to be well represented, but architecture, according to this contemporary, is below the average. The hanging at the exhibition has apparently the approval of the local press, and an illustrated catalogue by Messrs. Schuster, showing some 200 of the exhibits, has been very well received. The Emperor went over the exhibition a few days previous to the opening ceremony.

IT is to be regretted that the Committee of the House of Lords before whom the Bill of the London County Council came last week has rejected that part of the measure which would have made the garden of Lincoln's Inn Fields a public space. We are certain that this is a mere retardation of a step which is certain to be taken in due course. There is, in our opinion, no justification for withholding this garden any longer from the general public. If it were in a square surrounded by residences instead of offices, the case would be quite different. As a matter of fact, what use is made of it is by persons who are charged a fee by the trustees. To withhold its use from the general public cannot be justified. As the Bill in question provided that compensation should be paid for any damage to any private right, there was no legal objection to the measure. We therefore hope that the County Council will bring forward the Bill again next Session, and that it will, after it has passed the House of Commons, be supported by petitions from all quarters.

IN a somewhat rambling but well-meant article in the current number of the *National Review*, under the head of "Amusements of the Poor," Lady Jeune makes a practical suggestion of some value. It is that the building known as Columbia Market should be used as a public recreation building in which concerts for the poor should be held, and in which the poor of the neighbourhood should be able to find harmless amusement. Such a building would be of great social value, and if a number of halls could be erected in different parts of London to be conducted on similar lines they would supply a want. If Columbia Market cannot be transformed into social and philanthropic energies to obtain a more modest but similar building in some spot where it is needed.

WE have before us Dr. R. Bruce Low's report to the Local Government Board on the general sanitary condition of the Hendon Rural Sanitary District, and on scarlatina and diphtheria therein. The following are some of the causes suggested in the report for the unsatisfactory sanitary state of the district:—

"Wooden cottages exist throughout the district, as, for instance, at Alpertown, Elstree, and Kingsbury, some of which are damp and insufficiently ventilated, while others are dilapidated. Commonly they are also small in size and badly lighted. As a rule, these wooden cottages are old buildings, and their defects of construction are due to the mistakes of past generations. But defects of the above sort are not confined to wooden dwellings. Cottages built of brick are in various localities found to be in bad repair. Some of them were found unsafe, as, for instance, those at Edgware recently closed by magistrate's order. And even comparatively new cottages are sometimes damp, through imperfection of the methods adopted for getting rid of the rain which falls upon their roofs. Some that I saw at Wealdstone, for instance, though their roofs were properly spouted, had their downfall pipes arranged to deliver directly on the surface of the ground beside the dwelling; so that the rain from their roofs was soaking into their foundations, and with the result that damp could be seen rising both outside and inside on their walls."

The question of water supply, as usual, comes in:—

"At Pinner, though the mains pass through the streets, several local wells are still in use. One such well I saw situated in a front garden; it is about 12 ft. deep, dry steined only, and insufficiently protected from surface washings. A 'clay-jointed' drain from a water-closet and slop-sink passed within 2 ft. of this well. The water of the well becomes at times discoloured and smells badly. Farther up the same street a well, 60 ft. deep, situated in a back-yard, is in use by several families. The top of this well is provided with a lid, level with the ground. The labour of winding up the bucket to obtain water from the well prevented, I was told, its free use."

Further on, we come on the old complaints as to want of attention to removal of refuse, which is always found in connexion with insanitary reports of rural districts:—

"A large number of dwellings have water-closets. In the cottage class of property these closets are usually situated out of doors; most of them are flushed only by hand, and many of them were in a dirty state at the time of my inspection. Some of the basins were coated with filth; some were completely choked up and unusable, and in other cases the basins were cracked or broken. At Wealdstone the closets are generally supplied each with a flushing-box; but it is of the kind known as a 'waste preventer,' and only flushes so long as the chain is pulled. Careless persons, or those in a hurry, do not drag on the chain long enough to flush the basin completely; consequently I found many such closets in a filthy state from want of sufficient flushing. With regard to house-refuse there are no arrangements for public scavenging. Each occupier has to get rid of the refuse at best he may. Where there are gardens and allotments, no particular difficulty is experienced in dealing with it; but where there are no back gardens or allotments, or where there is only a small back-yard, the occupier is often at a loss what to do with his house-refuse. At Wealdstone, for example, I saw that in many cases it had been deposited upon unoccupied building land, notwithstanding a notice posted there, threatening offenders with penalty for so doing. In some cases house-refuse had been surreptitiously deposited on the roadside. Some persons were found bedding their backyards with ashes and house-refuse, and other people were using their ashes for making paths. Ash-bins are hardly ever to be seen in connexion with cottage property in the district."

COMBERMERE Abbey Estate, on the southern confines of Cheshire, will be offered for sale in July next. The property is named from the Comber Mere, close to which the mansion stands. The latter represents a religious house founded there for Cistercians in 1133 by Hugh Malbanc, Lord of Nantwich. Valued in the "Monasticon" at 275*l.* yearly, it was granted by Henry VIII. to Sir George Cotton, his esquire of the body, and Mary his wife. It has since continued in that family, which gave many renowned officers to our militant forces, including the late Field-Marshal, Lord Combermere, ennobled for his services in the Peninsula. Mrs. Thrale (Piozzi) was a daughter of Hester, second daughter of Sir Thomas Cotton, Bart., by her marriage with Mr. John Salus-

bury, of Bachecraig. William III. stayed one night at Combermere when on his way to encounter King James II.'s army in Ireland. Some materials of the monastery were used in building the present house. Of the interior of the library, a fine apartment, and supposed to have been made of the refectory, there is a view, together with two others of the house and grounds, after Augustus Butler, in vol. V. of Twycross's "Mansions of England and Wales," 1847-50; the carvings comprise a set of shields bearing the arms of the Salusburys and Cottons from the time of King John, which are considered to be unique after their kind. Two other views, one after P. de Wint, will be found in Dr. George Ormerod's "Cheshire," 1819.

THE small joint exhibition of works by Mr. Cotman and Mr. Macquoid, at the Society of Fine Arts Gallery, does not explain itself, as there is no sort of relation between the work of the two exhibitors. Mr. Cotman's small landscapes form the chief value of the collection; at least they are more interesting than Mr. Macquoid's paintings of animals and costumes, though some of these are brilliant in their way.

THE exhibition of the Society of Portrait Painters at the Grafton Gallery looks so well on the first entry that one comes to the conclusion that it must be one of the great attractions of the season. Several of the best contributions, however, have been hung together in the Octagon gallery, and a penetration into the further rooms shows that quality of the whole exhibition is not quite borne out by the promise of the first room. There are a sufficient number of really fine portraits to render the collection well worth a visit, and some of them are not less welcome for being old acquaintances. Among them are two very fine specimens of French portrait painting, by M. Jules Lefebvre and M. Carolus-Duran; a fine painting of Miss Mabel Lewis by Mr. John Collier; a portrait of a girl by Mr. Lavery; Mr. Roll's curious and half comic portrait of "Coquelin Cadet"; Mr. Whistler's of Signor Sarasate, &c. Mr. Blake Wirgman and Mr. Percy Bigland take a very good place in the exhibition, their portraits showing dignity of style as well as careful execution.

ARCHITECTURE AT THE ROYAL ACADEMY.—III.

1,506: "Design for East Window, St. Margaret's Church, Lowestoft," Messrs. Heaton, Butler, & Bayne. This is hung rather too high to be well seen; but it appears to be a good window design of the normal type, of which the general colour effect is satisfactory.

1,507: "Banacle Edge, Witley, Surrey," Mr. Basil Champneys. A pleasant, picturesque small country house, with a good deal of character about it. A long roof with the ridge parallel with the front of the house is broken by three gables rising out of the roof and filled with plaster scroll decoration; small bay-windows are corbelled out under the wide eaves, an octagon bay projects in the centre on the ground story, with a balcony railing over. The whole is a picturesque country nest. By the same architect is:—

1,509: "Swan-buildings, E.C.," A very good example of the architectural treatment of a business front in a quiet and unostentatious manner. It is a high narrow front chiefly of brick, with a ground floor shop window and a little bas-relief of a swan on the side pier; higher up the date on a panel is made into an ornamental adjunct. There is little other ornament, but the elevation is notable for the care and refinement with which all the small details and mouldings are treated; the design looks very simple and unpretending, but it is full of good little points which give it a quiet originality and character, and is in its way, one of the most meritorious exhibits in the room.

1,508, 1,510, interior and exterior of "St. Peter's Church, Bushey Heath," by Mr. James Neale, have both been illustrated in our pages; they are solidly executed pen drawings showing a chancel in Gothic style with a roof ceiled in cants and a traceried window at east end.

1,512: "Municipal Technical School, Manchester"; Messrs. Spalding & Cross. No plan is given, though a plan in a building of this kind is of great importance; the drawing is a large and careful pen line perspective in a rather mechanical architectural draughtsman's style. The general design is suitable enough to a building of that class; the material may be guessed to be terracotta facing, from the indications of detail; the windows are arranged in vertical groups in the manner (derived originally from French chateau architecture) which is so much the fashion at present; the centre is projected and raised, and emphasised by round turrets at the angles, between which is a deeply recessed doorway. There is nothing original in the architectural treatment, but it is suited to the class of building for which it is intended.

1,514: "Design for Frieze"; Mr. Arthur Gwatkin. This may be taken along with Nos. 1,521 and 1,538 by the same hand. 1,521 is the large drawing which hangs centrally on the walls, and is a piece of rich and effective foliage design, in which large scrolls of acanthus, kept rather dark in colour, are relieved by a play of coloured flowers over them; the whole being kept quite formal and conventional. 1,538 is a smaller design of somewhat similar type, and very good in colour; 1,514 is a floral design somewhat more realistic, and not so satisfactory as design, though the colour is agreeable.

1,517: "St. Olave's Grammar Schools, Southwark"; Mr. E. W. Mountford. This is a quiet and suitable treatment of school architecture, though the want of a plan renders it impossible to trace out the meaning of the architectural treatment. The grouping of the three tiers of windows in the wings is well managed, and adds dignity to this part of the exterior; the wings are connected by a lower centre decorated with engaged columns. We may observe that the quadrant porch in the re-entering angle on the left, a good feature in itself, is out of drawing.

1,518: "Battersea Town Hall," by the same architect, is a view of the back portion of the building, showing an example of the use of Gothic buttresses with an aisle wall closing them in, applied in a style which is not Gothic.

1,519: "A Small Country House, Yorkshire"; Mr. G. Kenyon. Rather a melancholy looking little house—this may be the effect of the drawing; it is noticeable as one of the few cases in which complete plans have been added, as of equal importance with the perspective view. As a compact country-house plan this has merits, in regard to the arrangement of the principal rooms, but it is a defect to leave the small lobby, on which the sitting-room doors concentrate, of so very irregular a plan; this might have been avoided; a lobby should not appear a space left by accident, as this does.

1,520: "Design for a Frieze"; Mr. Paton Wilson. A monochrome drawing of a frieze formed of seaweed forms and fish, cleverly designed and with a good decorative effect.

1,532: "Design for a Cardroom Window"; Mr. F. G. Collinson. A Renaissance alcove painted on the centre of a square-paned window, with a card king in the niche; below is a cartouche with some emblem on it, supported by two cupids. The whole looks a little too fragmentary, but it is a new idea.

1,534: "St. Joseph's Church, West Hartlepool"; Messrs. Dunn, Hansom, & Dunn. This is a solid-looking church, apparently brick, but we fear the tower cannot be repaired as satisfactory; it is too much as if divided into two equal halves, and wants definite balance and proportion; one does not know whether to regard it as a square tower with an octagon lantern, or an octagon tower with a square lower story; one or other form should dominate.

1,535: "Leeds School of Medicine, Mount Pleasant"; W. H. Thorp. No plan, without which one cannot tell the meaning of the exterior features, or why there are large windows in one place and small in another. The general design has an agreeable aspect of what may be called collegiate Gothic, with a short battlemented tower of distinctly collegiate type over the entrance. The octagon lantern on this tower falls into the opposite error from that of Messrs. Dunn & Hansom's church, in being too small for its tower, and seeming lost on the top of it, the angle buttresses not even availing to connect it with the angles of the tower.

1,536: "View of Goddington, Chesheld, Kent"; Mr. W. H. Neve. An example of a half-timbered house aiming decidedly at the picturesque, but treated symmetrically in its main arrangement of masses. There is a little too much of the timber-yard about it, and the higher

portions seem to want, architecturally, a little more solid support.

1,540: "The Tower and Ante-Chapel, St. John's College, Hurstpierpoint"; Messrs. Carpenter and Ingelow. An elevation showing a solid stone tower with a staircase turret at one angle, and a gable in grey flint abutting against the lower portion of it. The rest of the building, so far as shown, is in grey flint (apparently) with light-coloured stone dressing. It is a satisfactory and solid bit of modern Gothic building, with no pretension to anything exceptional in treatment.

1,541: "Design for a Book Cover"; Mr. Rowland G. Jones. Designs for book-covers are not as often seen here as one might expect, for it is a class of work quite allied to architectural design. This is a design in white on black, except a grey border-line, for Spenser's "Shepherd's Calendar"; the upper portion showing a harp form with a circular wreath of symmetrical foliage appearing as if hung on it; but the whole is kept very conventional, and is rather a suggestion than a representation. We do not gather whether the design is meant really to be in white and black, or whether this is only intended to represent gilding. It is a good design either way.

1,542: "Church of St. Columba, Wanstead Slip, interior"; Mr. E. P. Warren. A very plain interior with a brick arcade without mouldings, apparently plastered in the spandrels, which are left white. The tie-beams are effectively treated in a simple manner, and the whole is a very good bit of interior architecture for a church where, as we conclude, simplicity and economy were desired.

1,543 to 1,545 are works by Messrs. Ernest George and Peto. The first, "Motcombe," shows the plan of a large house in two blocks, the offices block surrounding a courtyard with something like an approach to a cloister (judging from the plan). The house has a large forecourt on the entrance side; the garden front, which is shown in the view, is very plainly treated, with mullioned windows, with corbels which occasionally diversify themselves by rising in the middle into a little triangular-shaped pediment, for no particular reason. The doorway alone is decorated with some simple architectural features. The general effect is eminently home-like, though of a home of another day. The plan is a good one, and shows a fine suite of rooms on the ground floor, well secluded and cut off from the offices; the space to the left of the dining-room and seems rather wasted. No. 1,544: "7, Delahay-street, Westminster," is a very good plain treatment of street architecture with round-headed windows which nevertheless are far more Gothic than classic in effect; as there is no plan we do not see the reason, though there should be one, for the abnormal height and narrowness of one group of windows on the right. Nor do we understand the meaning of the number of iron tie-heads visible on the walls. Are these old walls pulled about and cut into? If so, of course the ties are comprehensible. If the whole is new building (and there is nothing to indicate the contrary), why is it that Messrs. George and Peto, or their builders, cannot build brick walls safely without iron bandages, seeing that other people can do so? No. 1,545: "West Dean, Chichester," is an interior of a hall, with a large projecting stone chimney-breast going right up to the ceiling, treated with columns below the mantelpiece, and decorated above with plaster, and a cornice surmounted by a broken pediment and angle pyramids shown in bas-relief at the corners. This desire to get in the orthodox pyramid or nine-pin termination of Jacobean architecture, even in a bas-relief representation, is touching; but this is a picturesque hall nevertheless, with its plain solid wainscot on the lower portion of the wall, and open timber gallery or loggia at the end. A view of the staircase is subjoined on the same sheet.

Various important drawings which are passed over in their proper order of numbering in the preceding remarks, were already referred to in the first article on the Architecture at the Royal Academy.

A.A. STUDENTS' SMOKING CONCERT.—Once a year it is the custom of the A.A. students to arrange a smoking concert and to invite the General Committee and instructors as guests. A large number of members mustered on Monday evening last under the chairmanship of the President, Mr. H. O. Cresswell, and a very pleasant evening was spent at the "Mona Hotel," Covent Garden. The chairman was supported by Messrs. Goldsmith Farrow, Baggallay, Earle, Elsey Smith, Lewis, Max Clarke, and Cole Adams. Messrs. E. Graham Simpson, S. B. Lee, and E. O. Cummins performed the necessary secretarial duties.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS:

HOW TO USE VITRUVIUS.

THE fourteenth ordinary general meeting of this Institute for the present session was held on Monday evening last at Conduit-street, the President, Mr. J. Macvicar Anderson, in the chair.

The Secretary announced the death of Mr. George Pownall, Fellow.

The names of several gentlemen recommended for election as Fellows and Associates were read, and it was also announced that M. Eugène Muntz, of Paris, was recommended for election as an Honorary and Corresponding Member.

The Dictionary of Architecture.

The President said that before calling on the lecturer for the evening, he wished to interpolate a few words. In the rooms of the Institute during the past week a meeting was held and presided over by their old friend Professor T. Hayter Lewis. The meeting was convened for the purpose of winding-up a work of great magnitude and importance—the "Dictionary of Architecture." He thought it would not be seemly if the completion of that great work were allowed to pass without the Institute recording its acknowledgments to those gentlemen who had, by their energy and indefatigable labours, brought about the completion of the "Dictionary." It would be difficult to say when the work was inaugurated. Only those who could lay claim to be the oldest members of the Institute could have any recollection of the period. It was satisfactory to know, however, that long as the work had been in hand, it had been brought to a successful conclusion. There were one or two gentlemen whose names had been intimately associated with the work. Foremost amongst them stood the name of Mr. Wyatt Papworth, and indefatigable as his labours had been, they had been ably seconded by the gentleman who had acted as secretary to the Architectural Publication Society for a great number of years, viz., Mr. Arthur Cates. He (the President) begged to move a most cordial and hearty vote of thanks to those gentlemen for their labours, which had now brought about the completion of a great work. In such a matter as that he felt that the Institute was speaking the feelings of the whole of the profession.

The motion was carried by acclamation.

Vitruius.

The President said he had much pleasure in calling upon Professor Baldwin Brown, Honorary Associate of the Institute, and Professor of Fine Arts in the University of Edinburgh, to read a paper on "How to Use Vitruvius."

Professor Baldwin Brown, in commencing his paper, said it was part of the educational policy of the Institute to encourage the historical study of architecture amongst the younger members of the profession. The scheme of Progressive Examinations laid down by the Institute required that the aspirant should become as well acquainted with the normal forms of the art in the past as with its modern practice. He was taught to value tradition while being prepared to adapt his art to the actual conditions of the present, and was encouraged to view in a catholic spirit, as part of one great unity, the manifold phases through which architecture had passed in ancient, mediæval, and modern times. That being so, it was not necessary to apologise for the introduction of a theme which had no claim to that actuality which some might deem obligatory in a paper addressed to a professional audience. The subject had no immediate relation to any of the pressing problems of the hour. The most perfect acquaintance with Vitruvius's book would not enable an architect to design an ideal modern cathedral, for instance. The study of Vitruvius belonged avowedly to the literary rather than to the practical side of architecture; but it was not on that account a subject unsuitable for the attention of the Institute. Any one who looked through the *Transactions* of the Institute could not fail to be struck with the amount of archaeological treasure enshrined in those volumes. All the most distinguished writers and explorers in regard to architecture had proceeded out of the ranks of practising architects, and were the supply of such to fall the whole tone of the profession would suffer. The layman who entered into that field must do so under disadvantages. The lecturer concluded his preliminary remarks by observing that he should make no pretence to deal with obscure technical problems; his paper was merely meant to serve as a

guide to those who might not be far advanced in Vitruvian studies. Vitruvius Pollius (for the *præ-nomen* Marcus rested on no ancient authority) was an architect and military engineer of the time of Augustus Cæsar. He wrote a work in ten books, entitled "*De Architecturâ*." Those books treated of architecture, engineering, and military works, but also incidentally gave us certain details about himself and his professional career, and about the sources from which he derived the matter for his book. The importance of the treatise to modern students appeared at once from the fact that Vitruvius was the only ancient architect whose utterances on matters concerning his own art and profession had come down to us. But Vitruvius's book had not only survived: it had enjoyed quite an extraordinary reputation, and that in ancient and mediæval as well as in modern times. An acute scholar of the early part of the present century, Councillor Schultz, gave it as his opinion that the "*De Architecturâ*" was a figment of the tenth century; but that view, which was never seriously supported, was certainly disposed of by the number and antiquity of the manuscripts of Vitruvius, an account of which was laid before the Institute in 1836 by the late Professor Donaldson. The estimation in which the Romans held the treatise was shown by the fact that the elder Pliny paid Vitruvius the compliment of quoting (without acknowledgment) whole paragraphs from it. Frontinus, in his remarks upon Roman aqueducts, spoke of "Vitruvius the architect." There was other evidence as to the genuineness of the antiquity of the faith in Vitruvius as an architect. In the fifth century, Sidonius Apollinaris, Bishop of Clermont, enumerating in rhetorical strain the names of men of old famed in various spheres, made mention of the plumb-line of Vitruvius. Whatever was the exact date at which Vitruvius wrote, it must be remembered that he lived at the very beginning of the great Imperial period of Roman architecture, and had either not had the opportunity of seeing, or did not think it necessary to mention, the characteristic Imperial structures which were beginning to be built in his lifetime. Vitruvius's work was in all probability preserved to posterity through the interest taken in the remains of antique culture at the Court of Charles the Great. The oldest MS. of the work which had survived was that in the Harleian collection in the British Museum; that MS. dated from the ninth century, and belonged formerly to the abbot of the monastery at Illdesheim. Valentinus Rose considered that there was evidence of the existence of a manuscript of the "*De Architecturâ*" written in Anglo-Saxon characters of about the eighth century, and that point (which was to be explained by the intercourse between Charles and his ministers and some of our Saxon kings) might be worth the attention of those who were interested in our pre-Norman stone architecture. Preserved and studied under monastic conditions during the middle ages, the MSS. of Vitruvius were sought out and studied with avidity by the scholars of the Early Italian Renaissance, and for their benefit, Sulpitius, the first editor of a printed Vitruvius, edited the *editio princeps* of the "*De Architecturâ*" at Rome about 1486. That edition was soon followed by others, the most notable of which were those edited by Fra Giocondo. The lecturer said it was not his purpose to review the successive printed editions of Vitruvius, of which a grand collection was to be found in the Library of the Institute; nor was that needful, as communications on the subject by Professor Aitchison and Mr. Paul Waterhouse appeared in the *Journal* of the Institute in 1890. Nor was it necessary to repeat the oft-told story of the extraordinary influence exercised by Vitruvius's book over the men of the late Renaissance and of the seventeenth and eighteenth centuries. In many quarters Vitruvius was looked upon with the same kind of reverence with which Protestant Churchmen of the same period regarded the Bible. Writers who criticised his style or his statements still (like Leon Battista Alberti) relied on him to form the groundwork of their own disquisitions, and his influence was traceable through all the Italian architectural writings of the Later Renaissance; was potent in the France of Louis XIV., when Perrault published his great French edition; and appeared on almost every page of such English works as Sir William Chambers' "*Civil Architecture*." Even as recently as 1836, Marini, the editor of the most sumptuous edition of Vitruvius that had ever appeared, spoke of the "*De Architecturâ*" as a "noble work pored over in constant perusal by so many distinguished architects." But although Vitruvius came down to us from antiquity

with considerable claims to our respect, the species of reverence with which he had been regarded was now a thing of the past. Now there was danger of going to extremes on the other side, and it was unfortunate that the modern critical era, though it had done so much, had not yet produced a full and satisfactory edition of Vitruvius. The student of Vitruvius who approached that author from the historical and artistic standpoints soon found himself, for practical purposes, breaking up the treatise into certain main divisions, the respective contents of which were greatly unequal in value. Most of the last three books, relating to hydraulics, dials, water-clocks, and military engines, might be put on one side, and from the other books various incidental discussions, such as those on the winds and Greek harmonics, might be eliminated. The bulk of the treatise would then be found to consist of matter of archaeological and literary interest, roughly divisible under four heads, viz., 1, personal references and reflections; 2, technical discussions as to the nature and use of various materials employed in construction and decoration; 3, dissertations on the laying out of cities and the planning and arrangement of public and private edifices; and, lastly, there were detailed directions, with measurements, for the setting-out of the "orders" and the planning and construction of the more important buildings. That portion which had been the object of the most attention and reverence was the last, and that was just the part which must be received by modern students with the greatest caution and reserve. The general descriptions were, on the whole, more trustworthy; while the technical discussions, especially in the section on decoration, possessed an actuality which was absent in other parts of the book, and were often of the highest interest and value. For the interpretation of all the matter of the treatise the personal references scattered up and down it should be taken into account. The lecturer quoted some of these, showing that Vitruvius spoke bitterly of "the emptiness of busy practitioners" who had "elbowed him out of the course," who "bought their way with money," and "made interest through their friends," having "a winning way" with them, and being "smooth of tongue." He said he was of modest means, but he scorned "to use the arts of those who went about to canvass for clients." Some of his contemporary practitioners of the latter type were, he says, "not only ignorant of architectural science, but of the simplest building processes; yet they went boldly raiding in their ignorance, tempting their clients with small estimates, and then sending them in a ruinous bill." There was also, he said, "the heaven-born artist architect, who learnt his business by the light of nature." "No wonder," he exclaimed, "that the long-suffering paterfamilias became in desperation his own architect, preferring to waste his money at his own sweet will rather than at another's." Disappointed as Vitruvius seemed to have been in most of his aspirations, one of his desires had been amply fulfilled—the desire, namely, that his fame should rest on his book. Having discussed some of the points suggested by Vitruvius's silence as to the works of the Augustan age, in their hearing as to the date at which portions of the "*De Architecturâ*" were written, the lecturer went on to say that the technical passages in the work were written in simpler language and in a more flowing style than the more ambitious parts of the treatise, but there was no need to enlarge upon them, as the recent work of Professor Middleton on "*Ancient Rome*" contained in its earlier chapters a very complete commentary on that part of the "*De Architecturâ*." Vitruvius had a far higher ideal in plaster work than the Florentines of the Renaissance, and he strongly criticised the then new fashion in decoration, consisting of painting feigned architectural members upon the walls, and the imitation of subjects of various kinds from nature. His attack on new fashions in wall decoration was substantially the only notice taken by Vitruvius of the changes in taste and practice which were going on in his time. There was much that could be made use of by the student in the account given by Vitruvius, at the opening of Book V., of the Forum and public buildings adjacent to it. In all Western cities the market-place was the centre of urban life, just as the city gate was in the East, and Vitruvius began his account of secular architecture with the Forum. Passing from the readable descriptions given by Vitruvius of these buildings, the lecturer spoke of those sections of the treatise which dealt with the proportions of sacred edifices and with the details

of the so-called orders. That was the portion of the "*De Architecturâ*" to which the greatest importance had generally been attached; it was the part, for example, selected for translation and annotation by Wilkins, and it was quoted on almost every page of all the older books on classical architecture. It was, however, the part which the new Vitruvian criticism was inclined to pass over as unworthy of serious attention, and in dealing with it in the present day one had to adopt an almost apologetic attitude. Having cited a number of passages in support of this view, and expressed the opinion that Vitruvius had never been in Greece, although he wrote of Athenian buildings as if he had seen them, the lecturer, in his concluding remarks, showed that Vitruvius had promulgated a somewhat narrow view of Grecian architecture by giving the impression that it was more formal and rigid than was actually the case. What made that architecture so perennially instructive to the student was the exhibition, side by side, of the most simple, even bald, severity of form, with the most delicate and almost imperceptible varieties and refinements in detail. As long as architecture was recognised as an art based essentially on composition in mass and line, so long would the Greeks, the greatest masters of form the world had ever seen, continue to be the preceptors of successive generations of constructive artists. No one who came to close quarters with the work of the Greeks could avoid an encounter with Vitruvius, and if the intercourse that resulted was to be of real value, the author must be neither exalted nor despised, but only understood.

The President, in inviting discussion, said he had followed with very keen interest the able treatise which Professor Baldwin Brown had just read to them. Nor could it be otherwise, for apart from the interest of the more technical part of the treatise, it could not fail to interest them to learn how those problems which they spent their lives in trying to solve were treated by men who lived nearly two thousand years ago. It was also interesting to learn from Vitruvius's personal experience that even in those days a man of solid parts, of erudition, and ability, had yet to repine that such qualities were to a great extent unrecognised by an inappreciative public; while, on the other hand, men not possessed of those solid qualifications managed to push themselves into positions for which they were not qualified. He feared, from circumstances which occasionally came under his own observation, that such experiences were not confined to the age of Augustus. Even in those days, it would seem that there were men who assumed to themselves, while they denied it to others, the title of heaven-born artist architect. He called upon Professor Kerr to open the discussion.

Professor Kerr said he had very great pleasure in moving a vote of thanks to Professor Baldwin Brown for his interesting paper—a disquisition so eloquent, and so full of information, as to remind him of old times in that room. Vitruvius not only held a unique position as a writer on architecture, but he happened to live at a time which was of peculiar interest to us, viz., at the commencement of the Christian era. Of course, as had been said, the Emperor Augustus, like all the Romans, employed Greek artists, and in his opinion some of the works which the Greeks erected for the Romans were improvements upon some that they erected upon Hellenic ground. At all events, Greek architecture in its Roman phase had culminated before the time of Augustus, and was commencing that course of decadence which led to that typical style best manifested in the Colosseum. In fact, the Romans laid down their style at the Colosseum, and the Italians, thirteen hundred years after, took it up at the same point. Vitruvius seemed to have been somewhat of a purist in theory, and to have desired to revert to the classical Greek. He (the speaker) could not exactly see his way to believe that Alberti derived his knowledge from Vitruvius. He rather thought that he derived it from the ancient monuments themselves. Indeed, he believed that Vitruvius's book was first published in 1486, and Alberti's in 1485. He did not think that Vitruvius's writings had much influence in the sixteenth century. As he said, he thought that the Italian architects took up Italian architecture at the Colosseum, where it was left by the Romans.

Professor Aitchison, A.R.A., said he had much pleasure in seconding the vote of thanks to Professor Brown for his fascinating as well as philosophical account of the works of Vitruvius. With regard to the question of style, of course when architects were very numerous and there was a question

of livelihood in the choice of one of two styles, it was to be expected that there would be a good deal of vigour shown by the relative adherents of the two styles. Architects in the present day were undergoing a new system of instruction almost as great and as important as that undergone by the Barbarians who overran the Roman Empire, but in a different way. After the long blank which followed, there were a century or two left entirely unbridged. They could not expect the older men in the profession to spend very much time on the problem of bridging over this gap, but the younger men, the students, were seeking to bridge over it. He hoped that by constant assiduity and industry in study we, as a courageous, wise, and virtuous people, should have geniuses arise amongst us who would achieve things in architecture in the future as to which the things done in the past by us would be as nothing. He quite agreed that Vitruvius was a most fascinating author, but it was nevertheless difficult to understand why he had been so popular. There must have been some inherent merit in his work to carry it down to us, for not only architects but literary men attached much importance to it. The great point of the work of Vitruvius, as it appeared to him (the speaker) was that he had taught us the importance of taking a module for the arrangement of the proportion of buildings. In ancient architecture everything was arranged in accordance with some given module of proportion. Vitruvius had thrown much light upon that subject, and he had given a great many valuable practical hints as to matters of construction; but he lived in what might be called the raw brick period of Roman architecture, or, at least, if he lived beyond that period, he took no note or gave us no account of the transition which took place from brick to marble under Augustus, and did not describe the most striking features of the Roman architecture of the time. His remarks on plastering, &c., were of course extremely interesting, and his writings as a whole were invaluable to the archaeologist, although, of course, as far as architects were concerned, archaeology *per se* was merely an interesting amusement which had nothing whatever to do with architecture. Nevertheless, young architects who wanted to do great things must study the great things which had been done in the past, but the lessons which were to be learnt from the great works of the past must be gained from study of the buildings themselves. He was glad that Professor Brown had paid a well-merited tribute to Wilkins. With regard to the question of optical corrections in Greek architecture, he (the speaker) would point out that Plato frequently referred to the devices by which optical illusions were rectified.

Mr. H. H. Statham said he should like to say a few words in support of the vote of thanks to Professor Baldwin Brown for his exceedingly logical and interesting paper. He (the speaker) would suggest whether there was not one reason, which had been a little passed over, why Vitruvius had always been held in honour, and should be held in honour now; Professor Brown just approached it, but passed away from it again, viz., that Vitruvius was an architect who took a remarkably comprehensive and all-round view of his art. He was a man who, although his opinions about the artistic side of his art seemed to us somewhat pedantic, nevertheless regarded architecture as a great art, and gave the greatest possible attention, from his point of view, to all branches of technical instruction, so that his treatise formed a kind of *résumé* of all that the architect of his day had to think of. He thought that was one reason why Vitruvius had been thought so much of, and it was certainly one reason why the Institute should hold him in honour, for he was the first upholder in literature of the view of architecture which the Institute had been endeavouring to uphold, against considerable recent opposition. That was why he had hoped that there would have been a larger meeting than he saw before him to pay honour, not only to Professor Brown, but to the memory of Vitruvius. With regard to the remarks made by Vitruvius as to Greek buildings, he (the speaker) had always thought that Vitruvius had not seen the buildings themselves, and that seemed to be the view of Professor Brown. At the same time we had to remember that it was Vitruvius who put us on the track of the optical refinements and was right about some of them; he was a valuable exponent in that respect, at all events. He should like to point out one curious discrepancy between his theory as to the Parthenon and the actual facts of the building. He said that all the entablature should set rather

forward, otherwise it would appear to be foreshortened to the eye, and the intended proportion would be spoiled. That was perfectly logical and reasonable, and yet the fact was that the whole entablature of the Parthenon, which was the most refined in design of any Greek building, was all set backwards, except only the corona, which was very slightly forward. He had always been impressed with that striking contrast between the words of Vitruvius and the actual facts; yet he thought that his theory was very possibly right in regard to the general practice of the Greeks. He should like to think, also, that Vitruvius was right as to his knowledge of other points of Greek architecture, because he thought his view of the Greek stage with a raised platform for the principal performers, and the orchestra down below, was absolutely in accordance with the spirit of the construction of the Greek drama; and he thought that if their learned contemporary in Germany, Dr. Dörpfeld, succeeded in proving that there was no raised stage, and that the principal performers were mixed with the chorus, so much the worse for the Greeks. He thought that all who had seen the Greek drama revived, as at Bradfield College last year, must come to the conclusion that there was a raised platform for the principal performers. It was very curious to note Vitruvius's criticism of the fashionable ornament of his day: he criticised freely what were afterwards to become the very worst features of Renaissance ornament. It seemed to show that the Roman example was stronger than Vitruvius's criticism. Professor Brown made some remarks about Vitruvius being up to date. He (the speaker) was turning over his Vitruvius in anticipation of the paper, and could not help being struck by some of the directions given by him for the arrangement of temples and other buildings; the directions were only modern life put in another way. The temples of Bacchus, he said, should always be put near the theatres. If one walked down the Strand one would see a modern application of that.

Mr. John Slater said he had great pleasure in supporting the motion. One of the things that had struck him as most interesting in reading Vitruvius was the description of the plaster-work of the ancients, which enabled us to understand, to some extent at least, the charm of the colour decorations of the buildings he referred to. He had just had an opportunity of seeing the coloured decorations in some of the restored churches at Hildesheim which, viewed in the light thrown upon such matters by Vitruvius, were horrible to contemplate. He cordially welcomed Professor Baldwin Brown's paper, for he (the speaker) had always urged students to study Vitruvius, whose writings showed clearly that the architect must be a many-sided man. He (the speaker) had always thought that it was a mistake for any architect to limit himself to one style. The architect who did so would only find himself in a Procrustean bed.

Mr. William White, F.S.A., said it seemed to him that Mr. Statham's remarks were perfectly true and just, but he thought they ought to go back, like Vitruvius, to some agreement of principles of construction and proportion, which had been very little considered as matters of geometrical principle. He thought that the geometrical principle of proportion was so essential to taste harmony and elegance in architecture that whatever style might be adopted, there ought to be some systematic mode, some agreement—some conventional agreement—for carrying it into practice. As for the popularity of Vitruvius, he thought that there was just that one simple account to be given of it, which was knowledge.

The President, in putting the motion, said they had all listened with pleasure to what had been truly described as a fascinating and philosophical lecture.

The motion having been carried by acclamation Professor Baldwin Brown, in reply, said he thanked the meeting very warmly for the kind attention which they had bestowed upon his long paper. At that period he would not venture to detain them by any lengthened remarks on all the points raised in the course of the discussion, but he should like to make one or two observations with regard to Professor Aitchison's remarks as to the use of archaeology. As a matter of fact there was a right way and a wrong way of using archaeological knowledge. He thought that a knowledge of archaeology in certain departments would be of great advantage to every architect. He would especially instance the archaeology of *technique*, a knowledge of which, in regard to such matters as plaster work, for example, would be of great value to the modern architect. Professor Aitchison had

referred to Wilkins and his ingenious explanation of the *scamilli impares*, but Wilkins and Vitruvius were not in accord. One explanation was that the optical curvatures in Greek architecture were made to counteract an apparent tendency to hollows in straight lines; another explanation was that the curvatures were meant to be seen as curvatures. For his (the lecturer's) own part, he could not see the need of any optical corrections of straight lines. To his eye, there were no hollows. With regard to the Greek stage, he thoroughly agreed with what Mr. Statham had said. For artistic effect the *pulpitum*, the elevated stage, was wanted. Professor Curtius, of Berlin, had recently expressed his opinion that there was originally a stage, probably of wood, but he did not believe Dr. Dörpfeld's theory that the actors walked about on stilts amongst the chorus.

The meeting then terminated with the announcement by the President that the next meeting would be held on the 5th proximo.

THE STONE BUILDINGS OF THE COTSWOLDS.*

THE particular portion of the Cotswold Hills to which I wish to draw your attention this evening is the small area bounded by Cheltenham and Winchcombe on the west, by Chipping Norton and Moreton-in-Marsh on the east, by Broadway and Campden on the north, and Northleach and Cirencester on the south. In appearance these Wolds have a gentle down-like aspect falling at intervals into valleys, the sides of the hills abounding with springs. Villages, farms, and manor houses are plentiful, and the country is well timbered, beach and elm growing specially well.

In these short notes I will not attempt to tell you of the history of these hills—how rich they are in Roman remains. There are everywhere traces of Roman occupation. The Fosse way—one of the most perfect of Roman roads—enters Gloucestershire near Moreton-in-Marsh, and runs in a direct line over hill and dale, through Stow-on-the-Wold, Northleach, and out at Cirencester—once a great Roman station. The beautiful remains of the villa, and Roman baths at Chedworth, some few miles from Northleach, are well known. A great portion of these remains are in a perfect state of preservation.

Under the Heptarchy, this country formed the western part of the extensive kingdom of Mercia. Winchcombe and Kingstunley were residences of its kings. This country is also interesting from its close connexion with the Parliamentary wars, many of the villages and houses having legends and tales concerning them. At Donnington, a little hamlet lying near Stow-on-the-Wold, the king's forces, under Lord Aston, were so completely defeated by Colonel Morgan in March, 1645, that all hope of maintaining the garrison at Oxford was abandoned. At Bourton-on-the-Hill was born Sir Thomas Overbury, whose death by poison is recorded in the Parish register in 1613. Amongst other interesting entries it is also recorded that on October 10, 1666, the parishioners collected a fund of six shillings and eightpence "towards the late fire at London."

At Compton some four miles from Moreton-in-Marsh, are the remains of Archbishop Juxon's Manor house, erected in the early part of the seventeenth century.

Chastleton Hall—not exactly on the Cotswolds—is a very fine house with a courtyard. It is full of most interesting work and detail, having excellent door and window fittings and panellings. The long gallery is a charming room with a barrelled plaster ceiling, panelled in oak up to the springing line. This oak was partly painted and gilt, as is the case at Haddon Hall and other places.

Geologically the Cotswold Hills form a portion of the great belt of limestones which extend across England from the Dorsetshire coast to a point between Filey and Scarborough. They form an elevated table land or plateau some 800 to 1,200 ft. above sea-level, presenting a steep escarpment facing west to the valley of the Severn.

This escarpment was perhaps a cliff range overhanging an arm of the sea, and the table land behind has since been cut into valleys by frost, rain, and brooks, and swept completely bare of the gravels which lie so thick in the valleys beneath. The strata dip slightly to the S.E. and E., and comprise the whole of the Oolitic series, a vast mass of more or less continuous beds of limestone, separated by partings of clay, all of

* A Paper by Mr. E. Guy Dawber, A.R.I.B.A. Read before the Architectural Association on the 12th inst., on elsewhere mentioned.

marine origin, and enclosing in places vast amounts of shelly matter, such as beds of oysters or reefs of coral.

To architects the whole formation is of unusual interest, as within its limits are found almost all the building limestones used in England. The series commences with the inferior oolitic limestones, which stretch from Bridport northward to Bournemouth and Sherborne, and broadens out on the flat-topped Cotswolds east of Cheltenham. It is succeeded by a band of the clayey substance, "Fullers' Earth." This forms a water-bearing zone amongst the hills, which would otherwise present many arid and barren tracts. The Great or Bath oolite has at its base the well-known Stonesfield slate, which splits into coarse fissile slabs, used for roofing purposes.

The main body of the Great oolite caps the hills round Bath and ranges over the Cotswolds, where it is very largely quarried. The middle and lower beds are the best stones for building purposes, soft when first quarried, but possessing the well-known property of hardening under exposure.

The stone in the immediate district I am speaking of is quarried from about April to October, after which the quarries are closed for the winter months. It is generally obtained by clearing away the upper layers of inferior stone and earth, and is not mined for, as most of the Bath stones. When fresh quarried it is of a pale lemon colour, which bleaches by exposure, and after a time turns to all manner of rich colours, and quickly becomes covered with lichens. It is an excellent weather stone, as the work in the district testifies. Nearly every village has its local quarry, but the best stones are Bourton Hill, Westington, Windrush, &c., in the immediate district of which I speak.

Owing to the nature of the formation of these hills, and stone being practically the only material usable, we cannot but admire the ingenious way in which the builders used it in almost all their work. The country roads are metalled with it, and bad roads they are as a rule, unless mixed with a harder stone. The fields are divided by stone walls, mostly laid dry, with small stones, most ingeniously fitted together—in fact, in a wall properly built it is almost impossible to pull out a stone. The cattle troughs, gate posts—in fact, everything for which stone can be adopted, are made of this material.

The houses generally are simple in plan and not badly arranged, and in the larger houses, those occupied by the yeomen or farmers, the plan is generally elongated, with a large central hall or reception room, a kitchen on one side, and dairy, &c., beyond, and a general living-room on the other. The stairs lead out of the hall or a passage behind the hall to the bedrooms, nowadays changed to rooms opening off a passage, but formerly opening one out of the other. At this period it was thought injurious to sleep in rooms facing the sun, so most of the original rooms face the north and east.

Mr. Baring-Gould says, in his "Old Country Life":—

"At the head of the stairs slept the squire and his wife, and all the rooms tenanted by the rest of the household were accessible only through that. The females, daughters of the house and maid-servants, lay in rooms on one side, say the right, the maids in those most distant, reached through the apartments of the young ladies; those of the men lay on the left, the sons of the house nearest the chamber of the squire, and the serving-men furthest off."

As a rule the houses—the cottages and manor houses, and, indeed, all the larger ones—were built during the seventeenth century or early part of the eighteenth. It is rare to find them much earlier than these last years of the sixteenth century, and this is probably owing to the fact that during the seventeenth century there were more resident gentry in the country than at any other period, and that they mostly lived on the produce of the land, and were not, as a class, at all wealthy.

Naturally these people would encourage building, and, no doubt, their example helped to form the taste of the people and inhabitants of their estates. Hence the uniformity of feeling in the work of this period.

When in the reign of Queen Anne the trade of the country developed, and great fortunes were rapidly made in commerce, many of the landed gentry who had become impoverished, first by the civil wars, and then by the extravagance of the Restoration period, sold their estates and went to live in the country, towns, and cities. The wealthy business class, who occupied some of these old houses, not being indigenous to the soil, did not take so much interest in the village folk and community at large, and chiefly expended money on their own houses, not having direct

ancestral interest in the villages, and so to a certain extent neglected them.

Even in later times, when the labouring classes became very poor, it was no uncommon occurrence for them to be turned out of their villages and their cottages pulled down so that they should not become a burden on the parish and the landowners. You will note that nearly all these stone buildings are of the seventeenth century, and in this district you will often find entire villages built during this period with hardly a house of later date, except perhaps one or two erected within the last fifty years. They are nearly always built of rubble stone walling, sometimes coursed, but more generally not, and have dressed angles and stone mullioned windows, etc. The stone laminates freely, and hence there was no difficulty in obtaining walling stone. The walls are thick—2 ft. and more in many instances—and delightful window seats and nooks are obtained in this way, as the mullioned windows being on the outer face of the wall, the whole depth was given to the room. In some situations these thick walls hold the wet and damp to a very great extent. As a rule, however, they are absolutely dry. Horizontal damp courses were unknown when these houses were built, and the floors were generally of stone laid direct on the earth, unless there were cellars underneath. The upper floors were generally of thick joists pugged solid between with lime and chopped straw (see litho. illustration, fig. 5).

In Campden—a most unique country village—are some excellent specimens of this period from parts of the court-house, built in the fourteenth century to houses of the latter end of the last. The old market-house in the centre of the main street was built in 1624, by Sir Baptist Hicks, a former Mayor of London, and a great benefactor of the town. One house of the fifteenth century, with a beautiful bay window, carried up two stories, was the residence of the Grevilles, who were wealthy wool merchants in the fourteenth and fifteenth centuries, and whose memorial brasses are in the church. This now decayed town was full of life and activity, and had a very large wool trade with Flanders—the sheep being raised on the Cotswolds surrounding, and the wool being sent abroad.

I know of no more interesting country town in all England than this, or a more picturesque sight than the main street, with its small islands of buildings, as it were, dotted about, breaking the continuity of the street, and giving a charming variety to the perspective. Adjoining the church, on a raised terrace overlooking undulating fields and hills, are the remains of a house once inhabited by Baptist Hicks, which was burned down during the Parliamentary wars. At either end of this raised terrace are pavilions. There is a great similarity between the mouldings of these terrace pavilions and those of the Kite's Nest, a manor house near Broadway, some seven miles off—a house that contains amongst other interesting details a truly magnificent oak staircase, with massive turned balusters and solid newels. These houses were evidently built by the same hands and carried out at the same time, as they are rather later in character than the usual work.

The roofs of all these houses are treated in a similar manner, high pitched at about an angle of 55 deg., nearly all covered with the small stone slates of the district, or else thatched, but this is probably a substitution for the slates in later times. It is rare in this part of Gloucestershire to find the large, thick Forest of Dean slates, and to my mind the small ones are infinitely superior both in appearance and suitability. They are graduated in size and thickness from the eaves to the ridge, where the thinnest are placed.

They are covered always, in the old work, by a stone cresting, generally of plain section, and are hung with oak or deal pins over laths.

Owing, presumably, to the difficulty of procuring lead, the builders of these houses turned their attention to methods of doing without it, and so we find the houses generally so planned that they can be roofed in a single span. Hips are extremely rare. There are always gables with the coping projecting well over behind, the slates tucked close under and pointed flush. The chimneys, too, have a projecting weathering at the bottoms, following the rake of the roofs, and are nearly always arranged centrally over the ridge. The valleys where one would naturally expect to see lead, are formed of slates, in a wide sweep, laid on the curve just as the other portions. The eaves in most of the work project well out on a moulded or played stone course, and have no eaves gutters—a bad plan, as the water soaks into the foundations and makes them damp.

The method of procuring these slates is worth noting. In October a piece of ground at the

quarry is measured off, and the top, 8 ft. or 10 ft. of loose stuff, is cleared away. This process is called "ridding." The stone for the slates is then uncovered, and is called "pendal." It is dug out and wheeled to the top of the ground, laid down flat, and roughly fitted one piece into the other as well as it will allow. It lies then all through the winter exposed to the frost in thicknesses of from 2 in. to 12 in., or 14 in. Owing to the beds of natural moisture in the "pendal," the frost swells these, and, in a thaw, a few blows of a hammer separates the layers. When this splitting is done they are squared and cut into sizes and are ready for use, but should there be no frost there are no slates and the stone must wait for the following winter.

For stone houses there is no more beautiful or suitable material than these stone slates. Even when brand-new, they are beautiful in colour, being of all shades of greys, yellows, and blues. To see the old houses, with roofs covered with lichens, and the richest colours conceivable, all harmoniously blended, is charming. If properly seasoned at first they will stand for centuries, and no frost or wet will touch them afterwards.

It seems difficult to understand, with such material in this district, that blue slates, and even galvanized iron—materials wholly out of harmony with the buildings—should be employed. Yet so it is the excuse being that the stone slates are more trouble to hang and want occasional repairing, in spite of the fact that before one's very eyes are old houses and barns two hundred and more years old still covered with the original roofs. It seems unreasonable to go miles afield to obtain an inferior material, when a better one lies literally—at one's feet.

Another matter I should like to draw your attention to is the variety of the stone gable terminations and finials. These latter are especially worthy of note. In no district in England is such a wonderful variety of detail and form to be found.

In Chastleton Hall are many good examples, and in Broadway and Campden and Moreton-in-Marsh they are especially interesting, being pierced and cut in a really marvellous manner. These finials are generally placed on the apex of the gables, but many are also on the springers and knee-stones. As an instance of the way tradition lingers in country places, even in these prosaic days, you may note corn-stacks thatched, with the apexes carried up, and open work finials in twisted and woven straw of infinite variety, showing the influence of the stone treatment in this district.

The windows are nearly always treated in the same way, with stone mullions, and narrow lights, about 18 in. from centre to centre, with stout chamfered ovolo moulded mullions, and with labels over the heads, or else a moulded string. Except in the larger houses, transoms and upper lights are uncommon.

The doorways vary. They have either the four-centred arch, such as you will notice on the photograph of Campden Almshouses (see fig. 6), or else a square head, with very deep lintel and moulded jambs.

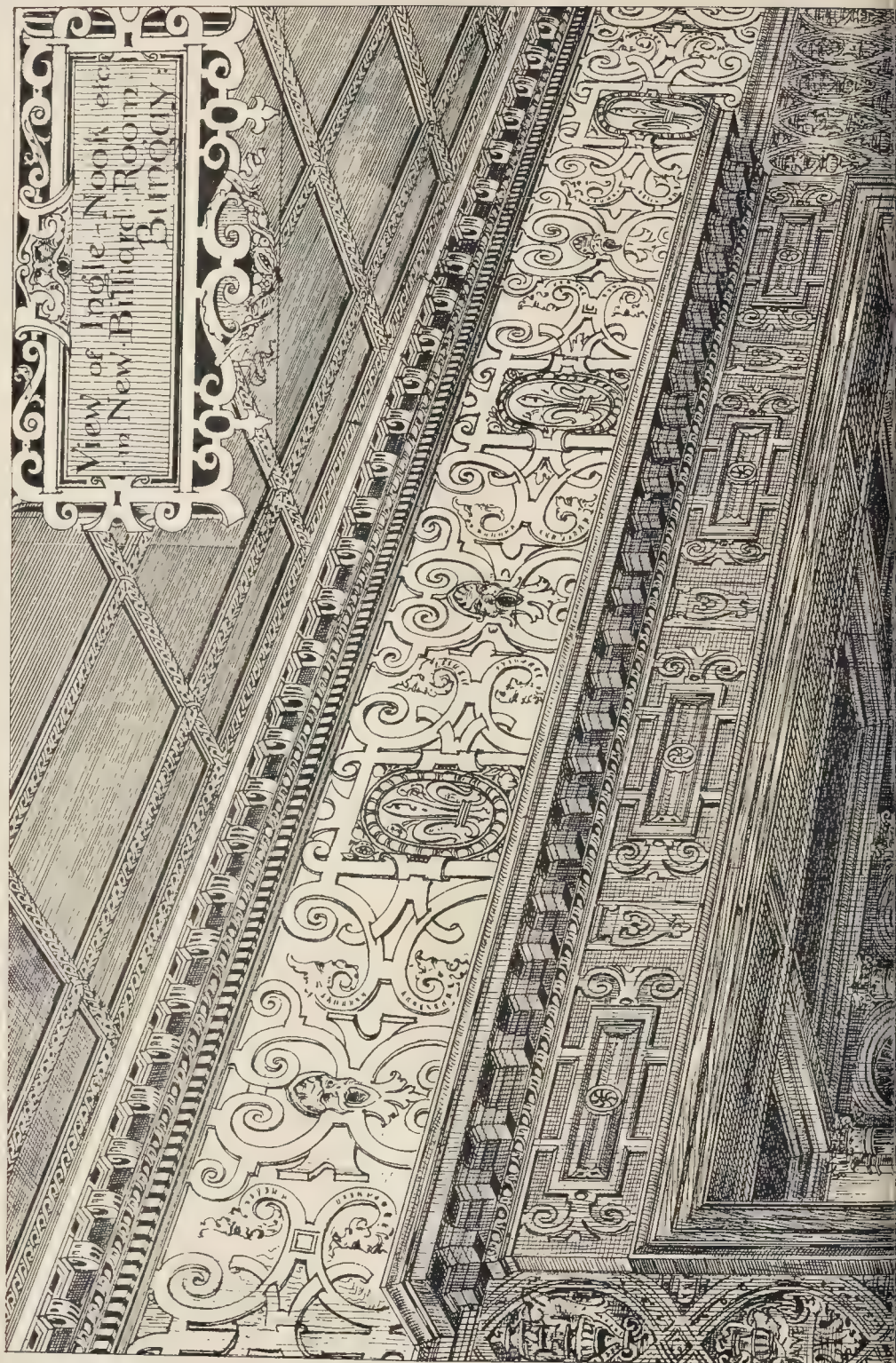
In Broadway (see fig. 4), is a peculiar instance of the transition from the Tudor to the Jacobean style. The outline of the doorway is distinctly Gothic, having a four-centred head and leaves in the spandrels, but the detail is Classical, with dentils worked all round it and down the label moulding.

The roofs are frequently broken up with dormers, and these are treated in various ways, as you will see in the photographs exhibited.

The chimney-stacks are invariably carried up solid until the roof is well cleared, when the flues (see figs. 2, 4, and 6), are treated separately, either square or diagonal on plan, and the cap ties them together at the top. This, however, was the general method of treatment throughout England at this period.

In connexion with the windows I must speak of their fittings and their delicate and refined iron work. Many beautiful examples of these I show you to-night, both in the actual metal and in drawings. Great time and care were spent in the seventeenth century on the furniture of the doors and windows, and some of the iron casement fastenings in these Cotswold villages and houses are beautiful examples of the smith's work. When one considers that these houses were occupied and built for the yeomen and ordinary workers of the land, and that in the humblest cottages fastenings as delicate as the examples I exhibit are found, it grieves one to think that such work in such situations is unheard of in modern buildings. All of these fittings were made by the local smiths in the villages where these houses were built, and from





View of Ingle-Nook etc.
in New Billiard Room
Budget



Royal Academy Exhibition, 1893

their frequency and variety in this part of England is evidence of a great power of design. In a window in the Kite's Nest—a farm-house near Broadway—you will notice the ingenious way in which the one handle works the top and bottom catches, and how cleverly the initial S is worked in and dominates the entire design. Can we not fancy the pride and pleasure of the smith in making such a charming piece of work? The door furniture, hinges, and lock plates show very great variety, and are evidences of a refinement of thought and feeling quite unknown amongst the rural population of the present day.

Plaster used in a constructional sense is uncommon, though there are a few instances in which the old "Wattle and Dab" treatment still remains. This is a rough framework of timber, covered with closely-woven and interlaced wicker-work, plastered on the outside face, the whole generally raised some four or five feet from the ground on a stone base. Only barns and farm buildings are treated in this way, and not the houses. In some instances, the stone buildings have been stuccoed, probably about the latter end of last century, in a rather original way, leaving the mullioned windows and dressed stone-work exposed, and the flat wall spaces treated with stamped designs and decorations. Good examples are to be found in Stow-on-the-Wold and Burford, and other places.

The real timber and plaster-house is never seen on the Cotswold proper; but it is interesting to notice that directly one gets into the Worcester-shire and Warwickshire vale, where oak and chestnut abound, the timber treatment commences. At Broadway are some examples, though only fragmentary (see figs. 7 and 8), and then used in connexion with stone buildings, and not as a separate structure.

At Todenham, some three or four miles from the Cotswolds, in the Warwickshire vale, is a very fine half-timbered house, &c.

What is the one great lesson to be derived from the study of this old work of the Cotswold district? It may be summed up in two words, "Simplicity" and "Restraint." The more you analyse and look into these old buildings the more you will discover that all their charm depends on the honest, simple, and unaffected way in which they are treated.

If you take any of these houses and begin with the plan, you will notice how plain and direct is its purpose, and how suited to the lives and customs of the people who then occupied these houses.

The rooms squarely treated, the windows and doors well placed, the fireplaces in the positions where most heat is obtainable (and yet where most effect is gained), all teach us a lesson, that in our daily work we should do well to follow. The exterior, with its broad quiet wall surfaces and simple roof, with gables at either end of the building, or with one gable standing out to mark the entrance all tell of a breadth of treatment and grasp of composition almost unknown to-day.

It must not be imagined that the great charm of these buildings is referable only to the softening and mellowing hand of time. Quiet grouping and dignified proportioning are great factors in their beauty of effect. Each building tells its own purpose at a glance; there is no mistaking the cottage for the manor house, though one may contain as delicate and refined handiwork as the other. All are treated with a consummate skill and power that show a wonderful appreciation of the beautiful at this period.

I would urge you, in your studies of old buildings, to strive to analyse their composition. Do not merely sketch the quaint bits of striking detail, but try to discover for yourselves what it is that produces the effect you see before you. If you are studying the Cotswold buildings you must assuredly come to the conclusion that everything depends on their quiet, refined, and simple treatment. Try, I repeat, and find out for yourselves how such effects are produced, and study those effects and principles, even more than mere detail. The noblest buildings in all ages depend mainly on their proportions and treatment of surfaces, and I think you will agree that the nobler and simpler the proportions, and the broader and quieter the surface, the grander in all respects the building.

Concentrate your grouping so as to give emphasis and point to parts of your design. Let some portions stand out distinctly, yet in harmony with the rest—your doorway, for instance, your dormers, roof, or chimneys. Above all, let the enrichment and ornament be so placed that it has meaning and purpose.

Poor sculpture—in this instance I mean carved enrichment and so-called "ornament"—is the

bane and curse of much modern work. How many buildings are absolutely ruined and their effect spoilt, by being covered with bad carving laid on without object or purpose, in any position where there is wall space? We see many buildings that in themselves are good in their lines and grouping, yet with their proportions marred, their wall surface frittered away, by meaningless, commonplace carving. In the houses, of all kinds, in the Cotswold district, carving is almost entirely absent, but when it is used in the building, it tells its purpose and has point and meaning and justifies its own presence. In one group of buildings, the Almshouses of Campden (see fig. 6)—a long line of quiet frontage, with a projecting gabled wing at either end raised on a terrace overlooking the road, there is but a single central panel—the arms of the founder surrounded by mantling and crest; and one instinctively turns to that simple carved stone with a feeling of admiration for the artist who designed these buildings, and the restraint he has exhibited in his work.

If you must have carving, exercise your judgment, and only place it in positions where it will emphasise and help your design; do not put bands of carving round your chimneys or under your plinths, as we often see, and do not carve all your cornices and ornament.

There is one great feature about the work of these Cotswold builders—the certain way in which they obtained effect in their buildings. An enriched panel, a carved sundial, a coat of arms, or band of ornament, are far more telling when rightly placed than a wealth of meaningless detail. Words, fitly chosen, we are told, "are like apples of gold in a basket of silver." May we not say almost as much of wisely-chosen architectural details?

As a general rule, I have always thought that if you design good mouldings with careful regard to their positions, and omit entirely all sculpture and carving, you will have a better building, and one that will live better in years to come, than if you had depended on carving for effect.

Perhaps I am to an extreme, but to me bad carving is terrible. It is always an eyesore and an irritant. It is generally coarse and always vulgar—at the best dull and insipid; but so many buildings are nowadays covered with this meaningless style of work,—bodyless griffins swallowing their tails, or corpulent cupids with wreaths of flowers—all true "fish out of water," having no regard or relation to the building and forming no part of its composition.

Aim at breadth and boldness in your designs, and cut out all the meaningless detail, and detail that has no purpose to fulfil. Group your buildings so that all is harmonious, and look well to the principle of domination and subordination.

You may say that all this applies more to large buildings than to small every-day work; but there is as much design needed and breadth of treatment wanted for the cottage and small house as for the mansion. A speaker at a former meeting of the Association once said that he thought it a blessing that we had clients who put limitations to our work—and I think it a very true remark. If we had no difficulties to overcome, no conditions to fulfil, and no limit to our expenditure, we should soon be lost in a sea of architectural trouble.

It is the having strict conditions to adhere to, and a limit of cost to keep within, that not only gives zest to our work, but also restrains one's too exuberant fancies, and compels us to make the utmost of awkward sites and indifferent materials—though as a rule the more awkward the site, the pleasure is obtainable in overcoming its difficulties.

Now let me say a few words about glass. Use all the clear white glass you possibly can, and if you must have any painted or stained windows, try and get the very best obtainable, both in colour and design, and worthy of the position it has to occupy. A simple shield and coat of arms, a single head or motto even on a ribbon, well painted and executed, attracts the eye at once. Standing out against the sky like a gleaming jewel it is worth far more than many windows, filled with interesting patterns of indifferent workmanship and material. In the country it is so far more interesting to see nature's handiwork than man's, that one does not care to be shut in by coloured glass, when the sky and birds and flowers are to be seen. I know that opinions differ greatly as to large or small squares of glass, but for my part I would, wherever possible, break up the surface of windows into small panes, either with lead or wooden bars, so as to give scale and proportion to the building, and so avoid the bald empty look of large sheets of plate-glass. Sometimes when

these latter are used the rooms are often cold, and there seems to be a draught from the windows. The origin is in the room itself, and is created by the fire. The heated atmosphere of the room is lowered in temperature by impact against the large cold surface of the glass, and returns in the direction of the fire as a chilly draught. This will often account for rooms in which plate glass has been substituted for the old lead lights being found so cold and draughty. Where the panes are small and the surface broken up, any tendency to this kind of draughtiness is not so noticeable. Of course in some positions plate glass must be used. For example, where large and extensive views are wanted, and the small panes would destroy the prospects afforded. Still, as a general rule, a window treated as I suggest will be found best for both internal and external effect.

In towns and cities the use of coloured glass is allowable; here unsightly objects have often to be shut out, but in the country you cannot have too much clear glass. A great charm is added to a window by lead glazing, in quiet patterns—not too intricate, so as to be fussy or irritating to the eye—but some of the varieties and simple contrasts obtainable by the use of squares and circles are always pleasing.

There are many villages and houses in the Cotswolds where the old glass remains intact, notably in Broadway and Campden, and the villages adjoining. This is generally tinted, from a pale amber tone to almost bottle green. It mostly was cast this colour, but a good deal is referable to age and exposure to the elements. In many of the houses—for the most part on the windows of the staircases—there are devices, crests, or initials painted in some few panes. In a charming early sixteenth century house at Temple Guiting the glass in many of the lights has a bishop's mitre, or crozier, or other symbol; but most of this has been taken away, or broken up, and the house stripped of its panellings and furniture. It now, I believe, forms the residence of a ploughman. This fine old house was at one time the summer residence of the Bishops of Oxford, and belongs now to Christ Church College.

Endeavour to make your windows long and low, so as to get all the light you can into your rooms—a long mullioned window of some six or eight lights is far pleasanter to sit by than a high window reaching nearly from floor to ceiling. At times a high sill, with a wide window-seat, is a charming feature in any room. And speaking of windows, I do not myself at all object, as so many do, to sash windows. These, in some instances, can be used with almost better effect than casements, and, if properly treated, always look well.

In country houses it is well to give great consideration to the plan, and your rooms should be well placed, with a view to convenience inside, and also appearance outside. Remember that in the country, a drawing-room is used nearly all day long, and should have a southern aspect, so as to get all the sun obtainable. It should command the garden, or part of it, and be sheltered from the approach to the house. Your hall should have a fireplace, and should be, in a measure, treated as a sitting-room, with the stairs close to and yet not opening directly out of it. It should be a bright, cheerful apartment, but with a greater air of dignity than the other rooms. The dining-room in a country house of any pretension should be ample in size—there is no greater mistake than to make a small dining-room in a country house—and the windows, in my opinion, should be placed rather high up above the ground, as this is more especially a room for meals, and will not be used much at other times, though in smaller houses where the dining-room is generally the living-room, it is more cheerful to keep the sill low. There should be a serving door opening into a scullery or lobby, and not another room. A door is better than a hatch, which is useless without servants to work together, one on either side of it. At the best it forcibly recalls the City restaurant. The lavatories, &c., should be conveniently placed, but yet quite apart, not on any account opening directly out of the hall, but out of a corridor leading to the billiard-room or the garden. It is most essential to provide a good lavatory on the ground-floor for the use of the male members of the family.

Fireplaces and chimneys will take all your time and ingenuity in country buildings, especially, as is so often the case, your house is surrounded and overtopped by high trees. Without the very greatest care, you will find some of them smoke, and all your labours will be thrown away, and all your best endeavours nullified. Clients are

obdurate where smoky chimneys are concerned, and the most beautiful chimney-piece, the most delightful inglenook, is quite lost on them, and naturally too, if they cannot get near them for smoke. One of the best arrangements is to build the flues with flat ledges, to take the down draught and prevent the wind beating right down on the fire; cowl and pots are useless in many cases of smoky chimneys.

In conclusion, I would urge all the younger members of our profession to try and spend as much time on the works and in the workshops as possible. It is only there that we can see how our work develops and note opportunities for improving our work. You will find, that your happiest hours are spent on your buildings, watching them grow from foundation to finish, and you will regret you cannot be there more.

Nothing is too small or beneath your notice if you would produce a successful building. Try all you can to do your duty, and though oftentimes you will find the work on which you have spent most time and thought passes unnoticed, you have the inner consciousness that it is done well, and that is its own true reward.

I would urge all students to try and get on some building from commencement to completion, either under some clerk of works, or as one, and to learn thoroughly all the practical part of the profession. No amount of designing and drawing, however excellent, will make up for errors in construction and a want of practical knowledge.

Something has been said lately for and against a country practice. Having been articulated in the country, and seeing nothing but country work and ways all that time, I also can sing the praises of a country practice. You will doubtless all agree that we London architects know quite as much of the way our work goes on as if we lived in the midst of it. In these days, when our work is so scattered, hundreds of miles apart, London, in my opinion, is the best centre for an architect, and I quite think we London architects are often as well acquainted with the country as those who live in it, and, if anything, more appreciative of the charming villages and beautiful rural scenes than those who live amongst them.

It must pain us all to see in so many villages the old-fashioned cottages and houses being swept away, and, in their place, hideous houses—rows in exact imitation one of another—vulgar and pretentious, bringing the artificiality of the town into the country. We hear so much nowadays of the country awakening to a great love of art, of the people appreciating architecture, and wishing for a higher ideal in life and work and its surroundings, and yet year after year sees the rapid effacement of such villages as I have described to-night, not only in this particular district, but all over England. Everywhere there is a transformation to the commonplace and sordid, and the old houses and buildings are pulled down or so altered as to be unrecognisable.

There is an old proverb that bids us "take care of the pence and the pounds will take care of themselves." In respect to our old architecture we seem to go on an inverse principle.

We take care of the "pounds"—our great national buildings, our cathedrals, our churches, and so on—and yet the poor little "pence," the cottages and small country houses, that, in my opinion, are quite as characteristic, and as essentially marking an epoch in English architecture—we neglect altogether, and are losing rapidly. Fortunately the Architectural Association does much to uphold the traditions of Old English domestic architecture. Its teaching all along has been directed to the cultivation of a love of that simple, homely style of building that finds its most perfect expression in our old country houses and villages, such as those I have spoken of to-night.

[Some notes of the discussion which followed will be found on another page.]

Illustrations.

INGLE-NOOK IN A BILLIARD-ROOM.

THIS drawing, which is exhibited at the Royal Academy, shows the inglenook and fireplace, and a small part of a new billiard-room, in a house built last year at Bungay. It is attached to an old house, and approached by means of a new garden corridor 8 ft. wide, and a special staircase. The ground floor rooms are devoted to additional offices.

The work has been chiefly done by local men, according to the express wish of the owner: the



brickwork and tiling by Messrs. Read; the wood-work by Mr. Rowe and by Mr. Foulger; painting and plumbing by Mr. Brownson; the iron-work, guttering, &c., by Mr. Richmond—all of Bungay; the plaster-work by Messrs. North, of Norwich.

The size of the room itself is 27 ft. 6 in. by 18 ft., with deep recessed windows and dais at each end; an oriel projecting into the street on one side, and the inglenook here shown on the other side, giving additional floor space beyond the dimensions above given.

The stamped plaster-work in frieze round the building (outside) and on the oriel window on the street front, the oak wainscoting and overmantel and marble-work, have all been executed by Messrs. Daymond & Son, of Westminster; the ornamental glazing, tile-work, and wall-hangings by Messrs. W. B. Simpson, of St. Martin's-lane; the parquetry-work by Messrs. Turpin, of Bayswater.

The architect was Mr. Bernard Smith, London.

ITTON COURT, MONMOUTHSHIRE.

In the illustration shown, the only existing portion of the original house is the large tower, now converted into the principal entrance.

The house is of various dates, commencing with the tower, about the latter end of the fourteenth century, down to the Georgian and Queen Anne periods.

The entire new buildings shown in the drawing and on the plan, supersede uninteresting blocks of stable buildings and out-offices of quite recent date.

It was desired and felt that the character of the tower should be used as the key-note to the new work, keeping breadth and quietness especially in view.

The works are being carried out by Messrs. Cowlin & Sons, of Bristol, under the supervision of the architect, Mr. E. Guy Dawber, of London. The drawing from which the illustration is taken is exhibited at the Royal Academy.

STONE BUILDINGS OF THE COTSWOLDS.

THESE views of various old houses in the district of the Cotswolds are from photographs by an amateur, Mr. C. O. E. Saner, of Hull. They are given as illustrations to Mr. Guy Dawber's paper at the Architectural Association, to which the reader is referred.

BOURNEMead, BUSHEY.

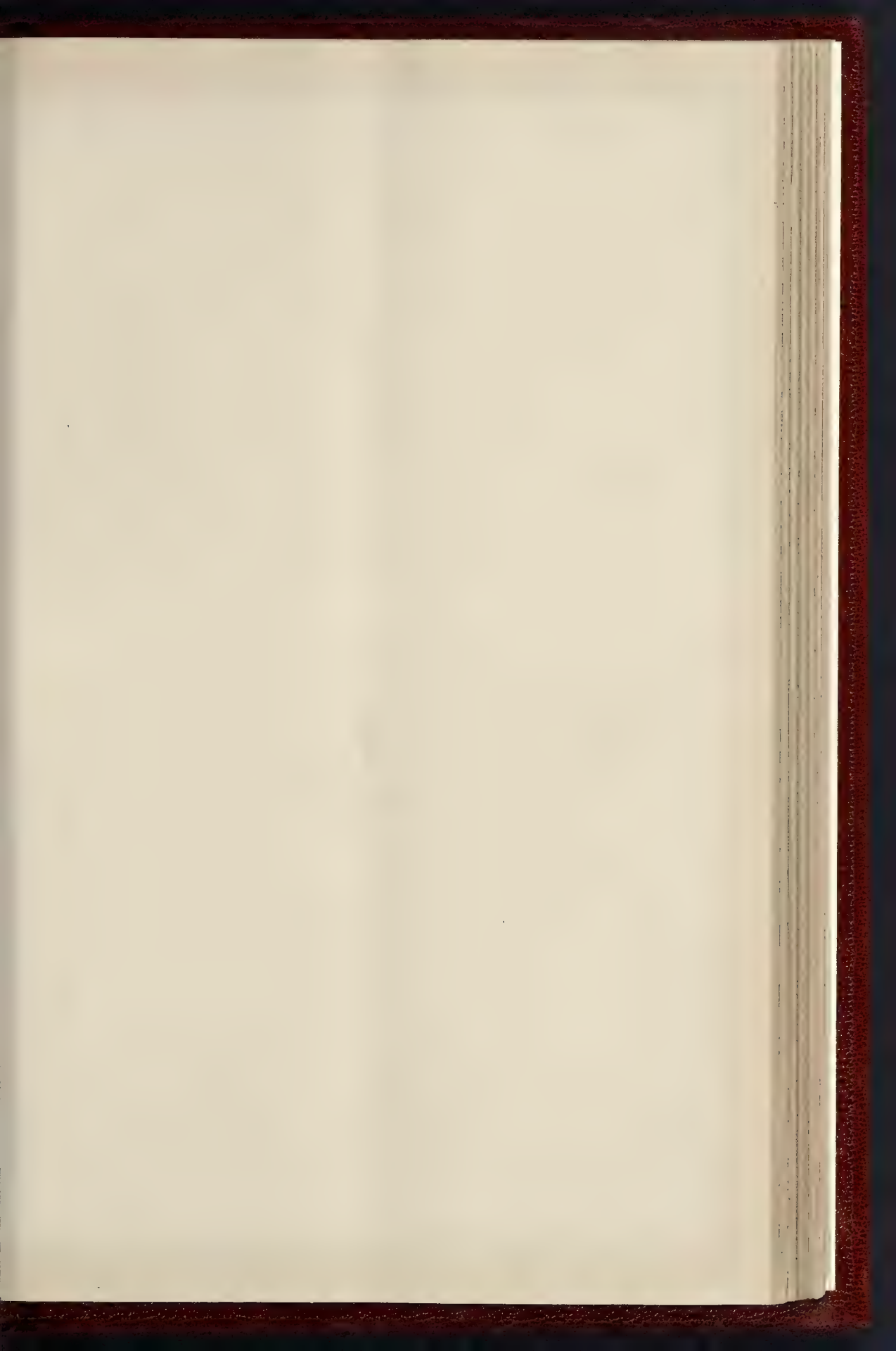
THIS is the house of an artist—a pupil of the "Herkomer School." It is built of red brick, with red weather and roofing tiles, and half-timber work in the gables. The studio has a partially open timber roof. The work was carried out by Messrs. G. & J. Waterman, of Watford, under the superintendence of the architect, Mr. J. M. Brydon.

VILLAGE HALL, FOREST ROW, SUSSEX.

THIS Hall has been erected for the use of the villagers by Mr. H. R. Freshfield, of Kidbrooke Park. It is built of the local stone from Ashdown Forest, red brick, weather tiles and roofing tiles, with half-timber work in the gables and entrance porch. The principal feature is the Hall itself, which is about 45 ft. long, by 23 ft. broad, and has an open timber roof. The general contract was taken by Mr. Job Luxford, of Forest Row, the carving over the porch and in the gable being executed by Mr. Aumonier, of London—all under the superintendence of the architect, Mr. J. M. Brydon.

This drawing, like the last-named one, is exhibited at this year's Royal Academy.

"ARCHITECTURE AT THE ROYAL ACADEMY."—Mr. A. H. Tiltman writes to say that the design for Mission Church, No. 1,492 in the Royal Academy catalogue, referred to in our last notice, is by him, the name "Tillman" being a mistake in the catalogue.



ALTERATIONS. ITTON COURT. MON.

A CORNER OF THE OUTER COURTYARD

E. GUY DAWBER ARCHT. .

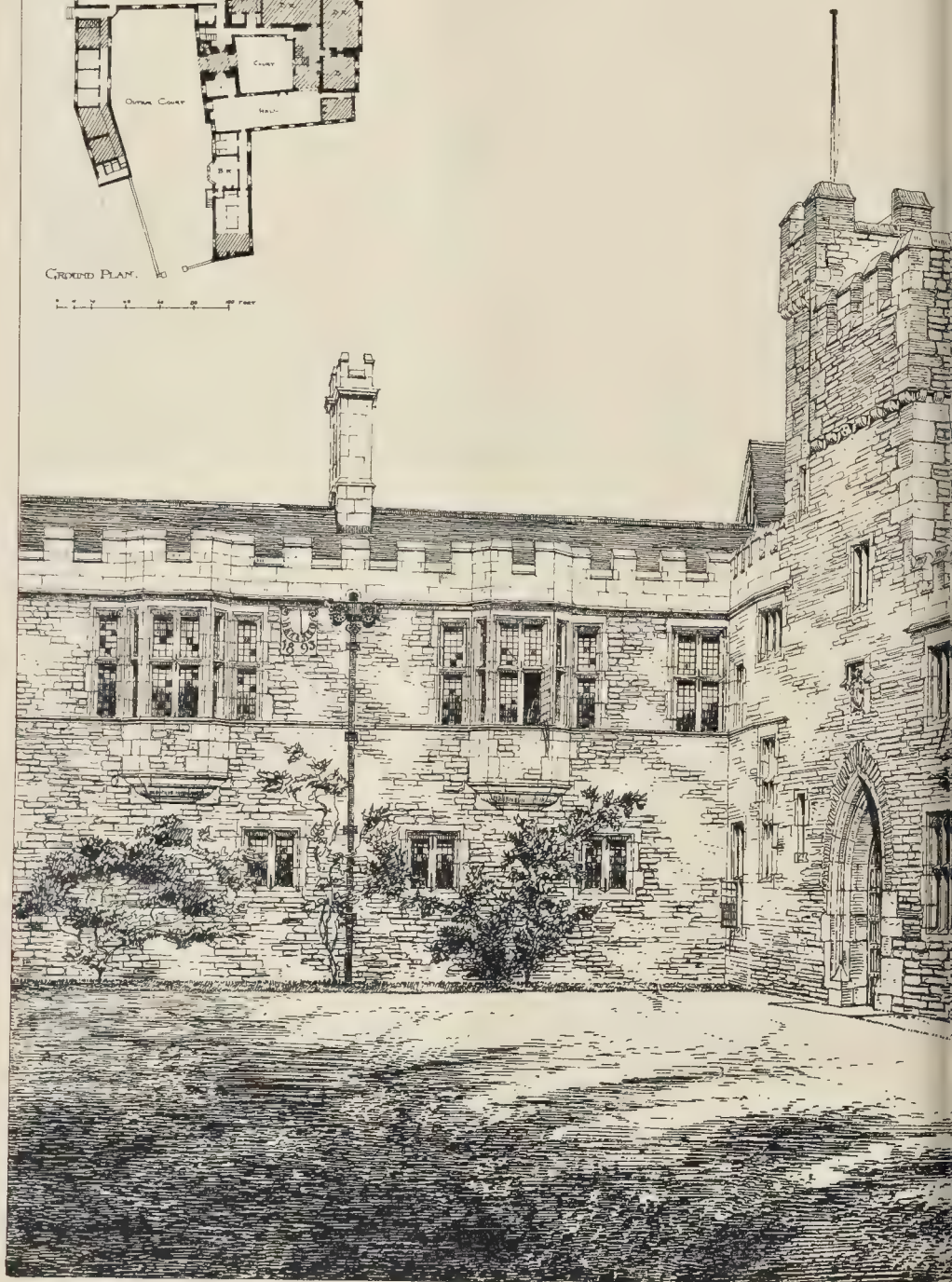
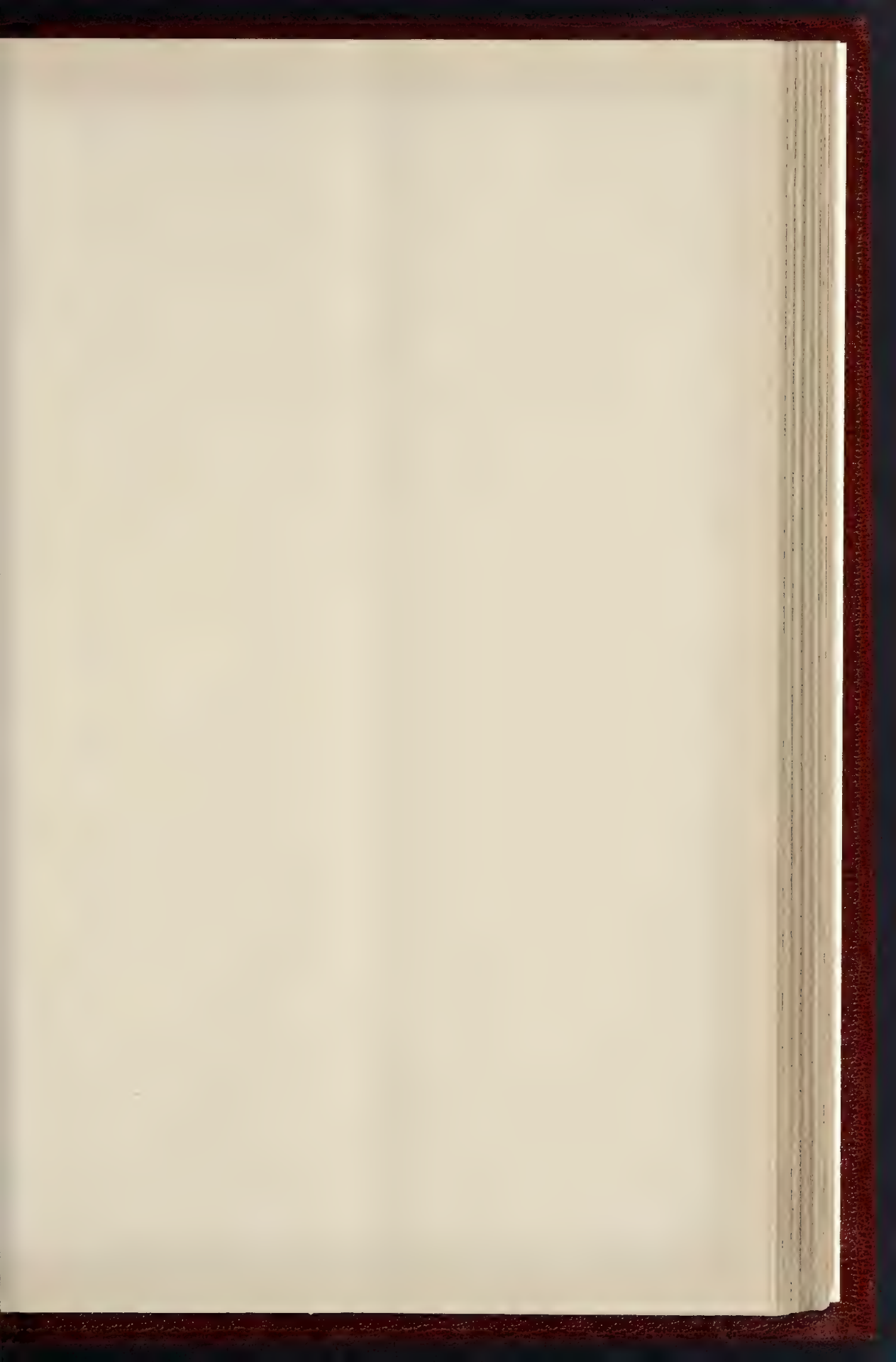


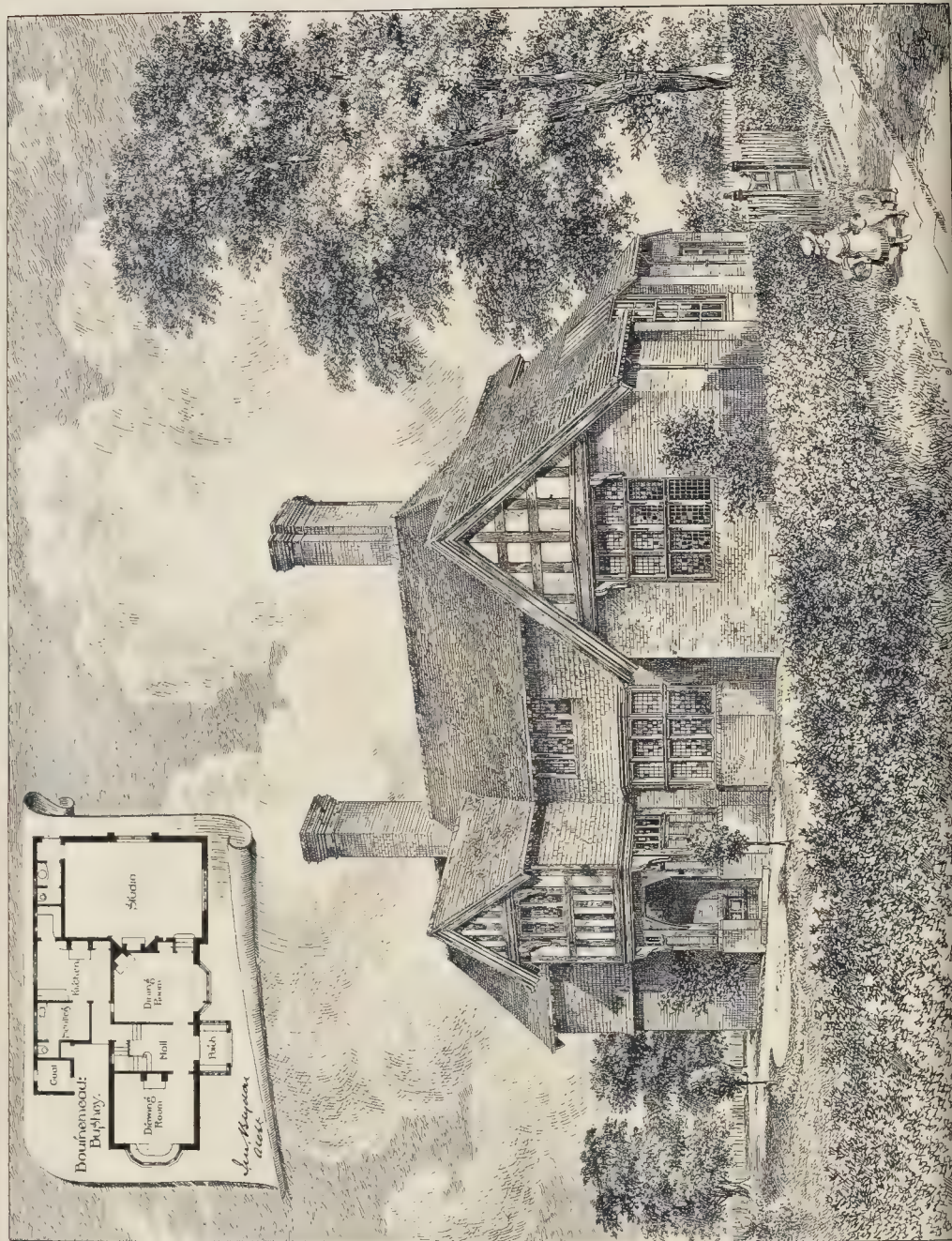


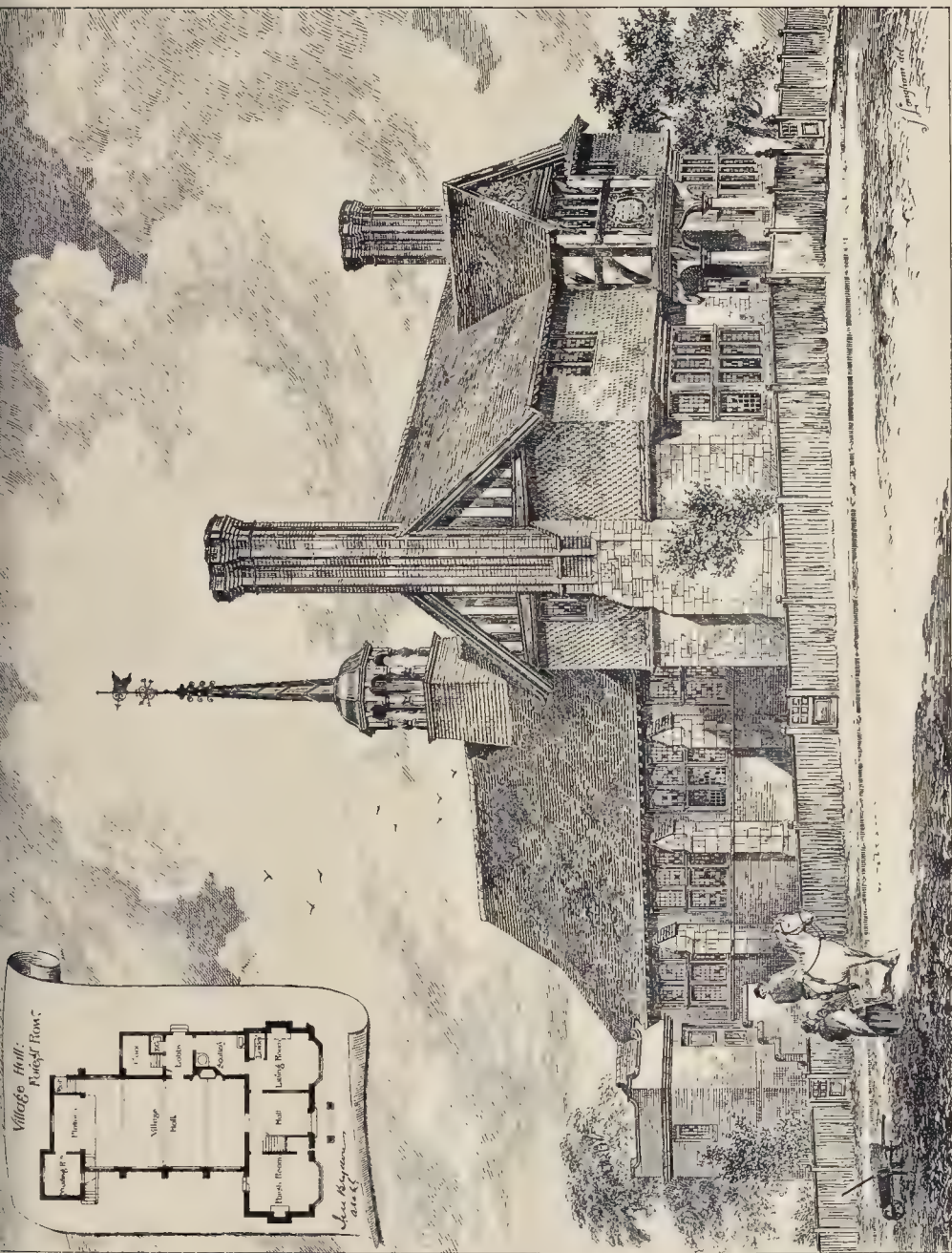
PHOTO BY THO SPRAGUE & CO 45 EAST HARDIN STREET FLETCHER LANE N.C.





THE BUILDER, MAY 20, 1893.





Royal Academy Exhibition, 1893







1 WILLERSLEY



2 FARNHAM HOUSE, BROADWAY.



1. BROADWAY.



2. MARKET HALL, CHIPPING CAMPDEN



7. BROADWAY.

FROM AMATEUR PHOTOGRAPHS BY MR. G. F. SANIER, OF HULL

4. BROADWAY.



6. CHIPPING CAMPDEN WIMBOSLES



8. BROADWAY

ARCHITECTURAL ASSOCIATION: ILLUSTRATIONS TO MR. E. GUY DAWBER'S PAPER ON "THE STONE BUILDINGS OF THE COTSWOLDS"

TOMB, WESTMINSTER ABBEY.

The tomb of the Duke and Countess of Buckingham, Westminster Abbey, of the early part of the seventeenth century, stands in the Chapel of St. Nicholas. The figures in white marble are the work of the sculptor, Nicholas Stone, who, according to Walpole, received £600 for it. His work, though somewhat florid, is refined and vigorous. The tomb has little architectural merit, but, nevertheless, it adds to the interest of the chapel.

FRANCIS D. BEDFORD.

SAINT GILES'S PUBLIC LIBRARY COMPETITION.

During the first three days of this week, the designs submitted in competition for the new Public Library for the district of St. Giles', have been on view at the offices of the Board. It was a limited competition, six architects having been invited to compete. The site is immediately adjoining the present offices of the Board, at 197, High Holborn, on the east side, and is nearly rectangular in shape. On the east of the site are Messrs. Kent's premises, separated however by a passage known as Green Dragon-yard, over which rights of way and light exist. This and the retention of certain lights in a portion of the passage leading to the Board's present offices were the chief points to be remembered in the treatment of the site.

Of the six designs sent in, the first premium has been awarded to Mr. W. Rushworth, of Palace Chambers, Westminster, Mr. W. Harrison, 64, Cannon-street, being placed second, and Mr. W. C. Marshall, of 28, Bedford-square, third. The competing architects have followed generally the instructions given by the Board in their conditions, and therefore there is a good deal of resemblance to each other in the plans in the arrangement of the various departments. The basements are devoted to storage, heating, &c. On the ground floor is the main entrance, hall, and news-room; on the first floor the lending library; on the second floor the reference library; while the floors above contain the librarian's residence and the rooms of the caretaker.

Mr. Rushworth, whose plans have been accepted, has well merited the choice made. His plan is at once strikingly simple and well arranged. The existing doorway to the offices of the Board has been taken as the keynote of the design for the frontage, and the main entrance has consequently been placed at the other, or east end of the façade. Almost immediately inside the door is the main staircase, and to the right hand the entrance to the news-room. A separate entrance for the private use of the librarian has been placed at the side, opening to Green Dragon-yard, and communicating with the main staircase, which it adjoins, at the various levels. Close to this also is the lift and ventilating shaft. The news-room itself is a spacious room about 60 ft. long, and may be best described as a rectangular apartment with the space allotted to the staircases taken out of it at the N.E. angle. The lending library on the first floor is of the same extreme length, some extra space being given to it by carrying it over a portion of the present passage to the Board's Offices, which it was possible to build over without interfering with its present top-lights. The second floor has a good Reference Library, and above are the librarian's residence and caretaker's rooms, as before noted.

In comparing Mr. Rushworth's plan with those of the other two premiated designs, the advantage gained for the whole by the judicious planning of the principal staircase is at once apparent, the form of the principal rooms being in the other two much interfered with and spoiled by an undue extension of the staircase. In Mr. Harrison's plan the Lending Library has been considerably curtailed in size, owing to the introduction of a large top-light over the back portion of the news-room on the ground floor. The treatment of the minor staircase also is not so successfully planned as in that of the accepted design.

Of the other three designs the same feature, the staircase, has spoiled the plans from its size and position, one of the competitors having placed a large circular staircase almost in the centre of the news-room.

The elevation towards High Holborn is the only one which admitted of much architectural character being introduced. We cannot say that we think either of the designs, the selected one included, are at all satisfactory. Mr. Rush-

worth's front elevation, especially in its upper stages, requires some careful revision, which we hope will be done before the work is finally executed. The general idea in all the designs has been that of a central gable with windows immediately under it, lighting the centre of the principal rooms, and flanked by doorways on the ground floor (one of which exists as before mentioned) with windows over them lighting the main staircase on one side, and a portion of the principal rooms on the other. All are "Renaissance" in character, of varying merit. As a whole, we prefer the frontage of the second premiated design.

The Board, however, have undoubtedly done wisely in choosing that design which had the best and simplest plan, and with some more care devoted to the Holborn front, refining the character of its details, the accepted one will doubtless make an excellent library for the district. The estimated cost of the building is 4,500*l*.

THE ARCHITECTURAL ASSOCIATION.

The thirteenth ordinary meeting of this Association was held on Friday evening, the 12th inst., in the meeting-room of the Royal Institute of British Architects, 9, Conduit-street, the President, Mr. H. O. Cresswell, in the chair.

Messrs. F. J. Parkinson and H. A. Douglas were elected members.

Mr. E. S. Gale, senior hon. sec., announced some donations to the library by Mr. Wonnacott, and a vote of thanks was accorded to the donor.

Mr. F. T. W. Goldsmith proposed a vote of thanks to the President for allowing the members to visit the new buildings for the *Morning Post*, as reported in our issue of the 6th inst.

Mr. Goldsmith and the President having made some observations as to future visits and lectures,

The President announced that the time for the delivery of drawings for the A. A. Travelling Studentship would be extended to July 1 at 3 p.m.; and he also reminded the members that the annual dinner of the Association would be held on May 31.

The President then called upon the senior hon. secretary to read the list of gentlemen nominated as officers and committee of the Association for the next session. The following were among the nominations: President, Mr. E. W. Mountford; Vice-Presidents, Messrs. W. D. Carie and E. S. Gale; treasurer, Mr. H. W. Pratt; librarian, Mr. J. W. Stothold; hon. secretaries, Messrs. F. T. W. Goldsmith and B. F. Fletcher. The result of the election will be announced at the next meeting of the Association, which will be the last meeting of the session. Messrs. E. H. Parkes, W. H. White, E. W. M. Wonnacott, and T. E. Yates were elected scrutineers to examine the balloting papers.

Mr. E. Guy Dawber then read a paper on "The Stone Buildings of the Cotswolds," which we print in *extenso* in this number, together with several of the illustrations of buildings referred to in it.

In the discussion which followed,

Mr. Roland Paul, in moving a vote of thanks to Mr. Dawber for his paper, said it had treated of a most interesting part of the county of Gloucestershire, a county which was very rich in domestic work. Chipping Campden was an exceedingly interesting place, and the village street was most picturesque. It was almost untouched, the oldest work—part of the Town Hall—being fourteenth-century work, and there were examples up to the seventeenth century. There were many interesting places round Campden, and some notable houses between it and Cheltenham, which could be reached by the line from Chipping Norton Junction. Mr. Dawber had spoken of the ugliness of modern rows of houses, and he (the speaker) had often thought that when we wanted to build a row of houses we might take a useful hint from the almshouses and other buildings which we saw in old towns. Nothing could be more simple than the old almshouses near the church in Chipping Campden; they were all exactly alike and very simple in treatment—simple repetitions of good features—and the result was excellent.

Mr. Leonard Stokes said he had much pleasure in seconding the vote of thanks to Mr. Dawber for his excellent paper, which had covered rather more ground than its title, for Mr. Dawber had not confined his attention to the buildings of the Cotswolds, but had given them a very excellent lecture on the designing of houses in general. He (Mr. Stokes) was a little hazy as to where the Cotswolds began and ended, but there certainly was a little town near Stroud named

Painswick which possessed some very interesting architectural remains; it was a place well worth seeing. He was somewhat surprised that Mr. Dawber had not enlarged more upon Broadway, which struck him (Mr. Stokes) as being even more interesting than Campden, although Campden had more monumental work in it. He thought that Old Broadway Church was an ideal village church. He was rather interested in Mr. Dawber's theory about plate-glass. He seemed to think that plate-glass produced colder draughts in a room than the same area of quarried glazing. He should like to feel sure that that was correct, but he did not quite see the reason for it. He should have thought that plate glass being thicker than quarried glazing would keep out the cold better; besides, the quarries were apt to get a little loose in the leading and to let the draught in. He should also like further information about the ledges in the chimneys to which Mr. Dawber had referred for the prevention of smoky chimneys. They were all very much indebted to Mr. Dawber for the excellent photographs and other illustrations with which he had illustrated his paper. The photographs, he understood, had been lent by a friend of Mr. Bilson. The whole district was very rich in interesting every-day buildings. There seemed to have been enough of the old buildings left to accommodate the present population, therefore one's nerves were not jarred upon by modern work cropping up amongst the old.

Mr. W. D. Carie said he should like to support the vote of thanks to Mr. Dawber for his charming paper. He knew a little of the district referred to, but not very much. He did not know exactly whether it was in the Cotswolds, but there was one very interesting old place named Kingswood, he thought, not far from Wotton-under-Edge. There was an old building there, with a front towards the street, having a gable, and a couple of doorways below, in a sort of College-gateway style, and a traceried window on the first floor; below the transome there was a very distinctly-marked classic pilaster. With regard to the question of plate-glass windows, he could not help thinking that Mr. Stokes was right and Mr. Dawber wrong in thinking that plate glass was less draughty than lead lights. He thought that the reason why plate-glass was thought to be more draughty was that it was generally used in sash windows, which were in themselves more draughty than other forms of windows, unless very well made. He quite agreed with what Mr. Dawber had said as to providing ledges in chimneys so as to prevent down draught and smoking.

Mr. F. R. Farrow, in supporting the vote of thanks, said he had not had the pleasure of going into the Cotswold district, but he hoped that before very long that district would be selected as the scene of one of the Architectural Association's excursions.

The President having put the motion to the meeting, it was carried by acclamation. Mr. Dawber briefly replied, and the meeting terminated.

COMPETITIONS.

TECHNICAL EDUCATION BUILDINGS, STAFFORD.—At the quarterly meeting of the Staffordshire County Council, held at the Shire Hall, Stafford, on the 9th inst., Mr. H. T. Hinkes moved—"That the Technical Instruction Committee be authorised to expend the capital sums of 8,500*l*. and 500*l*. for the purposes of the erection of the new Technical Education Buildings at Stafford, and that the common seal be affixed to all necessary contracts in connexion therewith when approved by the Clerk of the Council." He said the resolution was necessary to give effect to the intentions of the County Council to put up these buildings at Stafford. After open competition amongst various architects, the committee had approved and accepted the plans sent in by Messrs. Bailey & M'Connell, of Walsall, whose estimate was 8,430*l*. In accepting the plans, the committee insisted on some minor alterations, which the architects agreed to, and that the contract should not exceed 8,000*l*. They asked sanction to spend 8,500*l*. on the building, as it was necessary to allow a margin, and they asked to be allowed to spend 500*l*. on other fittings, and hoped the expense would not exceed those two sums. Lord Hatherton seconded the motion, which, after the insertion in the resolution after "500*l*." the words—"being part of the surplus of the sums placed at the disposal of the committee by the County Council," was agreed to.

ARCHITECTURAL SOCIETIES.

NORTHERN ARCHITECTURAL ASSOCIATION.—The annual meeting of this Association was held on April 26 last, at the meeting-room, Art Gallery, Newcastle-on-Tyne. Mr. J. H. Morton, F.R.I.B.A. (of South Shields), the President, being in the chair. There was a large attendance of members. The annual report was read and confirmed. The Committee, in drawing this Report for the 34th session, stated that they were glad to be able to place on record the more assured position and increasing prosperity of the Association. Two principal objects had engaged the attention of the Committee. 1st. The engagement of permanent rooms, in which to hold the meetings of the Association, the library, &c.; 2nd. The drawing of a curriculum of study for the younger students, and a possible alliance with the Durham College. It is hoped that this may be arranged during the next session, the Committee having been empowered at a general meeting of members to approach the College authorities with full power to negotiate the arrangements for introducing the curriculum at the College. The engagement of permanent rooms in a central position in the city has no doubt been a great step in advance, and it is now hoped that good use will be made of the room for the reading of papers, and the discussion of subjects relating to architecture and the arts generally. The Association is able to record an increasing membership—2 members, 9 associates, and 6 students have been elected during the session, the roll now standing as follows:—31 members, 41 associates, and 22 students; total, 94. In connexion with the Institute an examination qualifying for candidature as Associate of the Institute has been held in Newcastle at which six candidates entered. The Committee of the Institute are thanked for sending a selection of prize drawings, which were duly exhibited. The following members of the Association have passed the Royal Institute of British Architects Preliminary Examination:—Messrs. E. J. Watson, E. Devereux, W. Reed, and M. Martinson. Messrs. A. Shaw and C. Rochester have passed the Intermediate Examination. Excursion meetings have been held at the New Station Hotel, Newcastle, at the Village of Blanchland (old church, &c.) at Messrs. Potters' Cement Works, and the restored church at Wallsend. On December 21 a paper was read by Dr. Gibbon on "Pompeii Past and Present"; on January 11 Mr. J. Brown read a paper on "Varnishes," and exhibited a collection of gums and other materials; on February 1 Mr. Charlwood read a paper on "Stokesay Castle," illustrated by a series of carefully-prepared drawings and water-colour sketches; on February 15 Mr. W. S. Hicks read a paper on "Fashion in Architecture"; and on March 1 Mr. A. B. Plummer read one on "Waltham Abbey," illustrated by a series of measured drawings. Papers have also been read at the students' meetings, and in all cases illustrated by sketches on the blackboard, viz.:—On "Heraldry" by Mr. J. Twist; "Gothic Mouldings," by Mr. Errington; and on "Perspective," by Mr. Boyd. The sketching club have held visits and return visits at Seaton Delaval, Ilexham Abbey, and Ponteland, and the annual social evening was held on January 24, when eighty-five members were present. The Financial Statement shows a balance in hand of £88. At the annual meeting, April 26, 1893, and the following gentlemen were elected to the offices for the ensuing session:—Mr. J. H. Morton (President); Messrs. J. Oswald and T. Cresswell (Vice-Presidents); Mr. J. T. Cackett (Treasurer); Mr. A. B. Plummer (Hon. Secretary); Messrs. H. Charlwood, W. S. Hicks, W. H. Knowles, F. Rich, J. Taylor, H. Badeswick, and G. T. Brown (Committee); and Messrs. W. Glover and J. Twist (Auditors). The resignation of the late Hon. Secretary, Mr. F. W. Rich, was received with regret.

HIGHGATE SANITARY MUSEUM.—A number of students from the plumbng classes connected with the Goldsmith's Institute and the Croydon Polytechnic visited the Museum of Sanitary Appliances at Highgate on Saturday last, the 13th inst. They were met by Mr. Thomas de Courcy Meade, M.Inst.C.E., the Engineer and Surveyor to the Hornsey Local Board, and Mr. Taylor, R.P., one of the gentlemen engaged in giving lectures on plumbing at the Museum in connexion with the Technical Education Committee of the Middlesex County Council. After spending some three hours there in examining the exhibits the students left, expressing their appreciation of the completeness of the museum and the excellence of the exhibits.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday afternoon last, the Chairman, Mr. John Hutton, presiding.

Rates of Wages and Hours of Labour.—The Report of the Special Committee on this subject (printed in last week's *Builder*, p. 371) was discussed at considerable length, and the recommendations of the Committee, added to by an amendment moved by Sir Thomas Farrer and accepted by the Chairman of the Committee, were agreed to. By the adoption of Sir Thomas Farrer's amendment, the second resolution reads as follows (Sir Thomas Farrer's words being printed in italics):—

"(s.) That, for the purpose of carrying into effect the above standing order, the following words be added to standing order No. 1:—"and by contractors in respect of the supply, manufacture and production of any raw material or manufactured articles, except contractors for the supply of stores to be used in maintenance, *provided that in the case of articles manufactured at places more than 20 miles from London, the London rates of wages and hours of labour shall not apply or be required although the articles are supplied within that limit.*"

The Widening of Ludgate Hill.—The Improvements Committee brought up the following report:—

"We have had before us an application from the City Commissioners of Sewers for a contribution towards the cost of acquiring the premises Nos. 1, 3, 5, 7 and 9, Ludgate Hill, and No. 1, St. Paul's-churchyard, with a view to the completion of the widening of Ludgate Hill. The Commissioners call attention to the importance of the improvement, and they make their application on the ground of the metropolitan character of the work. The improvement provides for the eastern end of Ludgate Hill, between Creed-lane and St. Paul's-churchyard, to be increased in width from 42 ft. to 60 ft., so as to correspond with the present width of the other portion of the thoroughfare, the width of the work being 89,920 ft. We may mention that in accordance with the Council's resolution of November 26, 1880, this application has been made to and considered by us in exactly the same manner as are applications for contributions to improvements in other parts of London. It must be admitted that the widening of Ludgate Hill has been necessitated not by local but by general through traffic going to and from all parts of the county, the street in question being one of the principal thoroughfares between the east and west of London. We are of opinion that the necessity and importance of the improvement, and the fact that it is one in which the inhabitants of London are interested, thoroughly justify us in recommending the Council to accede to the application of the Commissioners. We consider that the widening of such a thoroughfare as Ludgate Hill is an improvement of so decidedly a metropolitan character that the Council can well be advised to contribute at least half the cost. We have satisfied ourselves that the estimated cost is fair and reasonable, and we therefore recommend—

"That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, the Council do contribute, on the usual conditions, one-half of the net cost of widening Ludgate Hill at Nos. 1, 3, 5, 7 and 9, and at No. 1, St. Paul's-churchyard, as proposed by the City Commissioners of Sewers, such contribution not to exceed the sum of 44,960 ft."

Mr. Hubbard moved the following amendment:—

"That, considering that the ratepayers in the City are less heavily taxed for the expenditure of the Council than the ratepayers in other parts of London, and that between the years 1856 and 1880 the City authorities received, from the late Metropolitan Board of Works 575,794 ft. 3s. 6d. out of a total of 575,471 ft. 2s. 7d. contributed by that body towards the cost of local improvements (the annual charge resulting from which is still being borne by the whole of London), the Council is not prepared to contribute towards the cost of the City improvement referred to in the report."

After a long debate, the amendment was carried, on a division, by 60 votes for to 46 against.

After transacting other business (sitting till nearly half-past nine) the Council adjourned over the Whitsuntide recess until Tuesday, June 6.

THE ARCHITECTURAL ASSOCIATION SOIREE.

The Members' Soiree of the Architectural Association was held on Wednesday evening last at the Westminster Town Hall, and was, as usual, very largely attended. The entertainment provided consisted of a "play" of the sort which has been looked for as a matter of course during the last few years, and there can be no doubt that under the auspices of the A.A. Lyric Club (who were the caterers on this as on the last two or three occasions of the kind) a great deal of latent histrionic and vocal ability has been developed.

The play performed on Wednesday night was described on the "bill" as "a painfully-new and original Medley by Theo. Moore and Ernest Rüntz, entitled *Mythology Run Mad, or Les Champs de Mars*." It consisted of a prologue and two acts. The scene of the prologue was "On Earth" at the London Terminus (designed by the Soane Medallist)

of the "Lightning Streak Railway"; but Acts I. and II. were described as taking place in Mars, Act I. on "a rampart of the Acropolis," time morning; Act II. before "the Parthenon restored: another part of the Acropolis," by moonlight. The *dramatis personae* were: *Immortals*—Zeus, Mr. T. W. Miller; *Phaëton*, "a reformed Memorialist," Mr. A. C. Bulmer Booth; Sir Christopher Wren ("warned up for the occasion"), Mr. J. Dixon Butler; Joseph Gwilt ("a confounded nuisance"), Mr. F. W. Marks; Mercury ("a recently-deceased architectural politician"), Mr. P. J. Sutton; Cupid, Mr. F. Lindsay Sutton; The Adelpi Oracle, F.O.S., by The Oracle; and Venus, Mr. Frank Galsworthy. *Mortals*: Leonard Aloysius ("a poetic craftsman"), Mr. Ernest Rüntz; Jonathan Gin Cocktail ("a Chicago entrepreneur"), Mr. C. H. Brodie; Mrs Moriarty ("of Co. Dublin"), Mr. Theo. Moore, and Josephine ("a *vingtème siècle* party-sister to Leonard"), Mr. H. Seton Morris. The play was somewhat disjointed and "mixed" as to its plot, but the dialogue and songs served as vehicles for some very free and easy "topical" allusions to persons and things architectural. Of course Lord Grimthorpe came in for a quip, and Gwilt's "Encyclopaedia" was another familiar butt. A "hit" at the Lord Chief Justice, *apropos* of his recent remarks before which Art, was laid in firm Joke was perpetrated by the "Liberator" Building Society directors, and some plain speaking about the "Memorialists," were among other points made. Regarding the controversy raised as to whether architecture is an art or a profession, Gwilt explained his views by reciting some lines after Macaulay. We quote a few lines as a sample of the whole:—

"Artists in Art's service
Did not so cry and scold,
Nor snarl and bite, nor yell and fight,
In the brave days of old.
Then none were for a faction,
Then all were for their Art;
Then the craftsmen helped each other,
And heart communed with heart.
Then jobs were fairly portioned,
Then all were in one fold;
Oh! Architects were brothers
In the brave days of old!"

Much credit is due to Mr. Percy D. Smith for the scenes, which were painted by him. In the scene before which Art, was laid in firm Joke was perpetrated by painting the Elfin Tower on the Acropolis alongside the Parthenon.

The whole of the actors acquitted themselves admirably, and, with the authors, were enthusiastically called before the curtain at the close of the performances.

THE SANITARY INSPECTORS' ASSOCIATION:

CREMATION ABROAD.

The usual monthly meeting of this Association was held on Saturday, May 6, at Carpenters' Hall, London-wall, when Mr. Hugh Alexander, Chairman of the Council, presided, and Mr. T. G. Dee, Sanitary Inspector of St. Margaret and St. John's, Westminster, read a paper on "Cremation Abroad." There was a large attendance of members. The lecturer said he had been impressed during the Paris visit of last Whitsuntide with the superiority of the methods in force in that capital (except in regard to the Morgue) in comparison with our own methods of disposing of the dead. The cleanliness and the completeness of equipment of the mortuary visited at Père-la-Chaise cemetery must have favourably impressed every visitor. The crematorium was employed far more frequently in Paris, with a much smaller population, than in London, no fewer than 5,000 cremations taking place annually in the former city. The form of apparatus generally adopted in France was first proposed by MM. Mullet and Fichet, in 1875, and a model was shown in the Paris Exhibition of 1878, the chief features of which were (a) a retort producing carbon monoxide, and (b) a fire-clay muffle placed in a chamber resembling that of a reverberatory furnace. A current of very hot air, together with carbon-monoxide, is admitted into the muffle in which the body, in its coffin, is placed, combustion at a very high temperature being sustained by the beating back of the gases at the reverberatory bar. A sufficient stream of pure air is admitted to prevent smoke, and must be continued in order to afford the necessary amount of oxygen to completely oxidise the exposed surfaces of the body in successive layers, as its bulk becomes smaller and smaller. Several other forms of furnace, the details of construction of which are given in the work of Dr. Christoforis of Milan, were briefly described, differing from each other in some respects, and all differing from the French method, in employing the calcining process, air charged with the gases of combustion, and, therefore, more or less poor in oxygen, instead of pure air containing its due proportion of oxygen. In the Gorini furnace the corpse (uncoffined) is exposed for two hours to long flames, produced by burning wood and charcoal. In the Polli and Clericietti furnaces, ordinary gas, applied through Bunsen burners, is employed, the expense being considerable. In Melsen's system, used at Brussels, the body is calcined in one furnace, and the resulting

smoke and gases are consumed in passing through a second furnace. In the system of Dr. Lemoine, practised at Washington, the body is placed in a chamber heated from the outside and burned, like charcoal, without admission of air. Thirteen chemical elements, besides traces of lead and aluminium, are contained in definite proportions in the human body, 70 per cent. being water, about 18 fatty and other tissues, and 12 per cent. bone. The principal expenditure for fuel results from the necessity of producing preliminarily a very high temperature, the loss of heat from the evaporation of the water, the radiation of heat and the loss of heat by the chimney. In a crematorium like that at Père-la-Chaise, the loss is represented by about 28 lbs. of coke per hour, but by taking proper measures this loss might be reduced by one-half. The best results with a minimum of fuel are obtained when a recuperator is used. The lecturer described the construction of the recuperator, the arrangements for the supply of air and heated gases, and for preventing the egress of smoke or flame in the sight of the mourners which arise from a wooden coffin the moment it is introduced into a chamber heated to a temperature of 700 C., or 800 C. The duration of the operation at Père-la-Chaise, where the furnace contains three bodies at once, is one hour in case of single bodies and one and a-half hours for three bodies. Every precaution possible is taken that every portion of the operation is done silently, solemnly, reverently, "decently and in order," the mourners usually devoting one hour in the chapel to devotional exercises, during the reverend remains (now rendered pure and harmless), in a small urn, the opening of which is sealed with a decoration of ribbon fastened with a wax impress of the seal of the City of Paris. The urn is finally placed, with a stone tablet epitaph, in its own sealed recess, in an extensive colonnade. These methods contrasted favourably with those in use in this country. If they were introduced, the nation might, by the efforts of sanitarians, be educated up to more sanitary and scientific modes of disposing of the dead, and the existing prejudices against cremation, which had been unhappily deepened by the eccentricities of a late Arch-Duchess, might eventually be eradicated.

A discussion followed upon the proposal of a vote of thanks, in which the Chairman, Mr. Fairchild (Chelsea), Mr. Young (Battersea), Mr. Jackling (Maidstone), Mr. Osborne (St. Pancras), Mr. West (Walthamstow), Mr. S. Legg (hon. sec.), and other members took part, the majority of the speakers being strongly in favour of cremation.

A conference of members was subsequently held, in which the arrangements for holding the annual provincial meeting at Maidstone, this Saturday, the 20th inst., were discussed. The members will be received at 11.30 by the Mayor at the Town Hall, and a sitting will be held, with the President (Dr. Richardson) in the chair, at which Dr. M. A. Adams, M.C.H., and Mr. W. G. Scoones, C.E., Borough Surveyor, will deliver addresses. In the afternoon visits will be paid to the Maidstone Sewage Works and the Pumping Stations at Forstall and East Farleigh, under the direction of Mr. Alderman C. Ellis, Mr. W. J. Ware, C.E. (the Manager), and Mr. Jackling, Sanitary Inspector. The members of the Association will be entertained in the evening by the Mayor of Maidstone.

Books.

Theory of Structures and Strength of Materials. By PROFESSOR H. T. BOVEY, D.C.L. New York: John Wiley & Sons. (1893.)

This volume forms a practical text-book for students desirous of acquiring a knowledge of the principles of Applied Mechanics connected with the design of Structures. Though provided with a suitable index, it is a book that requires to be read from beginning to end, rather than in detached paragraphs. Framed structures, earth-work and retaining walls, bridges and arches, are dealt with, and the general principles of their strains and stresses explained. At the end of each chapter some practical examples are presented for solution, the answers to the problems being furnished upon the same page, a method we commend as more instructive for a practical student than if given upon a separate page at the end of the volume, like a school-book. The author quotes his authorities, and has endeavoured so to arrange the letterpress that a student may omit the advanced portions upon the first perusal, and obtain a complete elementary course in natural sequence. The various tables in the volume have not been copied from old published records, the results of which have become more or less obsolete, but give evidence of having been compiled from the most recent and reliable results. Hinged girders, pivots, gearing, and springs are examined fully, and the theorem of three moments in connexion with continuous girders ably set forth. The book possesses the advantage of

presenting both the mathematical as well as the graphic methods of determining results, and the student is led to compare the result of one method as a check upon the other. In dealing with the subject of columns, the author states, the experiments made in America prove, as those of Hodgkinson and others in this country have also shown, that the strength of iron and steel pillars is not only dependent upon the ratio of length to diameter, and on the form of the cross section, but also on the proportion of parts, details of design, workmanship, and on the quality of the material of which the columns are constructed. The American experiments also seem to lead to the conclusion that Gordon's formula is more correct as modified by Rankine; and that, "in the case of columns hinged at both ends, Rankine's formula, with the constant assumed at double the value it has when the formula is applied to columns with flat or fixed ends, is practically correct." The diagrams in the volume are both clear and adequate.

The Student's Introduction to Mechanics. By ROBERT SCOTT BURN. London: Ward, Lock, Bowden, & Co. (1892.)

THIS volume contains a series of papers by various writers, intended to show the leading principles of physical science for the instruction of those engaged in the design and construction of machines, tools, and appliances useful in the industrial arts, and has been compiled by the editor from papers which in the first instance appeared in "The Industrial Self-Instructor." The book furnishes a series of short paragraphs, each with a suitable heading, characteristic of the matter which follows. These headings are arranged in the order of pages to form a table of contents at the commencement of the volume. There is no alphabetical index; an omission which is better than having an index unsystematically arranged. The book is full of definition, but the reader is recommended "as his best course of action, at least at the beginning of his study, not to take up time by trying to reconcile—or to understand—the difficulties caused by opposing, contradicting, or confusing definitions," for "it is," as stated by the author in another paragraph, "one of the difficulties in arranging a description of the science of mechanics, in which the subjects will be perfectly consecutive, that terms are of necessity used in discussing one subject before they can be fully explained, and which can only be done in discussing another subject, and that, the one to which the terms naturally belong." The difficulty, however, is grasped by the advanced student. The first part of the book is written in a very argumentative style, and this portion of the volume is more suitable for those who have studied the subject than it is for beginners; but the book becomes more interesting when the illustrations begin. Mathematical equations are not introduced, and the volume presents itself as a readable book for those desiring to extend their power of thought, while simultaneously studying more elaborate text-books.

The Steam Engine and Boiler. By D. KINNEAR CLARK. London: Blackie & Son (Limited). 1892.

THIS treatise provides in two volumes a detailed description of the principles and performance of steam boilers, steam engines, their construction and comparative merits, illustrated by above 2,000 figures in the text, and a series of folding plates, twenty-one in number. It comprises a very full account of the principles and practice of the combustion of fuel, with the economical generation of steam and its application to stationary, portable, locomotive and marine engines of recent date. The engines alluded to are of every variety—simple, compound, and multiple-expansive, while the boilers, likewise, are of numerous types—Cornish, Lancashire, Galloway, and other systems; the Cornish type, with a single cylindrical tube, and the so-called "Lancashire," with its double flue cylindrical boiler and globular or spherical-shaped ends, varied in the Galloway boiler by the wide, segmental, kidney-shaped flue tube into which the furnace tubes are merged, which reaches from the point of junction of the tubes to the far end of the boiler, and is traversed by closely set water tubes or pipes. Other details in these systems are also compared, and the vertical boiler system ably dilated upon. The author has spared no pains in his references to British, American, and Continental works. Chapters are furthermore devoted to his investigations to the principles of riveted joints, forming single-weld and double-weld connexions, the strength of shells and flat-plate surfaces, the resistance of flue tubes, the action of governors, valve gear, and the important

details connected with the equilibration or balancing of engine work. The comprehensive character of the volumes is fully indicated by a glance at the synopsis of contents, and the reference thereto is rendered easy by a well-studied and carefully-compiled index of subject-matter and of authorities contained at the end of the second volume. The work is thoroughly practical, and a valuable list of tables, interspersed in the letterpress of both volumes, is provided.

Correspondence.

To the Editor of THE BUILDER.

COTTINGHAM'S HOUSE AND MUSEUM.

SIR,—The house, formerly No. 43, Waterloo-road, mentioned in one of your last week's "Notes," was built by L. N. Cottingham (died 1847), who, circa 1825, laid out an estate on the south side of Waterloo Bridge, in St. John's Parish, for John Field, of Tooting. There he kept his collection of original, and cast, specimens of Mediaeval architecture and art, with examples of carvings, metal-work, furniture, &c. A catalogue (by H. Shaw, I believe) was twice printed: in 1850 for Christie & Manson; in 1851 for Foster & Son, who in November of the latter year sold, at auction, the museum, consisting of 2,000 lots. These included the ceiling and roof, with its louvre, of the Council Chamber, Crosby Place, or Hall, and the windows (Decorated) of St. Katharine's by the Tower. The catalogue is illustrated.

The "Nun's-walk," and "cell" cited by the *Pell Mail Budget*, may be perhaps explained by the fact that Cottingham's house was built within the area formerly covered by Cuper's gardens. Waterloo-road was driven through the middle of the Gardens, which extended from the Belvedere-road, *olim* Narrow-wall, to St. John's Church, in the burial-ground of which some of the trees, it is said, still remain. A plan of the site as in 1745—seven years before the Gardens were closed—was published by R. Wilkinson in 1825. Visitors by water landed at Cuper's-bridge (or stairs), close by the old "Feathers" tavern. From 1636 to 1649 the Gardens formed the garden of Thomas Howard, Earl of Arundel and Surrey, which was taken by Boydel, or Boyder, Cuper, the Earl's gardener. The ground was next rented of Jesus College, Oxford, at 1,200*l.* per annum, by Mark Beaufoy, for his vinegar and British wines factory. On the opening of Waterloo Bridge and its approaches, Messrs. Beaufoy removed to South Lambeth. Numerous views and water-colour drawings of the Gardens, and of the Beaufoy factory, showing the old orchestra, by De Cort, G. Shepherd, C. Tomkins, and others, may be seen in the *Sonne* and British Museums. W. E. D.-M.

May 15, 1893.

SHOULD BRICKLAYERS TILE?

SIR,—Pray caution your readers against accepting the rather "bumptiously" given advice of "Wat Tylor." Anyone who remembers the hurricane of about fourteen years ago, and its effect upon tiled roofs in London, will think twice before he gives up nailing and a certain amount of bedding. Anyone who knows what wind and wet together are capable of, will hesitate about substituting a perishable cement fillet for lead soakers or for lead sunk gutters up the rakes of tile roofs.

The feather-edged boarding which Mr. "Wat Tylor" approves in lieu of of battening may have advantages. I remember its introduction nearly twenty years ago in London. But there is so much boiler about getting any "wood goods" properly seasoned, that I am disposed to prefer the sawn battens; they cannot twist in the sun, and they permit the underside of the tiling to be seen and got at if need be for repairs.

Of course the necessity for nibs, nails, pegs, mortar, hay, or other bedding, battens, boards, felt fillers and soakers must vary with the locality in which we build. R.

May 10, 1893.

THE SWEET REASONABLENESS OF THE TRADES-UNIONIST.

SIR,—In November last, at the Camberwell new Workhouse buildings, two of our navvies joined one of the trade unions under the threat that unless they did so a strike would ensue.

On the 9th inst. the whole body of 200 workmen of all trades struck, owing to our refusal to discharge one of these men, against whom we had no complaint, the reason alleged being that he was unwilling to pay up arrears of his union subscriptions—a false charge, as we have since learned, certainly a matter we could in no way recognise.

By a system of coercion, we understand, the unionists have succeeded in inducing, willy-nilly, nearly all our people on that contract to join their ranks, and their leaders have intimated to us that they will endeavour to compel employers in future to

employ none but union men, adding that several leading contractors whom they named had already, to avoid difficulty, instructed their foremen to employ none but ticket men.

Employers will have enough to do if they are to interfere in the domestic broils of their workpeople, and hold an enquiry over every new man they set on, to find out (1) whether he is a unionist; (2) whether he belongs to the right union; (3) whether his subscriptions are in arrear.

In the present case the leaders could not defend the matter on the grounds of justice, but appealed to us as to the expediency or otherwise of opposing the men's wishes.

We apologise for troubling you on this matter, but think that such an arbitrary and unreasonable piece of tyranny should be made public.

F. & H. F. HIGGS.

. Since this letter was put into type we learn from Messrs. Higgs that "the ostensible reason for the strike of workmen referred to having been found to be baseless, the union organisations appear to have discontinued the movement, and the men, after remaining out a week, have applied for reinstatement, which in 90 per cent. of the cases has been granted. The whole matter arose from unreasoning prejudice against one man."

TECHNICAL EDUCATION.

SIR,—May I crave a small space in your valuable paper to air a grievance? For some years past I and several of my friends (for whom I write) have as bricklayers been applying ourselves to the technical subject of brickwork and masonry, and trying to pass the examination. Now, sir, we find that the questions set are not such as to prove a man's technical knowledge; they are very suitable for architects and draughtsmen, so that young men in an architect's office can pass the examination with flying colours, whereas an acknowledged clever mechanic who has been at his trade twenty years or more is plucked. The examination is held on a Wednesday evening from 7 to 10, so that after rushing home from work, brushing up and getting to the Institute, we feel quite unfit. We are supposed to do nine questions (all sketches drawn to scale) in three hours, but to do them properly (see Nos. 1, 3, 5, 6, 7, 10, 12, 13, 14 in Ordinary grade, and all questions in Honours grade, with the maximum of 30 marks) would take a good draughtsman three hours to do two of the above questions properly, so what earthly chance has a mechanic got after using his rough tools all day, the questions, too, often put in language such as cannot be properly understood by men of very elementary education?

Perhaps you will think me bold in making such a sweeping assertion, but there are hundreds of plumbers, carpenters, and bricklayers who agree with me, that technical education, in most subjects, as far as examinations are concerned, is a failure and a farce.

The technically skilled mechanic does not and cannot pass the examination.

In conclusion, if technical education is to become popular, the mechanic for whom it is intended must be given a chance. I enclose examination papers, which I will ask you to kindly return. Thanking you in anticipation for your kindness in publishing this, BRICKLAYER.

. Our correspondent is mistaken in thinking that "it would take a good draughtsman three hours to do two of the questions properly:—nothing of the sort is the case. Finished drawings are obviously not required; only intelligible and clear diagrams to scale. The examination paper sent is one of the City and Guilds of London Institute, on "Brickwork and Masonry." We can quite believe that many men who are very efficient with their working tools, and practically understand their business, may find great difficulty in expressing their ideas on it with pen and pencil, but the faculty of doing so is the only practical test which can well be taken in an examination of this kind, and the best proof that a man really understands the reason for what he is doing.—E.D.

MIDDLESEX COUNTY COUNCIL OFFICES, WESTMINSTER.

SIR,—This new building of red brick and stone has now had the scaffolding cleared away from it; it promised to be effective and satisfactory for its position, but is now most hideously covered with a thick white frosting from some chemical action in the bricks and mortar. We are used to a moderate amount of this white furring, which gradually ameliorates and soon passes away, but here the effect is extraordinary, and in large parts the brickwork appears as though it had several coats of lime-white. Would the architect inform us what bricks were used, and exactly what lime or cement, and sand, to enable us to avoid such a combination, as I have no doubt he will in future?

Is it proposed to use any means to remove the disfigurement? Would a fire-engine with some chemically prepared water effect any improvement?

R. W.

. We had already noticed and lamented this unfortunate disfigurement of the walls, which has

taken place to a quite unusual extent. Some information from the architect might be very useful to others who have met with similar misfortunes.—E.D.

EXTENSION OF CHURCH, WEST DULWICH.

SIR,—In your R. A. notice you ask "which is the extension?" Everything shown on the drawing is the extension. It consists of two bays of nave and aisles; a baptistry at the west end separated by a triple arcade from the nave, and flanked by two porches. EDWIN T. HALL.

The Student's Column.

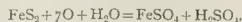
CHEMISTRY.—XX.

Compounds of Iron.

THE three principal oxides of iron are:—
Ferrous oxide FeO .
Ferric oxide Fe_2O_3 .
Magnetic oxide Fe_3O_4 .

Ferrous oxide, or protoxide of iron, FeO , is very unstable, owing to its great affinity for oxygen. It rapidly combines with atmospheric oxygen to form ferric oxide. Ferrous salts, such as ferrous sulphate, are more stable, but also have a tendency to change to ferric salts.

Ferrous sulphate, commonly known as *green vitriol* ($\text{FeSO}_4 + 7\text{H}_2\text{O}$), is obtained by exposing heaps of iron pyrites (FeS_2) to the action of the air—



It is also formed when iron is dissolved in sulphuric acid. Ferrous sulphate is largely used in the preparation of inks, Prussian blue, black dyes, &c. It is sometimes sold in commerce under the name of *copperas*.

Ferrous sulphide, FeS , is formed when metallic iron is heated with sulphur, as a black amorphous mass. When brought into contact with hydrochloric or dilute sulphuric acid, it is decomposed, and sulphuretted hydrogen is liberated. Iron pyrites is a native disulphide of iron, FeS_2 .

Ferrous carbonate, FeCO_3 , is found native in sphatose and in clay ironstone.

Magnetic, or Black iron oxide, Fe_3O_4 , is found native as loadstone, and is formed when steam is passed over red hot iron.

Ferric oxide, Fe_2O_3 , occurs in Nature as hematite. In the hydrated form, ferric oxide occurs as bog ore, which is very abundant in Ireland. Ferric oxide is of a reddish colour; it dissolves in acids to form ferric salts. Ferric oxide is largely used for red paint, and in extremely fine powder it forms the jeweller's "rouge," which is used for polishing. The Irish bog ore is used in large quantities for purifying coal gas from sulphuretted hydrogen.

Ferric chloride, or perchloride of iron, Fe_2Cl_6 , is obtained in solution when ferric oxide is dissolved in hydrochloric acid. It is used as an antiseptic and as a deodorant.

Symbol Co. Cobalt. Atomic Weight 58.7.

The metal cobalt is found in small quantities in meteoric stones. The principal ores of cobalt which are found native are: Speiss cobalt, which is an arsenide of cobalt (CoAs_2), and cobalt glance, which is a sulph-arsenide of cobalt (CoAsS). Metallic cobalt somewhat resembles iron in its colour and chemical properties.

Cobaltous oxide, CoO , or protoxide of cobalt, is a greenish powder which dissolves in acids to form a series of pinkish-coloured hydrated salts. Zaffre, which is used for imparting a permanent blue colour to glass, is an impure cobaltous oxide.

Cobaltous Nitrate $\text{Co(NO}_3)_2$ in the anhydrous condition is a blue salt. It may be obtained in the form of rose-coloured crystals by dissolving cobaltous oxide in dilute nitric acid and concentrating the solution by evaporation.

Nitrate of cobalt solution may be used as a "sympathetic" ink. When dry, the writing is of a very pale pink, but if warmed, it turns to a very visible dark blue, which, however, fades again upon cooling and absorbing moisture from the air. This property of cobalt nitrate is sometimes made use of in painting flowers, views, &c., which assume a blue colour when the air is dry, but change to pink when the atmosphere is so saturated with water that rain may be expected.

Symbol Ni. Nickel. Atomic Weight 58.7.

Nickel is more abundant than cobalt. Like cobalt, it is found in small quantities in the metallic state in meteorites. The principal nickel ore is the arsenide, NiAs , known as kupfernickel. Nickel is a silver-white metal, and is capable of assuming a high polish, which is remarkably

permanent. It is ductile and malleable, and requires a high temperature to fuse it. It has many properties in common with cobalt and iron. It is extensively used for electro-plating, and alloyed with copper and zinc as German silver. The metal is soluble in the common acids, forming green hydrated salts, and yellow anhydrous compounds.

Symbol Mn. Manganese. Atomic Weight 55.

Manganese occurs in combination with oxygen as a black oxide, termed pyrolusite, MnO_2 ; other compounds are also found, but in less abundance. Manganese is a very hard and brittle, reddish-grey metal. Alloyed with iron, it is used in the manufacture of steel.

Black Oxide of Manganese, or *manganous dioxide*, MnO_2 , is used in large quantities for manufacturing chlorine.

Manganate and Permanganate of Potassium. Green potassium manganate, K_2MnO_4 , is obtained by fusing together potassium nitrate, hydrate, and manganous dioxide. Potassium manganate is readily soluble in water, and forms a green solution (chameleon liquor), which is changed to pink colour by contact with an acid on account of the formation of potassium permanganate (KMnO_4). In practice, the permanganate is prepared by passing carbon dioxide into a solution of the manganate until the solution becomes acid; the solution is evaporated, and yields dark purple crystals. Both manganates and permanganates are effective deodorants for sewage, &c.

Manganate and permanganate of sodium is prepared in the same manner as the potassium salts, but caustic soda is substituted for caustic potash.

Symbol Cr. Chromium. Atomic Weight, 52.4.

Chromium is a constituent of many minerals, but is by no means abundant. The most important ore is chrome ironstone, $\text{FeO} \cdot \text{Cr}_2\text{O}_3$. A lead chromate, PbCrO_4 , is also found native.

Chromium Sesquioxide, or *chromic oxide*, Cr_2O_3 , is a dark green infusible powder, insoluble in water, which is extensively used as a pigment and for calico printing.

Potassium Chromate, K_2CrO_4 , is obtained by fusing chrome iron ore with potassium carbonate and lime in contact with air.

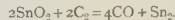
Potassium Bichromate, $\text{K}_2\text{Cr}_2\text{O}_7$, is made by treating the yellow mass thus obtained with hot water, and the resulting solution of chromate with sufficient sulphuric acid to combine with half the base.

$2\text{K}_2\text{CrO}_4 + \text{H}_2\text{SO}_4 = \text{K}_2\text{Cr}_2\text{O}_7 + \text{K}_2\text{SO}_4 + \text{H}_2\text{O}$. As the solution cools, the bichromate crystallises out in orange red crystals. Potassium bichromate is a powerful oxidising agent, and is used in dyeing and calico printing, for tanning, photography, and in the bichromate galvanic battery.

Symbol Sn. Tin. Atomic Weight, 118.

Tin is not found native in the metallic state, but is obtained from the ore termed *tin stone*, or *cassiterite*, which is a dioxide of tin found in Cornwall, India, Mexico, &c. This native dioxide (SnO_2) always contains a considerable amount of impurities. The ore is first broken up, and from the heaps thus obtained the richest lumps of ore are removed by hand-picking, while the less pure portion is crushed to a powder in a stamping mill, and from this powder much of the clay and earthy matter is washed away by exposing it to a stream of water. The tin ore, which usually contains sulphides of iron and copper in addition to arsenic as impurities, is next roasted to expel the arsenic, and to convert the iron sulphide (pyrites) into oxide of iron and the copper sulphide partially into copper sulphate. The mass which has been roasted is then exposed for a few days to the action of air and moisture, in order to convert the remainder of the copper sulphide, by oxidation, into copper sulphate, which, being very soluble in water, is removed by washing the ore. A considerable portion of the iron oxide is also removed by washing the ore in a stream of water.

Metallic tin is obtained from this purified ore by smelting it with about one-sixth of its weight of powdered charcoal and a little lime in a reverberatory furnace. The lime forms a fusible slag with any earthy impurities remaining in the ore, while the carbon unites with the oxygen of the tin ore, leaving the tin in an uncombined state:—



This crude metal, which contains iron, arsenic, and copper, is purified by re-heating the ingots of metal to a moderate temperature in a furnace with a sloping bed.

The comparatively pure tin fuses first and runs down the bed of the furnace, while the impurities,

which form a more infusible alloy with a portion of the tin, do not melt, but remain in the upper part of the furnace. Finally, the metal is often further purified by remelting it and plunging logs of wet wood into the molten metal, thereby causing an agitation which resembles boiling to take place, and the remaining impurities rising to the surface of the metal are skimmed off.

Tin is a lustrous white metal which tarnishes very slowly on exposure to damp air. It is soft and very malleable, but is not very ductile, and possesses a very low tensile strength. Tin is easily fused, is soluble in strong hydrochloric acid, and by nitric acid is converted into an insoluble white powder which, when dried, yields the tin dioxide (SnO_2), known as "putty powder," which is often used for polishing glass.

Tin is mostly employed for covering iron and copper, to protect their surfaces from the oxidising influence of moist air.

Tin Plate. is sheet iron coated with tin. The sheets of iron are first thoroughly cleansed by "pickling" in dilute sulphuric acid, then dried and twice dipped into a bath of molten tin, and finally immersed in a bath of strongly-heated tallow. The immersion in tallow causes the excess of tin adhering to the iron to run down and collect on the lower edge of the plate, from which it is easily removed.

Tinned Copper.—Before tinning copper vessels, the copper is first cleansed by rubbing it while hot with sal ammoniac, and then it is sprinkled with resin. Molten tin is then spread over the copper with a brush made of tow.

Mirrors, or "looking-glasses," are made with an amalgam of tin and mercury. Many of the useful commercial alloys contain tin as a constituent.

Tin forms two oxides—viz., stannous oxide, SnO , and stannic oxide, SnO_2 , from which a series of stannous and stannic salts are obtained.

Stannous Chloride, SnCl_2 , is perhaps the most important stannous salt. It is obtained by dissolving tin in hydrochloric acid. With chloride of gold solution it gives the precipitate known as "purple of Cassius," which is employed for imparting a purple colour to glass.

Stannic Gold, which is used as a bronze powder, is a disulphide of tin, or stannic sulphide, SnS_2 .

Symbol Sb. Antimony. Atomic Weight 122.

Although antimony is occasionally found in the metallic state, it is almost wholly obtained from the ore called *stibnite*, which consists largely of antimony trisulphide, Sb_2S_3 . The trisulphide is separated from the remaining portion of the ore, by heating the ore in vertical retorts which are perforated at the bottom, when the trisulphide melts and runs out through the apertures. Metallic antimony is obtained from the trisulphide either (1) by heating the sulphide with half its weight of metallic iron, or (2) by roasting it until it is mostly converted into oxide and then treating it with carbon.

(1) $\text{Sb}_2\text{S}_3 + 3\text{Fe} = 3\text{FeS} + \text{Sb}_2$
(2) $\text{Sb}_2\text{S}_3 + 3\text{C} = 3\text{CO} + \text{Sb}_2$

Antimony is a bluish-white metal, and is so brittle that it can easily be reduced to a powder with an ordinary hammer. It does not oxidise at ordinary temperatures in the air. Dilute hydrochloric and sulphuric acids do not attack the metal. Alloyed with lead, antimony is used as type metal. It is also a constituent of Britannia metal and of pewter.

Antimony Trioxide, Sb_2O_3 , is formed when antimony is burnt in air. Antimony trioxide is a white powder, which, when boiled with a solution of cream of tartar (acid potassium tartrate) dissolves and forms a solution which, upon concentration yields crystals of *tartar emetic* ($\text{KSbO}_3\text{C}_4\text{H}_6\text{O}_6 + \text{water}$). In large doses tartar emetic is poisonous.

Antimony Trichloride, SbCl_3 , sometimes termed "butter of antimony" can be obtained in crystalline form by distilling a mixture of mercuric chloride and antimony sulphide, or in solution by dissolving metallic antimony in strong HCl . Antimony trichloride is decomposed when largely diluted with water, a white precipitate of antimony oxychloride, SbOCl , being precipitated. Antimony trichloride is used for producing a brown coating on steel, guns, &c., which prevents them from rusting.

Antimony Sulphide, Sb_2S_3 , is used for colouring indiarubber. It occurs native in the form of black or steel-grey crystals, but may be artificially prepared as an orange coloured powder by passing sulphuretted hydrogen through an acid solution of antimony trichloride.

Symbol Bi. Bismuth. Atomic Weight 210.

Bismuth is found in the metallic state chiefly in Saxony. It is extracted from the rock in which

it occurs by simply melting it out. As a sulphide, bismuth is found as bismuthite (Bi_2S_3), from which the metal is obtained by roasting the sulphide to oxide in the air and then reducing the oxide to metallic bismuth by heating it with charcoal.

Bismuth is a comparatively rare metal, and forms compounds much resembling those of antimony. The metal is mostly used for making alloys called "fusible metals," which melt at a low temperature. A plug of fusible metal is often let into a boiler to prevent explosion. When the steam (under pressure) reaches the temperature at which the alloy melts, the plug of course fuses and allows the steam to escape. Fusible metal is also used in the wires used for conducting electricity for lighting purposes on board ship. If by any accident the wire becomes heated to a temperature which is unsafe, the metal fuses and breaks the circuit.

Newton's fusible metal melts at 202 deg. Fahr., and consists of 8 parts bismuth, 5 parts lead, and 3 parts tin.

Rose's fusible metal melts at 201 deg. Fahr., and consists of 2 parts bismuth, 1 part lead, and 1 part tin.

Wood's fusible metal melts at 142 deg. Fahr., and consists of 4 parts bismuth, 2 parts lead, 1 part tin, and 1 part cadmium.

All these metals therefore melt at a temperature lower than the boiling-point of water.

The compounds of bismuth are comparatively unimportant.

OBITUARY.

Mr. JOHN M'LACHLAN.—The death has just taken place of Mr. John M'Lachlan, of Edinburgh. He was born at Tharhill about fifty years ago, and came early to Edinburgh, where he was educated under Dr. Ferguson.

Choosing architecture for his profession, he became a pupil under the late David Cousin, City Architect. After completing his studies by travel in Italy, Mr. M'Lachlan commenced practice on his own account in Edinburgh, where for nearly twenty-five years he has continued. The results of his labours, says the *Scotsman*, are distributed over a wide area of Scotland, and among them may be noted branch offices of the National Bank of Scotland in most of the leading towns; and in Edinburgh, those in Princes'-street, High-street, corner of Cockburn-street, and extensive additions to the law office, St. Andrew-square. He also designed the Stock Exchange offices in North St. David-street, and a large block of public offices in St. Andrew-square. Many mansion houses, villa residences, and buildings for commercial purposes were designed by Mr. M'Lachlan, and he made designs for a large number of churches, chapels, cottage hospitals, and other buildings in various parts of the country. He was one of the earliest members of the Edinburgh Architectural Association, of which he was President for two years.

GENERAL BUILDING NEWS.

THE BISHOPSGATE FOUNDATION INSTITUTE.—The foundation-stone of this Institute was laid on Saturday last the 13th inst., by the Rev. W. Rogers, Rector of St. Botolph's, Bishopsgate. The Institute has been established under a scheme of the Charity Commissioners of the City of London. Parochial Charities Act, in accordance with the provisions of the scheme, and in consultation with Mr. J. Macvicar Anderson, President of the Royal Institute of British Architects, the Governors, after competition, accepted the designs of Mr. C. Harrison Townsend, F.R.I.B.A., for the proposed Institute. These designs have received the approval of the Charity Commissioners and the London County Council. Tenders were received from thirteen builders for the erection of the Institute according to such designs, and that of Mr. J. T. Chappell being the lowest, was accepted for 24,934*l.* The Institute is to contain—(a) A Hall for "public lectures, musical and other entertainments, and exhibitions of works of art or industry"; (b) a Reading Room; (c) a Lending Library; and (d) a Reading Room supplied with periodicals and newspapers, which shall be open to the use of the public. The builder's contract provides for the completion of the buildings by Midsummer, 1894.

GRAMMAR SCHOOL, HORSHAM.—A new Grammar School was opened at Horsham on the 29th ult., providing accommodation for 100 day scholars and 20 boarders. These new buildings owe their existence largely to the Mercers Company, a distinguished member of which, Richard Collier, founded the school in 1530. The buildings form a large block on the Hurst-road, near Horsham station, and the site occupies 3 acres of land laid out for gardens, playground, cricket field, &c. The materials are red brick, Horsham stone, and Staffordshire tiles, built in sixteenth-century Gothic style. The contract for the whole of the work was entered into by Messrs. Potter & Son, Horsham, builders, at 5,795*l.*, and the work has been finished within the allotted period, the total cost being as adjusted 3*l.* 6s. 8d. less than the contract sum. Mr. Arthur Vernon, of London, was the architect.

BUILDINGS AT THE BOW, SHERBORNE.—The contract for the erection of new buildings at the site known as Adam's Corner, Sherborne, has been secured by Mr. Betten, the amount of whose tender was between 2,000*l.* and 3,000*l.* The almshouse master and brethren had secured the services of Mr. R. H. Carpenter, who had prepared the plans before his demise. The only existing premises that will form part of the new erection will be those abutting on the Parade. This house, which is a sixteenth-century place, and which adjoins the ancient gateway to the monastery, will be restored. The architecture of the new buildings will be in keeping with the general architecture of other premises in the town. On the ground floor there will be two shops, and at the back will be a smaller shop. On the second story there is to be a room—35 ft. 3 in. by 23 ft. 6 in.—and this will be let for the holding of public and other meetings. On the same story a reading-room will be provided.

WESLEYAN CHAPEL, LEEDS.—On the 13th inst. a new Wesleyan chapel was opened at Crossgates, Leeds. The chapel, which has been built from the designs of Mr. G. F. Danby, architect, of Leeds, stands on the site adjoining the schoolroom. It has been erected with pressed bricks, with stone dressings, in the Decorated Gothic style, and fronts the Manston-road. A double doorway is placed in the centre, and overhead is a large five-light traceried window, filled in with tinted leaded lights. The roof, which is open-timbered, is 32 ft. high in the centre. The chapel will, when completed, be 60 ft. by 40 ft., but at present only three-fifths of its length has been built. The accommodation now provided is for 240 on the ground floor and 110 in the gallery, which is placed over the entrance porch; but when completed the chapel will seat 510 adults. The whole of the internal woodwork is carried out in varnished pitch-pine. The cost of the present building will be about 1,400*l.*, and the principal contractors have been Mr. P. Rhodes and Mr. T. Harrod.

NEW CHANCEL, ST. JUDE'S CHURCH, MAPPERLEY, NOTTINGHAM.—The new chancel erected at St. Jude's Church, Mapperley, was consecrated by the Bishop of Derby, Dr. Were, a few days ago. Some eighteen months ago it was decided to enlarge St. Jude's Church by extending the nave and by the addition of a chancel, giving an increase in the accommodation of nearly 100 seats. Plans were drawn up by Messrs. Heazell & Son, of Nottingham, and accepted, and the work was entrusted to Mr. James Wright. The chancel is a brick and stone building, with Broseley tiled roof. The decorated east window and other details are in harmony with the nave previously built. The chancel is 38 ft. by 24 ft. The east window is of five lights, and is filled with stained glass, the subject being the Ascension. It has been executed by Mr. Samuel Evans, of Birmingham. The flooring is laid with Maw & Co.'s tiles, executed by Mr. J. G. of Nottingham. The roof is divided into panels and decorated. The choir stalls, the reredos, and the pulpit are of carved oak. A new font of carved Hollington stone, with alabaster shafts, to the memory of the late Miss Welby, has been presented by the family, and is the work of Mr. J. G. Thomas. The nave and chancel have been fitted with a system of heating by hot water by Messrs. Thos. Danke & Co. The nave has also been cleaned and decorated. The reredos and pulpit have been executed by Foster & Cooper. The decoration of the roof as well as the panels of the reredos were the work of Mr. G. F. Gascoyne.

BOARD SCHOOL, SHETTLINGTON, LANARK.—The corner-stone of the new Board School being erected to replace Eastmuir School, Shetlington, was laid on the 13th inst. The site of the new building is on the main road of Shetlington. The school, a two-storied erection, is built of red stone from Ballochmyle. The classrooms in all number 16, and are divided by sliding doors, while there are special private rooms for the master, mistress, and other teachers. There are separate entrances for the boy, girl, and infant pupils, leading into a large central hall, where, however, the staircases to each department are kept apart. Accommodation is provided for about 1,000 pupils, and the total cost of the building is estimated at 9,000*l.* On the south side of the school are placed the playgrounds and the janitor's house. Messrs. John Devlin & Son, Glasgow, are the builders, and Mr. Mitchell is the architect.

MODEL COTTAGES, GREENOCK.—The scheme for the erection of fourteen semi-detached double cottages at the corner of South-street and Finna-road, Greenock, is, says the *Glasgow Herald*, now nearing completion. The site of the cottages is on the north side of South-street and west of Robertson-street. The present Finna-road is to be closed up, and a new street opened between Campbell-street and Robertson-street. The cottages, which will be built of stone, will be finished in a very complete manner, and the accommodation is five, six, and seven apartments respectively, with scullery and out-houses. The scheme is in the hands of Messrs. Boston, Menzies, & Morton, architects, Greenock.

PROPOSED NEW SCHOOL, PAISLEY.—We understand that the Paisley School Board have instructed Mr. Thomas L. Watson, architect, Glasgow, to prepare plans for a new school, with accommodation for between 600 and 700 children, to be erected in the playground of the South School.

PUBLIC HALL, EAGLESFIELD, DUMFRIESHIRE.—On the 18th inst. Mr. H. C. Irving, of Burnfoot, opened the new Public Hall at Eaglesfield Village, Dumfriesshire. The building, which is situated in the centre of the village, is built of red freestone from Corsehill Quarries. The hall, which will provide accommodation for 350 persons, is 45 ft. long by 27 ft. wide. At the left entrance is a gentleman's cloak-room, while to the right is the stair to the gallery, which is above the cloak-room and vestibule. The platform is at the north end of the hall, while behind the platform is an ante-room. The architect was Mr. Peter Chapman, Lockerbie.

SANITARY AND ENGINEERING NEWS.

THE HIGHGATE MUSEUM OF SANITARY APPLIANCES.—A Committee of the London County Council, accompanied by Mr. Shirley, Murphy, M.D., the medical Officer of Health, and Mr. Santo Crisp, M.Inst.C.E., Assistant Engineer, visited the Highgate Museum of Sanitary Appliances on Wednesday last, and were met by Mr. H. R. Williams, Chairman of the Hornsey Local Board, and Mr. T. de Courcy Meade, M.Inst.C.E., the Engineer to the Board, by whom they were conducted over the Museum. The Committee were highly pleased with the numerous objects of interest, which the buildings contained, particularly with the sectional model of a sanitary dwelling, and the appliances for ascertaining with some degree of accuracy the flow of air through pipes used for ventilating house drains when fixed under varying conditions. This arrangement of pipes very clearly demonstrates the necessity for avoiding as far as possible all bends in the up-cast or extracting shafts as well as in the drains themselves. The latest improvements and inventions in sanitary work are constantly being added to the already extensive store of information contained in the buildings, and the fact that the Museum has been visited by 8,000 persons since the beginning of this year speaks well for its future sphere of usefulness. It was thought that if such an institution established by the Council much good would result. The Committee complimented Mr. Williams on the excellence of the collection, and having viewed the Sanitary Depot and Public Mortuary at Hornsey, returned to London.

HARBOUR WORKS, LEITH.—The tender of Messrs. Kinnear, Moodie, & Co., builders, Leith, for the construction of a reclamation embankment on the foreshore, and a wet dock, graving dock, and relative works on the east side of the Harbour of Leith, has been accepted by the Leith Dock Commission.

PROPOSED BRIDGE, DINGWALL, ROSS-SHIRE.—The scheme for the erection of Alcaig Bridge, Dingwall, was again under consideration at a meeting of the Dingwall Town Council Committee on the 18th inst. Plans of a structure to cost £2,000, were submitted by Mr. Fraser, C.E., Inverness, and approved of; but before proceeding further it was resolved to communicate with salmon fishing proprietors on the river Conon, which forms part of the ferry at the point where it is proposed to erect the bridge.

FOREIGN AND COLONIAL.

FRANCE.—M. Bérard, a former student of the French School at Athens, is to receive this year the medal offered by the Société Centrale des Architectes. —The first sale of the works of Meissonier realised 837,370 francs; the second, 593,000 francs. —Admiral Mot has been appointed curator of the Musée de Marine, in place of the late Admiral Paris. —The Académie des Beaux-Arts on Saturday last proceeded to the election of a painter in place of the late M. Cabat. The voters were thirty-three in number. At the sixth "tour de scrutin" M. Benjamin-Constant headed the list with nineteen votes, against seven for M. Aimé Morot and seven for M. Roybet. The new academicien is forty-eight years old; he was a pupil of Cabanel and made a long sojourn in the East. Among his best-known works are "l'Entrée de Mahomet II. à Constantinople," "le Harem Marocain," "les Derniers Rebelles," "Herodiate." He has been commissioned to execute, for the Hôtel de Ville, the large central ceiling of the Salle des Fêtes. M. Benjamin-Constant is son-in-law of M. Emmanuel Arago, French Ambassador in Switzerland. —M. H. Cannist has been named departmental architect of the arrondissement of Lille (Nord), and M. Batigny has been appointed Municipal architect of the Boulogne-sur-Mer. —The War Department has given orders for the removal of all the structures that have been erected during recent years in the military service zone, 200 metres wide, which surrounds the Paris fortifications. —An international hygienic exhibition is to be opened at Havre on August 1, in the gardens near the Hôtel de Ville. The general assembly of the Association Provinciale des Architectes will be held this year at Nancy, on June 15, 16, and 17, under the presidency of M. Gournond, architect, of Lyons. The organisation of architectural instruction in the provinces is to be the principal subject of discussion. —M. Denarié, architect, of Chambéry, has obtained the first premium in the competition for the construction of a group of scholastic buildings at Moutiers (Savoie). The competition was opened in 1891. —M. Adolphe Goupil, the founder in 1827, of the art-

publishing house first carried on under his name, and since by MM. Boussod & Valadon, has died at the age of eighty-seven. M. Goupil was father-in-law of M. Gerôme, the eminent painter. —The French Société d'Archéologie will hold its congress this year at Abbeville. —The jury of the competition opened at Nice for the erection of a monument to commemorate the union of the county of Nice with France, has selected, from the twenty-three competitors, three who are to compete again; MM. Darnet (sculptor) and Breffinelli (architect); MM. Allar (sculptor) and J. Febvre (architect); MM. Lombard (sculptor) and G. Redon (architect). —We have to announce the death of one of the oldest members of the Société Centrale des Architectes, M. Saint-Agnan Boucher; and that of M. Bresson, a well-known architect of Lyons, who leaves a great many works behind him.

MISCELLANEOUS.

THE WIDENING OF CHEAPSIDE (WEST END). —At their meeting last week the City Commissioners of Sewers, on the motion of Mr. W. H. Williamson, adopted a report of their Finance and Improvement Committee for the widening to 70 ft. of the roadway between St. Paul's Churchyard and St. Martin's-le-Grand, and for asking the London County Council to contribute towards the cost. We referred to this project in a "Note" on January 21 last.

LIVERPOOL ENGINEERING SOCIETY. —The annual meeting of this Society was held on the 10th inst. at the Royal Institution, Colquhoun-street. Mr. H. Percy Boulnois, vice-president, in the chair. The annual report was submitted. The roll of the Society, it was stated, comprised 240 members of all classes, of whom 3 are honorary members, 4 life members, 215 ordinary members, 8 associates, and 10 students. Reference was made in the previous year's report to the establishment of a fund for the purpose of awarding premiums for papers read before the society, and the prizes, the premiums, so bestowed to be called the "West premium." The Council had now pleasure in announcing that the first premium was awarded by the trustees, on February 8, 1893, and unanimously bestowed upon Mr. Ivan C. Barling, member of the Society, for his paper read on December 9, 1891, entitled "Sounding Apparatus."

The report was adopted, as also was the treasurer's statement. The officers for the ensuing year were then elected as follows:—President, Mr. H. Percy Boulnois (City Engineer); vice-presidents, Professor H. S. Hele-Shaw, and Mr. Arthur J. Maginnis; members of the Council, Messrs. M. C. Bannister, John A. Brodie, S. B. Cottrell, George Warren, Thomas L. Miller, Wm. E. Mills, James Morgan, and Ernest S. Wilcox; hon. secretary, Mr. Mr. K. C. F. Annett; hon. treasurer, Mr. Coard S. Pain; hon. librarian, Mr. Wilfrid S. Boulton. The adjourned discussion on the paper of Mr. E. W. Pierce, assistant solicitor to the Liverpool Corporation, on "Engineering Contracts," was concluded.

PROPOSED "OLD GLASGOW" EXHIBITION.—Considerable progress is being made with the preliminary preparations for the "Old Glasgow" Exhibition, which it is proposed to hold in the summer and autumn of next year. The exhibition will aim at illustrating the history, social life and manners, and the industrial progress of Glasgow from the earliest times up to the present century. A very strong committee, all more or less experts in various branches of Glasgow archaeology, has been organised. The great interest taken in the "Bishop's Castle" collection in Glasgow International Exhibition, and the marked success of similar collections in Manchester, Dundee, and elsewhere, go far to show that the "Old Glasgow" gathering is bound to prove of the greatest possible value. Much will depend upon the liberality of the owners of relics of the ancient life of the city, and to these the committee appeal for the loan of their treasures. The subdivisions of the proposed exhibition are expected to possess objects in art, literature, manufactures, shipbuilding, machinery, shipping, charters, incorporations, domestic articles, silver plate, ornaments, dress, the University and schools, and matters referring to distinguished natives and citizens, and historical events. The exhibition will be held in July, August, and September, 1894, in the Glasgow Institute of the Fine Arts. Mr. Robert Walker, the Secretary of the Institute, is acting secretary for the Exhibition. —*Glasgow Herald.*

MEMORIAL BRASS, ST. NICHOLAS' CATHEDRAL, NEWCASTLE.—A bronze tablet has just been set up in St. Nicholas' Cathedral, Newcastle, to the memory of the late Colonel Philip Fitz Roy. The tablet, which is the work of Mr. T. J. Gawthrop, London, is affixed to the north wall of the cathedral, near the entrance. The tablet is 6 ft. 4 in. deep, by 3 ft. 8 in. wide, in one sheet of metal.

THE ENGLISH IRON TRADE.—Matters continue very quiet in the English iron market. Crude iron is in dull inquiry generally, and there is still little life in the demand for finished iron. Tinsplate makers on the whole are well occupied. The steel trade gives promise of increasing activity. Shipbuilding exhibits little amelioration, and engineers and ironfounders are not in receipt of many fresh orders. The coal trade remains quiet. —*Iron.*

NATIONAL EXHIBITION, BUDAPEST, 1896.—A note has been received by the Department of Science and Art, through the Foreign Office, from the Austro-Hungarian Ambassador at the Court of St. James's, announcing that a National Exhibition will be held at Budapest in 1896, commemorating the thousandth anniversary of the foundation of Hungary.

BOVEY HEATH BRICKWORKS, SOUTH DEVON.—A serious fire took place at these works the other day, doing damage to the extent of upwards of 5,000l. One of the stoneware pipe factories was destroyed. Messrs. Candy & Co. Limited, ask us to say that the fire did no damage to either the glazed brick or paving-brick works.

NEW WAVERLEY CLUB (Fifth Session).—It is announced that the eighth and last concert will be held at the Freemasons' Tavern on Monday, the 29th inst., at 7.30. The nomination of officers for the ensuing season will take place the same evening.

SURVEYORSHIP APPOINTMENT.—Mr. Arthur H. Thomas, A.R.I.B.A., has been appointed Assistant County Surveyor to the Pembrokeshire County Council.

MEETINGS.

SATURDAY, MAY 20.

Incorporated Association of Municipal and County Engineers.—Midland Counties District Meeting, to be held at the New Works, of the Cong. Eaton Local Board, Stanton-by-Bridge, near Derby.

Sanitary Inspectors' Association.—Annual Provincial Meeting, Maidstone.

Glasgow Architectural Association.—Visit to Hawkhead Asylum.

WEDNESDAY, MAY 24.

Carpenters' Company, Carpenters' Hall (Lectures on Carpentry and Joinery).—Mr. Keith D. Young on "The Setting-out and Construction of Staircases, and Joists in Joinery." 8 p.m.

THURSDAY, MAY 25.

Society for the Encouragement of the Fine Arts.—8 p.m.

Institution of Electrical Engineers.—Continuation of discussion on Mr. W. B. Sayer's paper on "The Prevention and Control of Sparking; Continuous Current Dynamos without Winding on the Field Magnets; and Constant Pressure Dynamos without Series Winding." 8 p.m.

FRIDAY, MAY 26.

Architectural Association.—(A) Election of Officers; (2) Paper by Mr. T. A. Sladdin on "The Travelling Student's Notes." 7.30 p.m.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

5,493.—WATER-CLOSERS: E. Carter.—This apparatus consists of a closed vessel of any of the usual shapes, and made of metallic or other suitable material, having in its upper side a small outlet attached to the top. Communicating with the reservoir is a funnel, or a similar shaped vessel, open at the top and rising to within a short distance of the surface of the water in the flushing cistern. A chemical substance is contained in the lower vessel, and at each discharge of the flushing cistern a regulated quantity is forced by the weight of the column of water through the outlet in the lower, thus perfectly and automatically disinfecting the closet.

7,248.—BRICKS: H. & H. J. Warrington.—This specification refers to improvements in bricks for building purposes, the object being to form bricks in such a shape as to bind more firmly with less mortar or cement, and to prevent the appearance of unsightly joints. The bricks are formed of the usual materials with the parts receiving the mortar, and which are to be recessed or cut away from the rear of the brick to within a short distance of its face. The part thus left intact forms a flange, which, when the brick is laid, presses against the corresponding part of the next brick, the recessed or cut-away portion of the brick forming a bed for the mortar, &c., the flanged portion requiring little or no mortar. The joint thus formed is scarcely perceptible.

7,278.—BRICK STRUCTURES: H. G. Johnson and J. G. Coulter.—This invention consists of one or more series of specially formed bricks for building purposes, and especially for tying walls, chimney shafts, piers, &c., to reduce the risk of cracking, bulging, or displacement. The bricks are provided with one or more dovetail or similar shaped notches, or slots, so placed that when any two bricks of suitable pattern are laid in the required position, a key-piece or tie, larger at the ends than its middle, can be inserted between them, so as to engage in the slots or notches of the bricks in such a manner as to effectually key the latter together. The key-pieces may be of any suitable material, and may be set in position by any of the ordinary methods.

NEW APPLICATIONS FOR LETTERS PATENT.

MAY 1.—8,685, J. Harding, Doors and Movable Partitions.—8,721, O. Elphick, Water-closets.—8,739, Whitehead, Spring Door-fastener.—8,739, W. Finlayson, Earthen Lavabo.—8,740, J. G. Johnson and J. G. Coulter.—8,751, T. Brown, Window-sashes.—8,866, J. Cannadine, Tombstones, Memorial Stones, &c.—8,827, Formander, Band-saws.—8,828, J. Leigh, Fireproof Floors and Roofs.

MAY 3.—8,837, J. Easby, Flushing Water-closets.—8,841, N. Sandford, Fire-grates.—8,842, J. Hacking, Rainey-cowls.—8,843, R. Venturi, &c.—8,844, J. Douglas, Heating and Ventilating Buildings.—8,853, W. Needham, Wood Screws.—8,859, J. Dollheiser, Screw-down Taps.—8,863, F. Pover, Ovens and Kilns for the Firing of Bricks and Tiles, &c.—8,865, J. McQuinn and R. Tarnall, Composition or Concrete Pavement.—8,890, Beck & Co., Lim., and Others, Draw-off Taps.—8,891, G. Prüssing, Process for Improving Cement.

MAY 4.—8,940, R. Adams, Door-Closing Appliances and Checks.—8,942, F. Thomas, Drain-Pipes, &c.—8,946, W. Kirkland, Adjustable Door and Hinge.

MAY 5.—8,977, F. Clarkson and others, Screws for Wood, &c.—8,982, J. Bousfield, Wrought-iron Built Guide

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WALSALL.—Accepted for the erection of three chapels and entrance lodge, at cemetery, Ryecroft, for the Corporation. Mr. R. H. Middleton, Borough Surveyor, Bridge street, Walsall. Quantities by the Borough Surveyor.

R. M. Hughes, Bradford-street, Birmingham .. £3,841 0 0
T. & J. Hunter, Willenhall £570 0 0

WARLINGTON.—For the restoration and enlargement of All Saints Parish Church, Warlington, Surrey. Mr. P. M. Johnston, architect, 27, Lombard-street, E.C. Quantities by Messrs. R. C. Cleed and A. H. Butler .. £3,714
Thomson & Kingham £3,459
John Greenwood £3,161
Huddley & Greenwood £283

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B. Cook & Co. £1,457
C. W. Kilguback £1,121
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WHITBY.—Accepted for the erection of a villa residence, Ruswarp, for Mr. H. H. Kinnell, J.P. Mr. Edward H. Smaller, architect, 25, Skinner-street, Whitby.
Slating.—J. Bram, Whitby £380 0 0
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Plasterer.—H. Young
Joiner.—G. Mansfield
Slater.—G. Dodgson
Plumber.—T. Meyer
Smith, G. Dearlove
Painter.—J. Thomas

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Blocks in Text.

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Beni-Hasan.



OR a good many years past the name of Beni-Hasan (or, as Fergusson spells it, "Beni-Hassan") has been familiar in the ears of every architectural student as con-

nected with the early beginnings of Doric architecture. It is probably entirely to Fergusson that we must trace this general and popular acquaintance with the characteristics of these remarkable rock-cut remains of the Nile Valley, and with their significance in architectural history. Others have studied, described, and drawn the Beni-Hasan tombs, with the incompleteness and disregard of accuracy which were characteristic of architectural research in the days of our forefathers; but Fergusson's few general remarks and small woodcut illustrations have been for a whole generation the generally accepted illustration and criticism on a collection of architectural monuments which have a peculiar and almost unique interest and value in their bearing on the origin of the most perfect style of architecture that has, as far as our knowledge goes, ever existed in the world.

We have long felt that modern archæology, with its increased sensitiveness as to accuracy of representation and thoroughness of investigation, ought to have something further to say in regard to Beni-Hasan, and in this first volume of the records of the Archæological Survey in Egypt* we have an admirable commencement of the work, in the true spirit in which such work should be undertaken. Mr. F. L. Griffith, the general editor, in his short preface, says, "Our united aim has been perfection. We are proud even of our partial success, but we are fully conscious that we have not yet raised the work to what should be its ultimate level."

Although, as Mr. Newberry observes, the tombs at Beni-Hasan had been illustrated and

described by more than a dozen distinguished Egyptologists, the present expedition has already discovered three tombs hitherto unnoticed, and copied a large quantity of hitherto unpublished drawings and inscriptions; and there appeared to be so much to illustrate that it has been resolved to spread the record over two volumes, of which the first only is now published.

A large proportion of the illustrative plates in this volume are occupied with very careful reductions of the drawings and inscriptions, which are of the highest interest to those who may be called general archæologists, in the light which they throw on Egyptian life and on some of the private history of persons connected with these remains; but of course to architects the interest of these new investigations at Beni-Hasan turns rather on the information they may yield in regard to the origin of the proto-Doric architecture which is illustrated there. The connexion between the forms in these remains, and those of early Doric architecture, can easily be traced in the imagination, though the actual links are wanting. The question is not so much what came after the eight-sided and sixteen-sided pillars of Beni-Hasan as what preceded them; and the greatest value of new investigation there to architects would be in the discovery of any hitherto unobserved details which would furnish additional information or suggestion as to the origin of the Beni-Hasan forms.

Fergusson considered that the remains at Beni-Hasan showed evidence of having been borrowed from brick architecture; his argument being that the thin tile shown on the top of the octagonal and sixteen-sided columns was just what would be necessary to give the proper seating for the beam on a brick column; that the column itself might have been built up with bricks, and that the segmental arched form of the ceiling was an imitation of an arched brick roof. He also adds that the cornice indicates a lighter style of architecture than could be derived from stone buildings. It is of interest to see whether the new volume on Beni-Hasan throws a fresh light on these points.

Mr. Newberry classes the tombs (we will assume that they are tombs) under three heads: (1) halls without columns or portico; (2) those without portico, but with a roof supported by lotus-bud columns, and formed

in the shape of segmental arches; (3) those with an outer court, a portico, a chamber divided into three aisles by sixteen-sided fluted columns, also with ceilings of curved sections. It would be a very great point if we could discover any marked difference of date between the tombs with the lotus capital columns and those with the fluted columns and plain abacus. The two features are so entirely different, and point to such a different origin, that one must consider them from quite a different point of view. In the present volume no lotus-column tombs are illustrated, and we must wait for the second volume for their fuller consideration, but we may point it out as a very important object for the explorers, to look carefully for any indications of difference of date between the caves showing these two very distinct types of column. At the same time we doubt whether it is likely that any important difference in date will be made out. The whole set seem so far to belong to one group and one period (about 2500 to 2300 B.C.), and the similarity of the arched roof in both classes of tomb seems also to connect them closely.

The most important tomb illustrated in the present volume is that distinguished as No. 2. We have here a fore-court with two eight-sided columns in front of the entrance to the inner chamber, supporting a beam form parallel with the front of the inner chamber, and a segmental arched roof parallel to the beam, between it and the inner chamber wall. The inner chamber is divided into three aisles at right angles with its front, by two sixteen-sided columns on each side of the centre aisle, also carrying imitation beams, and three segmental waggon vaults over the three aisles, between the beams. All the columns stand on the well-known wide, flat, circular Egyptian base, and all carry square abaci forms worked out of the beam. In the eight-sided columns there is no attempt at fluting; in the sixteen-sided ones there is a very slight curved depression of each face, evidently not done to obtain the decorative effect of a fluting, but merely to emphasise the edges slightly, which would otherwise be at too obtuse an angle to be very marked in their effect. It is noticeable that the only other pillared tomb of which a plan is given (No. 14) has two circular columns, and a flat roof; and

* Beni-Hasan; Part I. By Percy E. Newberry. With Plans and Measurements of the Tombs by G. Willoughby Fraser, F.S.A. With forty-nine Plates. Published under the auspices of the Egypt Exploration Fund. London: Kegan Paul, Trench, Trubner & Co.; 1893.

moreover that the bases of these have much less projection than the usual Egyptian base.

Studying No. 2 tomb, one would hesitate to accept Fergusson's theory that the columns are imitations of brick-built structure. The building up of brick columns in the sixteen-sided form would be a matter of some difficulty and elaboration. We should be more disposed to regard them as derived from wooden pillars, the edges of which could be easily taken off, to reduce them to eight or to sixteen-sided posts for improved effect merely, and the wide-spreading base-plate seems just what is necessary to give them a good foundation and prevent them from sinking in the soil. On the other hand, it seems quite impossible to regard the segmental section of the ceilings as other than an imitation of a built arch, very likely of brick. One cannot imagine any other motive for this formation of the ceilings in a rock-cut chamber. If this view is accepted, we are here brought round again to a wooden origin for the Doric column as well as the entablature; an origin which has been rather discredited on account of the fact that the earliest genuine Doric—archaic Doric—shows columns of thicker proportions than the later and more refined Doric order. But the interval, both architecturally and chronologically, between the columns of Beni-Hasan and those of Corinth and Segeste, is very great, and we have at present none of the connecting links between them. We should suggest to those who are conducting the explorations at Beni-Hasan to keep a lookout for any fact, either in the remains themselves or in the inscriptions or paintings on their walls, which will throw any light on the question whether these eight-sided and sixteen-sided columns are imitated from wooden or from masonic forms. The question is of the greatest interest in regard to the history of the origin of Doric architecture. In the meantime we may congratulate the members of the survey, to whom we owe this volume, on the admirable and conscientious work of illustration which they have carried out thus far, and the sequel of which will be looked for with the greatest interest.

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EVERY style of art undergoes changes and is influenced by the taste, or want of taste, of the age through which it passes. This must always be the case where there is that kind of civilisation which has prevailed in Europe for the last thousand years, and it is one of the essential characteristics which distinguish Western from Eastern art. The latter, though often remarkably beautiful, yet is to a certain extent monotonous, owing to its want of mobility and the absence of that power of development which is essential to all true life in Art. Of course, all growth is not growth, and all change is not necessarily improvement, so it must often happen that what is at first regarded as advance and development of the right kind, or as original treatment, may be discovered after a while to be nothing but eccentricity and affectation. How this is to be detected and arrested is a question which has constantly exercised the wisdom and ingenuity of artists and art critics.

Some writers have attempted to settle the question by saying "appeal to Nature," which is simply begging the whole question, because all these various methods in art spring either directly or indirectly from the study of Nature, and to tell a man that he is to "copy Nature" is about as valuable a piece of advice as to inform him that if he wants to become an artist he must learn to draw. In drawing and painting we cannot possibly reproduce Nature, because we have to reduce to a flat surface that which is really solid, and we have to represent light by paint; so that here we are brought face to face with two perfectly insurmountable difficulties, a "plane superficies" to represent

solidity, and a solid substance to appear atmospheric; and which is the right solution of the problem, which is the best representation of Nature, to draw an object flatly, filling in an outlined space with colour as all early painters did, and as it is still done by Eastern nations; or by certain conventional exaggerations—darkening in the background, losing the outline here and there, increasing the lights and intensifying the shadows, to produce a modern portrait of the approved academical type? Who shall say which of these is the true representation; and are not both purely conventional imitations of Nature? The latter appeals to us, because it is that which we are accustomed to see; but it is much to be doubted whether it would, if we were not trained to regard it as right. We once read an account of some missionaries who were going to visit an uncivilised tribe of Indians, who, from their carvings and drawings, seemed to possess an instinctive perception of art; so the missionaries thought that some good reproductions of well-known modern pictures might interest these natives, and accordingly provided themselves with a number, which in due time they presented to various members of the tribe. The missionaries were, however, considerably disappointed some time after when, upon visiting these people, they found most of the pictures hung with the heads downwards, some placed sideways, and only a few (accidentally) the proper way up. Which shows that to the unsophisticated mind of a savage our method of representing objects is totally unintelligible, and shows also how difficult it is to form an opinion upon any new departure in art. There are, however, a few tests which may be offered and certain conditions which must be fulfilled in all imitative arts, such as drawing, painting, &c. The draughtsman must, in the first place, show that he knows the form, character, construction, and condition of the object he is representing; whatever method he uses, he must convince the person who looks at his drawing that he has the power of impressing these points upon the mind. We must be able to see the form of the object, to realise its construction, and to receive a true idea of its character and condition. Say for instance it is a head; there must be no doubt left upon the mind whether it is that of an old or a young person, whether it is in a state of health or decay. To represent youth or hearty middle age with the marks of extreme old age would, we feel, be morbid and vicious, and to insist strongly upon such marks of decay where they should not exist is a monstrosity.

Yet this is precisely what those who have adopted the latest craze in architectural drawing are doing. We do not deny that several of these men have shown themselves to be accomplished draughtsmen, and have produced interesting and attractive work; but we do protest against every building, whether ancient or modern, whether in a good or bad state of repair, being represented as in an advanced state of decay. We have before us a view of the interior of a French cathedral, which is in reality as sound as the day it was erected (about the end of the thirteenth century), the masonry joints are quite clean and true, the mouldings sharp and unbroken, the capitals perfect, the arches and vaulting ribs free from fractures, the soffit of the vault neatly plastered without a crack in it, the pavement regular and in good order; the whole giving one the impression of a well-preserved, thoroughly-serviceable building. Now, how is all this represented in the drawing before us? The columns have huge gaping joints from which the mortar has fallen out; they are from cap to base a heterogeneous mass of chips, cracks, crevices, chinks, and crannies; the mouldings are an indistinguishable mass of scarred and splintered stone work, the vaulting ribs are broken, and plaster from the soffit of the vault has for the most part come down, showing behind it

some rough brick construction which would disgrace a coal-cellar, and in such a dangerous condition that no one who valued his life would care to venture beneath it; *walk* he could not, because the pavement is so perforated with holes and pitfalls that it would be dangerous to attempt it. Yet what is gained by all this exaggerated and nonsensical misrepresentation of an impossible condition of decay? Well, we may sum it all up in the words of a guide who once showed us over a castle, and, coming to a piece of tapestry representing some mythical scene—"This," said he, "ladies and gentlemen, his a hold, hancient, hantiquated mythe!" Another drawing which we have before us (of course we refer to reproductions of drawings) is supposed to represent a Roman Basilica church, the columns and arches of which, when we saw it a few years back, were perfectly upright and "true"; but one could not even use Mark Twain's description of a Damascus rifle-barrel concerning them, as represented in the drawing, "that it was straighter than a corkscrew, but far less so than a rainbow," for here the columns are shown wriggling about as if they had a sharp attack of "St. Vitus's dance," or were reflected in the rippled surface of some very lively river. In another of these illustrations we find Westminster Abbey represented with a roof ridge which would form an appropriate outline to a dromedary's back or a chain of mountains. We find representations of well-known cathedrals, churches, mansions, &c. (which are really in excellent repair), shown in such an alarming condition that the District Surveyor must have been criminally negligent of his duty not to have ordered their destruction long ago.

But if this craze for exaggerating the appearance of decay in ancient buildings is absurd and false, what is to be said of its employment in depicting quite new buildings? Yet even this fashion is being introduced by some of these gentlemen of the new school, and a few weeks back we noticed a reproduction of a drawing of a brand-new London church, which was to be opened the next week, shown in such a very advanced condition of decay and of hoary antiquity that a fine sturdy branch of ivy had forced its way through the glass of one of the clearstory windows, and its graceful twigs and leaves were creeping up the vaulting ribs. We should hardly have thought that the modern builder would have tended the ivy so carefully, and we wish we could obtain the receipt for making the plant grow so rapidly; it must have made a growth of at least 45 ft. in thirteen months, which would be considered phenomenal even in the East, where strange things of this kind happen. In other drawings we find modern buildings, banks, club houses, hotels, restaurants, &c., in London, represented with great putlog-holes left open and birds flying backwards and forwards to their nests; a sweet look of rustic simplicity pervades the whole scene; Phyllis and Corydon may be discovered feeding the songsters out of the attic windows of the bank. Is yon distant spire the village church within whose sacred fane these lovers will ere long be united? and is the moss-grown path beneath, the typical rose-bordered road to happiness? or are they, oh name it not! Saint Giles's "in the Fields" and High Holborn? Putlog-holes, however, are not the only uncomfortable features represented by this school of draughtsmen when drawing new buildings; for we notice that every roof has a tile off or loose; perhaps a poetical emblem of the school itself.

But to regard the matter seriously, let us inquire what this kind of architectural drawing is leading to; what it is doing in the way of instructing the public; how it is affecting architecture; and how far it is worthy of being regarded as serious, earnest, and honest work? In the first place, that art which depicts mere decay and its phenomena must be morbid, because decay is a thing to

be avoided: yes, even in architecture. Are not our architectural students now frequently going to Spain and out-of-the-way parts of Germany in order that they may study the interiors of churches and cathedrals which have escaped the ravages of time and the mutilations of the destroyer? During the very best periods of painting, the fifteenth and sixteenth centuries, did the great artists ever represent decay or ruin in buildings? On the contrary, the architecture represented in the backgrounds of Memling's or Van Eyck's pictures, the most elaborate and correct as to detail, is never decayed or ruinous. The same will be found to be the case with Crivelli, Signorelli, the early works of Raffaele, &c. These men were able to appreciate the picturesque beauties of architecture from an architectural point of view, and the people of their time were taught by them to regard it as a fine art, "the art of building"; they did not look upon their exquisite churches and houses as mere objects to attract decay, or, like Stilton cheeses, to be manipulated in such a way as to bring about premature rottenness.

The French have a modern school of novelists and poets who delight in depicting decay, disease, and loathsome spectacles; but these French novelists have at any rate the excuse that they describe and depict the terrible scenes and repulsive models correctly. The new school of architectural draughtsmen cannot claim this merit, because they are *not* true to their models and scenes, and if they desire to be considered true depictees, they ought only to draw buildings which are really in a ruinous condition, and not add these blemishes to buildings which have fortunately escaped them. Of course, all this exaggeration of decay naturally leads the public to suppose that there is no real or true picturesqueness in architecture apart from decay, and that all its artistic qualities depend upon the particular fractures and injuries brought about by a condition of insecurity and rottenness; and so they are taught to overlook the noble picturesqueness which is brought about by powerful or artistic treatment, just combinations of light and shadow, or those contrasts which form "the gloom and the glory of a grand building." All this is ignored for some chips in the stonework or some broken tiles on the roof, and thus the public are encouraged to take a childish, or, rather, a senile, view of the art of architecture.

Then again, the kind of picturesqueness which these draughtsmen represent cannot be found in any building which is in use; and the public jumps at the conclusion that the practical and the picturesque cannot co-exist in the same building, and that the latter quality is only to be sought out or looked for in structures which are intended to be ornamental, or such as are preserved as vestiges of antiquity.

Another great danger which arises from this kind of drawing is that the exaggerated representation of decay may, and too often does, become a mere cloak to conceal slovenly and incorrect drawing, and a want of architectural knowledge, both as to construction and detail. We are led to this conclusion because we have observed that not unfrequently the gaping joints occur where, in reality, there would not be a joint at all; and difficult little bits of detail are got over by being shown in a very fragmentary condition. Now, of course, when landscape painters and others find that architectural detail and construction may be played tricks with in this manner, provided that a sufficient amount of decay is turned on, why should they not all become architectural draughtsmen, and why not eliminate every architectural feature and reduce the whole to an indiscriminate jumble of cracks and fissures? Let each schoolboy only learn the "dot-and-wriggle trick," make himself a joggled-ruler, and not trouble himself about detail and construction; then the new school will have succeeded in reducing architectural drawing from a difficult but beautiful art, to a degraded combination of

tricks and dodges, which will be of no value whatever to the architect, the student, or the public.

We trust, however, that before long a reaction against this "chippy" style may set in, that the kind of drawing which demands "joggled rulers" and "dotty dodges" may be abandoned, and that in its place we may once again see careful detail drawing, showing a knowledge of construction combined with artistic and accurate rendering of the effects of light and shadow, and that regard for truthfulness and absence of exaggeration which should be marked features in all true works of art.

NOTES.

SOME recent proceedings at the London County Council have not been calculated to increase the confidence of the Metropolis in that body. A vote to petition Parliament in favour of the Local Veto Bill was carried, though it is difficult to see why, if the Council petition either for or against the Bill, they should not do the same in respect of almost any measure before Parliament. A motion that the Council should contribute half the cost (a sum of 44,000*l.* odd) of widening Ludgate-hill, was met by a hostile amendment, which was carried, to the effect that the Council was not prepared to contribute towards the cost of these City improvements. Then a recommendation of the Special Committee as to fair wages was agreed to. This was to the effect that in all contracts for the supply of raw material, or manufactured articles, a condition shall be inserted that the contractor will pay the Council's rate of wages if the articles are manufactured within twenty miles of Charing-cross, or the Trade Union rate in case of articles manufactured outside that radius. It would not be a bit more Quixotic for any man in the street to go into a shop to buy a hat, and on finding that the wages paid to the hands by whom it was made were less than he thought proper to offer to pay such a price as he considered would properly remunerate them. The County Council was not elected to act as guardians of the workmen of Great Britain, but to manage the affairs of London with efficiency and economy.

THOSE who are interested in Colonial building materials will do well to go to the Imperial Institute, and to select a quiet day for the visit. The exhibits in the museum galleries are not all arranged, though a desperate attempt was made to get them into order by the 17th inst., when the governing body, with the Prince of Wales at its head, gave a reception, but there is more than enough finished to warrant a preliminary inspection. The various woods and building stones are, for the most part, the same as were shown at the Colonial and Indian Exhibition, but they can be seen to better advantage in their present home. In an Indian-Ceylon gallery we noticed some examples of building stones, the majority of which appeared to be excellent materials, though two or three certainly were of a very poor description, and not worth exhibition. The fine display of woods in the same section also might have been considerably improved by the judicious weeding out of certain pieces which, evidently, were fashioned before the timber was in a fit condition. Perhaps no part of the galleries claims, at the present stage, more attention than that devoted to the economic products from the Australasian colonies. These are in good order, generally, though we hope to see the exhibits labelled with more information eventually. Building stones and marbles form prominent objects, occupying central spaces in two or three of these Colonial departments, but we are at a loss to understand why the samples should have been canteined together in the form of trophies. We take it that one of the objects

of the Institute is to illustrate the ever-changing products of each country, and to keep them up to date, as far as possible. The rapid development of our colonies must of necessity lead to the extensive employment in the near future of other building stones than those at present known, whilst several now in use must in course of time be discarded; and no one would pretend that the series on view is as representative as could be desired. By making the exhibits into permanent objects it is hard to see where any new arrivals can be placed to be systematically classified; it rather looks as though no important changes were contemplated—no further attempt to be made to make the collection more comprehensive and useful—but we trust we are mistaken as to this. The samples of timber in the Australasian Gallery are remarkably good, and well illustrate the indigenous varieties of each Colony. The magnificent specimens of "Jarrah" in the Western Australian division recall to our mind the fact that much of the wood pavement at present laid down in London and elsewhere is constructed of this hard material. Referring to another matter, we are sorry to see that the executive of the Institute have announced that a band of music will be in daily attendance; that occasional vocal and instrumental concerts will be given; and that the amusements on Saturdays will be more lengthened than on other days. This seems like an attempt to transform an institution which was intended for serious objects into a mere place of popular amusement.

WE have received a circular from Sir Douglas Galton, dating from University College, calling attention to the formal opening next Monday, by the Duke of Connaught, of the new Mechanical and Electrical Engineering Laboratories for University College, which have been in course of erection for the last ten months, and at the opening of which "many distinguished persons" are to be present. We shall be fully prepared to do justice to the arrangements of the new laboratory when the day comes; in the meantime, let us call the attention of Sir Douglas Galton and others who are concerned in the matter to the architectural defacement of the College produced in the erection of these new laboratories—a matter which they seem to have overlooked or to regard as of no consequence. University College is the best work of Wilkins, an English architect of some note. Its central facade and return wings, the latter very well carried out in harmony with the original design by Professor Hayer Lewis, surrounding three sides of the open space on the east of Gower-street, formed a very fine and dignified piece of architecture, one of the best things of its kind in London. To get the laboratories, buildings entirely without any pretence to architecture have been built half across the opening of the quadrangle, a portion of them in two or three stories, the other portion a one-story building, solid, but with no more pretence to architecture than a shed, half obliterating Wilkins's facade and utterly destroying the effect of his building as a whole. There is not even the slightest attempt made to harmonise the new building with the existing one. A more brutal defacement of a fine piece of architecture it would be impossible to imagine than that which the "various distinguished persons" have been invited to inspect, as an example of the way we do these things in England. We hope that among the "distinguished persons" may be some who have a little sense of the claims of art as well as of science, and who may be disposed to speak their mind on the subject.

WE may congratulate Mr. John Burns on the admirable and trenchant criticism which he made, in Committee of Supply last week, in regard to the delay in

completing the South Kensington Museum. The front to Brompton-road, he truly said, was "like a blank factory wall after a fire." What, he continued, was 400,000*l.* to a nation like this? "It was only half the price of an ironclad, to be sunk through a fault in the compass or defective knowledge on the part of her commander." We should hardly accept Mr. Burns as an authority on naval matters; but it is satisfactory to find a member who represents the working classes speaking up so strongly for the adequate completion of a great Art Museum, the present state of which is a disgrace to the nation, and adding that he would gladly support an addition to the vote if it were possible for private members to propose an increase of it. Inasmuch as Mr. Burns is politically allied to the Radical party in the House of Commons, which always endeavours to oppose all expenditure on art, it is the more to his credit that he should have so strongly supported the opposite and more enlightened view of such a subject.

THE current "Quarterly Journal of the Geological Society" contains a suggestive article on the microscopic structure of Wenlock limestone, by Mr. E. Wethered, which constitutes a distinct advance in our knowledge of the formation of that material. The observations were for the most part made on the stone derived from quarries at May Hill (Gloucestershire); Purley, near West Malvern; and Ledbury. Three classes of limestone were studied:—(1) Massive (2) thin bedded, and (3) nodular and irregularly bedded. After boiling portions of the limestones in hydrochloric acid the results indicated a larger proportion of residue than is usual in most limestones, and as there is evidence that the mineral grains in the original sediment have undergone decomposition, it is clear that the amount of sediment deposited was considerable, so that the structure and composition of the stones have been materially modified during past geological time. It is now ascertained that the remains of crinoids enter largely into the structure of these limestones, shell fragments come next in importance, then valves of a minute crustacean, and lastly brozoa. The organism known as *Girvanella*, which the author had previously shown to be common in some oolitic stones, contributes largely to the formation of some of the beds, and, indeed, oolitic structure has been demonstrated to occur in some Wenlock limestones. The cementing material in the stones under discussion in most instances is calcite—a crystalline form of carbonate of lime. We trust that Mr. Wethered will continue his observations on the structure of limestones, a subject which has hitherto received but little attention at the hands of geologists, but which has considerable bearing on the method of weathering of certain building stones.

IN the *Deutsche Bauzeitung*, there is an illustrated article by Herr Ebhardt on "Ancient Rhenish Castles," which deserves the attention of visitors to that part of the Continent. The castles particularly referred to are those of Rheinfels, Turmberg, Katzenellenbogen, Schomburg, and Reichenberg. In most cases the principal walls of the castles alone remain. The design is practically the same in all cases, the site being always on the side of a prominent crag, facing the river, between two valleys, and thus rendered inaccessible from all sides excepting the rear, where protection was afforded by a moat and rampart, the latter in some cases as high as the castle itself. It is noticeable that none of the castles are built on the summit of the crags, but that the principal tower is carried so high as to afford a view over the country lying to the rear. The Castle of Reichenberg is

* "Quart. Journ. Geol. Soc.," vol. xlix. (1893), pp. 236 et seq.

practically the only one that retains any architectural details. It is principally built of slate from the neighbouring quarries, and to judge from its architectural features dates from the twelfth or thirteenth century. Its roof was still on in 1818, when after weathering the storms of war the castle was sold for the value of the materials and a demolition commenced which would have been complete but for the exertions of the late Herr Habel. In the lower part several chambers have now been made habitable, and a collection of ancient weapons and armour is shown in them. The court-yard, a flight higher, is still surrounded by the old massive walls; and to the left of the gateway is the old main building, rising to a height of four or five stories, also still in very fair condition. Herr Ebhardt's interesting article concludes with a strong complaint as to the action of the authorities, who, he says, do absolutely nothing to prevent the complete decay of this valuable historical relic. We know that the Prussian Government spends much money on "restorations" in the most out-of-the-way places. Surely it would pay them to keep a place in repair where there are swarms of tourists ready to pay a toll to see a good example of a Mediæval castle.

IN Notes and Queries of last week a contributor directs attention to the ancient church of Grey Friars, Aberdeen, which it is proposed to demolish for the new front, in Broad-street, of the Marischal University Buildings. He says that whilst the University authorities would preserve the church, the Town Council, who are contributors to the extension scheme, wish for a fresh elevation entirely of granite. It is stated that Grey Friars and portions of East Church (which was partly rebuilt, in 1834, on the St. Nicholas site) form the only remaining pre-Reformation buildings in the city. Grey Friars, formerly called the College Church, was built in the interval, 1518-32, by Bishop Dunbar, the architect being Alexander Galloway, rector of Kinkell. Enlarged last century, it is now almost surrounded by later structures.

WE have received an illustration, as also the block from which it was printed, of the ceremonial key with which the Queen unlocked the Imperial Institute on the opening day. The design is considerably better than some similar things that have been sent to us, but it shows nothing to justify its publication in our pages. We shall be only too glad to publish the designs of ceremonial keys and other objects of the same class when we receive anything which is really the design of an artist; and that is little likely to be as long as the name of the real designer and artificer of such objects is kept hidden behind the frontispiece of a trading firm. Give an artificer the chance of distinguishing himself as an artist and getting credit for his work, and he may do something really good; at all events he will be more ambitious to do so and more likely to try than when it is merely a question of satisfying an employer and getting his wages and no credit beyond. Or if a firm do not like giving an artisan this chance, why do they not at least go, on such an occasion, to a known artist and get a design from him? They might then send us something worth publishing. As it is, all we can say of the Imperial Institute key is that we have seen a good many worse ones, with which negative praise its projectors must be content, as far as we are concerned.

IN these days of competitive examination we feel disposed to suggest one more application of this test of fitness—viz., an examination of applicants for admission into picture exhibitions, to show that they have sufficient understanding of the meaning and objects of painting to have a reasonable claim for admission. A few days ago the writer stood before a painting at the Royal

Academy which has impressed every competent person with its new and original power in the treatment of one aspect of nature, and heard nothing from the passers-by but a continuous succession of sneers and exclamations of bewilderment and disgust: "Did you ever see such a thing?" "Just look at that thing!" "Whatever do they hang such a picture for?" &c., &c. What are such people let into an exhibition for, to take up room and swallow up the oxygen from those who can make a better use of their opportunities? Of course it must be admitted that, from the financial standpoint, the receipts of the Royal Academy would be seriously diminished by their exclusion; and worse, it might be suggested that some Academicians who have the privilege of putting their pictures on the line know as little of the ends for which painting was ordained as any of the visitors.

ARCHITECTURE AT THE ROYAL ACADEMY.—IV.

1,548: "Staircase Window"; Mr. Medland Taylor. This is a very good window design, consisting of a three-light window with figures of "Painting," "Poetry," and "Sculpture," treated in low tones, with very well designed drapery. The figure subjects are cut off at a level line at the foot, but the ascending stairline is followed by the predella panels beneath the figure subjects. What there is of positive colour in the window is to be found in the background to the heads and in the lower panels. The figure of Poetry, in the centre light, is represented with one foot on a step, as if ascending stairs, a pretty reference to the position of the window. Altogether this is a bit of stained glass which rises above the average in design and idea.

1,549: "Villa;" Messrs. Ernest George and Peto. From the plan and sketches this appears to be a villa for some exalted personage, to be erected in a hot climate. The plan shows a state reception room, "his highness' private room," &c.; the most noteworthy point in the planning being the separation of the kitchen wing entirely from the house by an open covered gallery, and the position of the dining-room as an open arched pavilion reached by a short corridor branching out from the before-named one, midway between the villa and the kitchen block. The pavilion is open all round, with timber supports and arch-like openings formed between them. The gables are decorated with geometrical half-timber work, rather English in appearance, for a house which is obviously not to be on English soil.

1,551, 1,557: "Design for a Country House;" Mr. Gerald C. Horsley. These are two elevations in ink line, on a rather large scale for this sort of thing (four feet to an inch), showing the entrance and garden fronts of a country house with little architectural pretension, with rather wide low windows with wooden mullions and small square panes. The mass of roof looks too heavy for the rest and crushes it rather. A plan is appended, showing an entrance vestibule divided by a screen from the hall proper, which is practically a sitting-room communicating with the dining-room on one side and the drawing-room on the other. The exterior walls are decorated with subjects referring to country life, a man mowing, another sowing, &c.; they are merely indicated in line, and are probably meant to be executed in *stippling*. The subjects on the gables on the entrance side are apparently ideal, and represent a crowd of figures under conventionally treated trees; to that we have no objection; but the painting of somewhat realistic figures carrying on realistic country occupations, as an exterior decoration to a country house, is somewhat too much akin to Pope's attempt to be "rural" by having rakes and scythes painted as leaning against the walls of his villa. Why paint them on the house when you have the real people going about around you? In any case, the decorative effect of such a treatment can only be judged of in a coloured elevation. By the same author are

1,552, 1,556: "Design for the painted decoration of the roof of a University Hall" (the catalogue gives "an University Hall," which is bad English); No. 1,556 giving part of the design to a larger scale. This is a peculiar design, of considerable originality. The lower part of the dome is treated as a kind of decorative base for the rest of the design; the space is divided off by an arcade of pointed-arch compartments painted on the wall,

led in with gold arabesques; the spandrels between them have medallions with symbolical heads, on a dark blue ground partially broken by design. Above this the dome surface is divided to rectangular panels (rectangular except for the necessary diminution upwards) by rigid bars of green foliage, and in each compartment stands a symbolical draped figure on a sphere, and backed by a continuous battlemented wall over which is a de horizontal band of greenery in the similitude of a hedge. Over this some boundary lines and the empty central space of the dome, which may be for a window. At the feet of the figures appears to circle a river, represented by a band of blue. The figures are not very effective, and in the case the artist seems to have been uncertain how he would treat the hands, and the figure has five hands; at least that is all we can make of; but the whole is an original idea and would have a good decorative effect. The kind of ribbon which meanders round in the open sky space above what we have called the "hedge" is a puzzle, unless it is a very conventional indication of a fountain.

1,553: "Apse windows, 'Hillhead Established Church, Glasgow'; Messrs. Shrigley & Hunt. A couple of lancet windows, showing the individuality of treatment. The figure subjects occupy two stages in the design, separated by, or rather imposed upon, an ornamental series of interlacing lines of somewhat Celtic character; the canopy decoration above the lower subject ("Christ Before Pilate"), consisting of dark scroll stalks with yellow leaves and dark flowers springing from them, is effective. The general colour effect of the whole good.

1,554: "Design for Wrought-iron Grille for Master-dome, St. Paul's Cathedral"; Mr. A. H. Shipworth. We presume this is intended to fill the spaces under the arches in the angle piers under the dome. We do not quite see why they could be filled with a grille, but the design is good and in the true spirit of classic wrought-iron work. We should have liked it still better, however, if the designer had avoided the vertical lines cutting into the arch, which is no doubt a constant feature in the treatment of large arched windows and openings in English Renaissance work, but is one the better on that account; the vertical lines cut upwards into the arch line. It would have been better to have allowed the arch form to rule the whole lines of the design.

1,558: "St. Peter's College, Radley, new cloister and proposed new Chapel and Hall"; and 1,562: "New Cloisters and proposed new chapel" for the same place, seen from another point of view. The latter drawing has been published in the *Builder*; it shows the chapel and cloisters only; the new drawing, a slight and apparently hurried one, shows the chapel from the other end, and the hall, and cloisters connecting them. The chapel and hall form nearly symmetrical blocks, both with the same general outline but treated with sufficient distinction of detail, the style being late Gothic of what is commonly called collegiate type, with low-towered roofs and raking battlements up the walls. The west end of the chapel, shown in No. 1562, is very effectively treated, upper part of lower windows and wall-panelling being combined into one design bounded at the sides by two small buttresses which run from the ground to gable; there is an octagonal turret at this end, with a lantern the details of which look too thin and cast-iron in style; there is plenty of precedent for this treatment, but it hardly becomes better for that, except as a mere matter of archaeological sentiment. The one point we really do not like in the design is the introduction, above the window arch at the ends of the chapel, of wall-tracery on quite a different scale from the tracery of the window below, which has an awkward and confusing effect.

1,561: "South-Eastern Hotel, Deal"; Messrs. James Brooks & Son. No plan. The building, shown in a large clearly executed pen-drawing, makes an effective block, and has the merit (for under present circumstances it is one) of not looking so terribly like a hotel as most hotels of the day do; whereby we mean to suggest that while in general it seems an understood thing that hotel architecture should exhibit flashiness of style, and absence of all refinement or restraint in detail, and an exuberance of balconies and wrought-iron roof-ridges, this example is free from such characteristics. The most salient features in the design are the angle pavilions set obliquely at an angle of 45 deg., and flanked by solid octagonal turrets with lead appurtenances or little cupolas, which support the base of the gable. A less pronounced gabled projec-

tion forms the centre of the main front, and marks the principal entrance. The principal windows, which are round-headed on the ground and first floors, and square-headed and mullioned on the upper floor, are exceedingly well grouped and combined by means of the minor architectural features, to which they have direct relation, so that there is an architectural unity about the whole; it looks like a hotel, but a hotel much more carefully designed than usual.

1,566: "Balliol College, Oxford; new house for a tutor on the College grounds, Holywell"; Mr. T. G. Jackson, A.R.A. Two Indian-ink sketches in one frame, showing a house in a solid domestic Gothic style, save that the gables are Elizabethan in character, and exhibit some delicate variations of detail. Two semi-circular bays, running through two stones, are prominent features. We fail to see the use of the buttress flanking one of the gables, it does not seem to be wanted there more than anywhere else for support of the walls. A plan would have explained the meaning of the little one-storied addition in the re-entering angle on the lower drawing, for which there is no doubt a reason, not apparent in the exterior design.

1,567: "Chapel, Selwyn College, Cambridge"; Sir A. W. Blomfield, A.R.A. This was illustrated in the *Builder* of May 13, to which we refer the reader in place of any description. The building is an excellent piece of modern Gothic, following faithfully the traditions of college chapel architecture. By combining the actual west window with a blank tracery design, of which it forms part, and which occupies nearly the whole wall between the angle turrets, the architect has given an increased breadth and dignity to the front without rendering the window too large from the interior. The value of plain wall space is well illustrated in the plain treatment of the lower portion of the turrets, and the bay next to them.

1,569: "The Chapter-house of a Cathedral"; Mr. John Begg. A perspective view of this design was published in the *Builder* for April 16, 1892. This is a coloured elevation, showing a chapter-house designed on a hexagon plan, a brick building with stone dressings. The principal windows are arched with three-centred arches, the mouldings of which partially die into the face of the buttresses; the spandrel space between the labels and the main cornice is occupied by tracery and carving. The design would have gained by a little more simplicity; there is too much wall over the main cornice, and there are no less than three ranges of small openings besides the main windows; a set of slits opening into the roof (apparently); a range of small square-headed windows just below the sill of the main ones, lighting an ambulatory, and below them again a range of slits lighting presumably a crypt. The importance and effect of the principal architectural features is a little interfered with by all this work above and below them, especially by the mass of blank wall above. There is a great deal of merit in the design, however, which was placed second for the Soane Medallion last year, and can hardly be said to be inferior to the one which was selected.

1,570: "New Banking Premises, Parliament Street"; Mr. H. Huntly Gordon. No plan; a spirited drawing lightly tinted in Indian ink, and owing a good deal in general treatment to Mr. Norman Shaw's building at the bottom of St. James's-street, especially as to the treatment of the large ground floor window. The windows are picturesquely grouped and the features of architectural ornament in good taste, the chimneys well treated in a simple manner, and the whole is a very agreeable example of the modern picturesque street front. The author would have done better to omit the badly-sketched figure which forms the finial on the highest point of the roof.

1,571: "Alterations, Iton Court, Monmouthshire"; Mr. E. Guy Dawber. This was illustrated in our last issue. The new portions are in keeping with the character of an old house, the dates of which vary from the fourteenth century to the middle of the eighteenth; but the end of the new "hall," a long narrow building the end of which abuts on the courtyard, might have been better accentuated in the courtyard elevation. In justice to the original drawings, we may observe that the shadow in the foreground appears much stronger and blacker in our illustration than it really does in the drawing; one of the inherent defects of photo-lithography, in which lines which are fainter in the original come out as dark as all the others in the copy; a defect which cannot be helped. The only way to get a fainter effect in photography from a line-drawing is to use thinner

lines; it cannot be done by using fainter ink: a fact of which many draughtsmen are still ignorant.

1,572: "Public Library, Colchester"; Mr. Brighwen Binyon. This is a pleasant and original little building, of red brick and of Jacobean leanings; the main feature is the large window which lights the principal room, and which forms an architectural design in itself with cornice and supporting figures in the upper portion; the horizontal cornice cuts across the middle of the gable over, leaving three triangular spaces which are filled with modelled ornament in plaster. The design of this window ought, however, to have had a more architectural base than is supplied by the set-off in the wall and the very plain basement windows, which are an eyesore in this position. A plan is added.

1,573: "St. Pancras Municipal Buildings; first premiated design"; Mr. W. Harrison. To this we already briefly referred in the course of a few remarks on the designs submitted in this competition (page 81 ante). It is better than some recent Vestry Halls, in being less pretentious in style, and the architect's choice in placing the council chamber and committee rooms on the second floor, at the top of the building, has left open to him an effective arrangement of large mullioned windows just at the top of the elevation under the cornice, the lower portions of the wall being left comparatively solid; this looks well, though we cannot think that putting the principal rooms so high up can be convenient. There is a certain character given by the circular turrets which flank the principal front, and which we presume are staircases, but no plan is given.

1,574: "A Cheshire House"; Mr. John Clarke. Why "Cheshire"? There is nothing especially Cheshire about it; half-timber houses are common enough in several other counties. This, like "a Doctor's House" before alluded to, seems a bid for a taking title. The house is an adequate one of its kind, but the pen-drawing (e.g. the grass) rather mechanical.

1,575: "New Royal Infirmary, Derby"; Messrs. Young and Hall. We only mention this because it is a good specimen of a clear pen-drawing, not over-worked, and with plenty of atmosphere left in it; but it is merely a picture of an infirmary, perfectly useless without a plan, and presenting no architectural features which are of any interest as such.

1,577: "St. Mary's Hospital, Paddington; perspective view of design for Clarence Memorial Wing"; Messrs. Salter & Adams. A small plan is appended to this, which is a large and carefully elaborated pen-drawing, showing a not unsuccessful attempt to give some architectural interest to a hospital building. The end pavilions are treated very plainly in the two lower stories, with rusticated walls, and the walls oversail to some extent above the principal stringcourse, the overhanging being the more remarked as the pavilions are treated with octagonal angle turrets, which are consequently considerably thicker above than below. There seems no reason for this treatment beyond the desire to produce a certain degree of picturesque effect. The upper portion of the building is decorated with pilasters, and the central portions, between the wings, get light and shadow from two tiers of wide balconies, carried on large and solid cantilevers. The first floor windows in this central portion have sculpture decoration in square panels over them. The plan shows that the central projection of the front does not answer to the centre of the plan, and that on one side we have a complete ward, on the other side a ward with a passage taken off it. The front does not seem to coincide with the plan in this point.

1,579: 1,580: "Glangwma, Carnarvon"; Messrs. Douglas & Fordham. These two drawings were published in the *Builder* of March 11 of this year. They represent a pretty large mansion, consisting of half-timber work above, based on solid stone wall in the ground story. The house looks very well in the excellent tinted drawings in which it is shown, but does not present any very marked character to distinguish it from other houses of the same style and of the same scale; it is all very satisfactorily carried out.

1,581: "St. Peter's, Pentre, Glamorganshire"; Mr. F. R. Kempson. We published another view of this church some little time since (*Builder*, October 24, 1891). It rather errs on the side of too conscientious solidity and despoiling of all mere prettiness: plain masses of wall, windows without tracery, and a square battlemented tower. Economy has perhaps been at the root of this; and it may at any rate be urged that heaviness is a better fault than trickery.

1,583: "Front entrance to Ashby Folville

Manor, Leicestershire"; Mr. John Ely. Is this old or new work? We presume new, or a new addition to an old house. It is a very well executed sepia drawing, showing the entrance porch of a Renaissance house with coupled wall columns on each side of the doorway, and a single half column on each side above, treated not quite like an ordinary order. The porch is crowned with orthodox forms of Renaissance finial. On each side are large mullioned windows, forming a screen abutting against the two wings of the house. The balustrade over these is too widely spaced, and looks rather mean in consequence. The projecting oriel over the entrance is rather heavy, and on the whole the drawing strikes us as better than the design.

INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS: MEETING IN DERBYSHIRE.

A MIDLAND COUNTIES' district meeting of this Association was held on Saturday, the 20th inst., for the purpose of visiting and inspecting the new waterworks of the Long Eaton Local Board at Stanton-by-Bridge, near Derby. The works, which have been constructed from the designs of Mr. George Hodson, M.Inst.C.E., F.C.S., of Loughborough, are intended to supply the district of the Long Eaton Local Board, and the towns of Melbourne (Derbyshire) and Castle Donington (Leicestershire).

The members assembled at the Midland Hotel, Derby, and drove in breaks to Stanton-by-Bridge. On arrival at the waterworks, the members, under the guidance of Mr. G. Hodson, the engineer, and his assistants, went over the pumping-station, and inspected the powerful engines and pumps which have been erected by Messrs. Tangye, of Birmingham. After the inspection of the works the members were entertained to luncheon by Mr. Hodson in a marquee specially erected in the grounds. Mr. Hodson presided, and amongst those present were Messrs. J. Cartwright (Bury), President of the Association, A. T. Davis (Shrewsbury), Hon. Secretary for the Midland District, E. Pritchard (Birmingham), J. Clare (Sleaford), W. Santo Crimp (London), J. Sheldon (Long Eaton), R. Codrery (King's Norton), A. R. Ridout (Wirksworth), W. Weaver (Kensington), J. H. Radford (Pulney), R. K. Hooley (Nottingham), R. Whitbread (Carlton-in-the-Willows), J. James Rinford (Ilkeston), G. W. Hawley (Nottingham), G. H. Lilley and J. W. Metcalf (Ashby-de-la-Zouch), J. S. Pickering (Nuneaton), J. T. Hawkins (Somerton), J. Myatt (Leek), S. Stallard (Maidstone R. S. A.), F. Massie (Wakefield), W. Hampson (Leicester), C. S. M. Wilson (Bilston), J. Gammage (Dudley), and a number of members of the Long Eaton Local Board and other visitors. Upon the conclusion of the luncheon,

The President (Mr. Cartwright) called upon Mr. Pritchard to propose a vote of thanks to Mr. Hodson for his hospitality. He had known Mr. Hodson himself for a long term of years, and had heard and seen something of the good work which Mr. Hodson had carried out as an engineer in different parts of the country.

Mr. Pritchard (Birmingham) said he had special pleasure in doing this, as he had been personally acquainted and professionally engaged with Mr. Hodson for more than twenty years. As the professional adviser of the town of Loughborough Mr. Hodson had so far succeeded in satisfying the ratepayers by his engineering work as to warrant them in electing him a member of the Local Board, and afterwards to the chief position in that town. That said a great deal, but what had been done for Loughborough had been done by Mr. Hodson for many other districts in the designing of works which had been greatly to the advantage and interest of the Boards by which he had been employed. They knew him also as a London engineer, and they appreciated him and approved his work as highly in Westminster as they did in the country. It might not be inopportune to mention that the Association of Municipal Engineers, which had done so much to elevate the professional status of the municipal engineer all over the country, and contributed in no small degree to the health and convenience of the public, was very strongly supported in its earlier days by Mr. Hodson.

The toast having been heartily honoured,

Mr. Hodson, in responding, said the test of the engineer was the result of his work. At present they had only seen the work, but he hoped to show a financial result in a few years which would make the Long Eaton Local Board thankful for

having undertaken those works. Water companies expected to make a profit of 10 per cent., and, as Local Boards could borrow money for 3½ per cent., there was a wide margin for making a handsome profit. Taking the interest at 3½ per cent., and sinking fund 1½ per cent., there ought to be a profit of 5 per cent. The Local Board ought to look at waterworks from a commercial point of view, as they did at gas or the electric light. If the business was only managed on these lines, and party politics kept out, a Local Board could manage as well and efficiently as a board of directors. In conclusion, he thanked the members of the Local Board for the generous confidence they had shown in him throughout the construction of the works; and as a result the contract had been completed without exceeding the amount of the original estimate.

Underground Water Supplies.

Mr. Hodson, jun., son of the author, then read a long and interesting paper, written by Mr. George Hodson, C.E., entitled "A Consideration of Some of the Conditions Requisite for Obtaining Underground Water Supplies," illustrated by a description of the works for supplying Long Eaton and Melbourne (Derbyshire), and Castle Donington (Leicestershire). After some prefatory remarks, the author said that the success or otherwise of schemes of water supply depends principally upon the correct appreciation of natural conditions, and he gave a short outline of the theory of water supply, and the physical and geological conditions essential for obtaining water in large quantities and of proper quality for the supply of a town population. All the sources of fresh water supply have but one common origin, namely, the rain or snow falling from the clouds; and the ultimate destination of all rainfall may be classed under two heads; the proportion evaporated and returned to the clouds as an invisible vapour, and the proportion returned by the streams to the ocean. This latter may be again subdivided into the proportion flowing off the surface during periods of heavy fall, which constitutes floods, and the proportion absorbed and temporarily retained in the strata, which is gradually returned to the streams by springs, either thrown out on the surface, or occurring in the river beds, which constitute the flow of streams during the absence of rain. In clayey districts and in districts of primary rocks, the ground is impervious, and a large percentage of the rainfall is returned with great rapidity to the sea; but in districts composed of porous rocks, sands, and chalk, a considerable proportion of the rain is absorbed into the ground, through which it slowly filters, and the period occupied in its return to the sea is dependent upon the porosity of the strata, the head due to the difference of vertical level of the area of absorption and the area of discharge, and the distance through which it has to pass. Supposing no more rain were to fall upon a porous area of outcrop, all the absorbed water would eventually run out, and the springs and streams would become dry; but so long as successive rainfalls keep adding to the underground water before the point of exhaustion of the springs is reached, they continue to flow, and the quantity they discharge is dependent upon the conditions before enumerated. Below the level of the lowest spring in a porous district a store of water must of necessity remain in the interstices of the strata, forming an underground reservoir, and below low water mark the originally absorbed water has remained at rest since the sea assumed its present level. When a well is sunk into an underground reservoir and pumping is commenced, the outflow from the springs is at once diminished to the extent of the quantity pumped, and if the pumping is in excess of the rainfall absorbed, the springs are successively dried up and the ancient store of water in the strata is eventually pumped out, and afterwards no more water can be pumped than each successive rainfall supplies to it. The measure of the permanent yield of any well is therefore exactly proportionate to the area and capability of absorption of the watershed contributing to it, in precisely the same manner as the measure of the capacity of the yield of an impounding reservoir depends upon the area of the gathering ground upon which the rain falls, the amount of rain, and the proportion of it which can be stored. In each case, during a period of drought the water level in the reservoir may be lowered and space provided for the accumulation of another store during the next wet period, but in each case it is evident that it is a hopeless matter to expect to obtain a permanent supply of a fixed quantity of water unless the

proportion of the rain falling upon the contributing area which can be collected by either method is equal to the quantity which it is desired to abstract. In the case of an underground supply it is not necessary that the absorbing area should be in the immediate vicinity of the well, provided that the pervious strata is continuous from the well to the absorbing area, and numerous proved cases exist where in fact they are many miles apart. In districts where the absorbing area occupies higher levels, and the strata composing it descends under an impervious formation having no outlet into the sea, the interstices of the strata become filled with water up to the lowest lip of the impervious stratum (which may be at a considerable height above the low-lying ground), and the perennial rainfall flows out at a spring at this point. If a well is dug or a bore-hole carried through the watertight stratum which covers up the saturated rocks or sands, the water will rise up to the level of the lowest outflow or natural spring, and thus constitute what is known as an artesian supply. Immediately the new outlet is made, exactly the same laws apply to the artesian reservoir as to the cases previously described, and this is proved by the well-known instance of the artesian wells in the chalk under London, where, formerly, the water rose above the surface in all the lower grounds of the valley of the Thames, but the multiplication of artesian wells has caused so large a drain upon the underground water that the inflow of the rain waters from the outcrop cannot keep pace with the quantity removed by pumping, and consequently the line of water-level has been gradually lowered until it now stands under London about 100 ft. below the Thames, and in course of time the ancient stock will be exhausted and the yield will become limited to the amount of the perennial rainfall.

In addition to the foregoing considerations as to yield; if the supply is to remain pure it is of vital importance that no part of the porous watershed contributing the supply shall be occupied by a dense population, because wherever this is the case, sooner or later, dependent upon the nature of the strata, pollution will certainly ensue, and the water of even deep wells will be affected. It was entirely due to pollutions on the surface of their watersheds that several of the old pumping stations of the Liverpool Corporation have been successively abandoned, and many other towns have suffered from the same cause. In the author's practice it has become his duty to condemn several old waterworks where the pumping pull had drawn to the well impurities, which, until the artificial conditions set up by the pumping operations were established, passed harmlessly away in an entirely different direction. This was notably the case at Pontefract, where the old sewers were simply excavations cut into the porous rock, and cesspools or dumb-wells in the higher parts of the town received the discharges from the water closets, but they retained so little of the solid matter as not to require emptying for years together. In this case the rock formed an exceptionally high-class filtering medium, but in the course of time it became so highly charged with the oxidised animal refuse that although no distinct case of epidemic disease could be traced to the water supplied from the well, every analyst who was consulted upon the question condemned its further use in strong terms.

The Rivers Pollution Commissioners in the conclusions of their valuable report, class "deep well water" as the second best source of supply. It therefore follows that wherever the conditions essential for obtaining an underground supply within a reasonable distance are available, no effort should be spared to secure it.

To secure the conditions essential for obtaining a permanent underground water supply, it is frequently necessary to proceed many miles away from the town to be supplied, and in some instances very great stress is laid upon this fact by the opponents who invariably crop up whenever any scheme for obtaining a public water supply is propounded. In reality, in nine cases out of ten, the additional cost is confined to the additional length of main pipe, and the cost of overcoming the friction of the water through it, and in some cases is even less than this, because of the simpler methods which can be adopted for obtaining the water at the distant site. Most certainly the nearest available site, when quantity, quality, and other conditions are equal, should, as a matter of course, be taken; but too much stress must never be placed upon the mere question of distance to the source, whether that source is surface or subterranean, because, after all, the cost of a mile or two, or even a few miles of pipes, sinks into insignificance when the quality, copiousness, per-

menance, and prospective freedom from pollution are in favour of the one more distant.

In seeking for an underground water supply the position of the engineer is one of much greater anxiety than when in his quest is for a satisfactory gravitation scheme. In the one case his source and its watershed are apparent, and he can gauge the quantity flowing off day by day, and year by year, and the analyses of samples dipped from the stream settled the question of quality. Mr. Symons has acquired for himself such elaborate information as to the rainfall over long periods of years, that very simple calculations enable him to arrive at sound conclusions in respect to the amount of storage which must be provided to utilise the watershed to its fullest capacity, and the difficulties of the engineer are in a great measure confined to the selection of a suitable site for a reservoir, and its safe construction, and in this matter so many excellent examples exist throughout the country, particularly in the Northern districts, that a capable engineer may quickly master the principles of successful work.

With underground sources the question is much more complicated. We have first to catch our hare; and few who have had much experience of underground water will be inclined to be over sanguine as to ultimate success, until the most careful geological examination has been made over every portion of the district from which it is anticipated that the supply will be derived, and until by means of boring and every other possible precaution, its freedom from faults and other interruptions has been ascertained. The engineer must satisfy himself as to the quality and extent of his absorbing area, and use the judgment which experience alone can give as to what percentage will percolate into it, and in deciding this question not only the characteristics of the different geological formations have to be considered, but also the nature of the soil—the surface slopes—and the facilities which exist for carrying the rainfall back again to the sea. He must carefully note the levels of the various springs, not only to ascertain that his underground sheet of water is continuous, but also to ascertain the direction in which the waters travel, so that he may arrive at reasonable certainty that the position of his proposed well will command it. He must adopt means of calculating the annual available percolation, and take care that he has a sufficient balance over the visible supply to ensure a perennial yield of the quantity required for his purpose. An examination of the banks of the streams will show at a glance, by the past action of the water upon them, whether the rainfall comes off in rapid floods; or, on the contrary, the absence of violent action on the banks will indicate that the return of the rainfall to the sea is spread over many months of the year, thereby proving that the underground store is of large extent, and that the absorbed rainfall is retained over considerable periods. He must also bear in mind that there is no law conferring a right of property in underground water, and that he must therefore place his works so that no one can come after him and choose a site from which his works may be dried up, so that if rivals do come into his watershed he must have secured the lowest position in reference to the gravitation of the underground water, so that he will have the full of the water from his neighbour, if the circumstances happen to be such that there is not sufficient for both. In addition to these considerations he must, in choosing a site, guard himself as far as can possibly be foreseen, against the pollution of his watershed by the growth of the population, or the extension of industries, which may occasion such pollution as will necessitate the abandonment of the works.

By such means, and by the use of a series of empirical rules based upon personal observations, which it would be difficult to give precisely in a written paper, and which could only be effectively conveyed by explanations given on the grounds of watersheds upon different geological strata where the system has been applied, it is possible to discover within very near limits, not only the direction of the underground flow, but also the annual available yield which can be looked for permanently, and the most favourable points for its abstraction.

Mixed up intimately with this all-important matter of the watershed examination is the question of main barrier and minor faults, structural and synclinal folds, and other regularities of the strata which break up the underground water planes, and bring disaster if their effect is not duly appreciated. Their discovery is often a most trying but interesting work, and their effect upon the question to be solved constitutes probably the greatest difficulty

in connexion with water supplies from subterranean sources. The surface investigations of a watershed usually give indications to a skilful geologist of their existence, but it is almost impossible to appreciate their actual effects unless the investigator has had some considerable experience of mining operations. The maps published by the Geological Survey indicate the actual position and throw of faults where they have been proved by mining operations, and in other districts where they dislocate a sub-division or an entire formation to a sufficient extent to be apparent on the surface, or where they bring one distinct portion of a formation down against another; but it is needless to say that the inch scale map shows nothing but the palpable dislocations, and the engineer must rely upon his own observations for detecting and guarding against the interruptions caused by the numerous minor faults with which the Geological Survey does not deal. Besides this, the engineer must not place a child-like faith in the maps of the Survey; many of them were made years ago, and require serious revision, and any one retained for, and upon whom the responsibility rests of recommending the outlay of the large sums of money required for the construction of waterworks, ought not to regard the maps as showing anything more than the approximate boundaries of the principal geological formations, and the major faults. When a re-survey has been made and plotted, say upon the 6 in. map, the department will be able to descend from general to precise information, and the work of the engineer will be facilitated; but after all, if his works are to be successful, he must intimately study the district, and by the preparation of sections of the strata in every doubtful direction, and by the free use of the boring tool, discover for himself the actual existence of all the conditions essential for success.

Thirty years ago Long Eaton, with the exception of Messrs. Clay's Railway Wagon Works, might be fairly considered an agricultural village, but owing to certain natural advantages, it has become gradually one of the chief centres of the Nottinghamshire lace industry. Its population is now about 10,000 persons, and the rapidity of its growth may be judged by the fact that its increase during the last decade was no less than 55 per cent. The town is built upon a bed of sand and gravel drift brought down by the rivers Trent and Derwent in past ages. This drift rests upon the Red Marl of the Trias, and varies in thickness according to the undulations of the Marl beneath it.

As in all other new districts, the first growth of the town was unaccompanied by those works of sanitation which are an absolute necessity wherever human beings congregate together, and the Local Authority was not formed until the nuisances due to the lack of sanitation had become intolerable. The sewage was freely emptied into the waterlogged subsoil upon which the town is built, and as the occupied area became larger, so much more did the pollution of the well water increase, until it is doubtful whether any of the wells, except those in the very outer ring of the built-upon area, yielded water fit for domestic consumption. The Local Board, when formed, proceeded at once to deal with the sewage question, and have solved it in what may fairly be considered a satisfactory manner. In consequence of the reports of the Medical Officer of Health, their own observations, and the representations of the Local Government Board, the question of the water supply had formed the subject of many discussions, and was postponed from time to time from financial reasons only.

In November, 1888, the matter was brought to a crisis by the publication of the preliminary notices of a company called "The Long Eaton and District Water Company," who, without in any way consulting the Local Board, proposed to secure the monopoly of the water supply of the district by including it in their limits of supply, and the author was retained by the Board to examine the company's scheme and report thereon. Having investigated the company's proposals, he formed the opinion that none of the conditions essential for success were present, and that the scheme propounded would certainly fail; and at a subsequent interview with the Board he was instructed to investigate the district and propound a scheme which the Board could properly submit to the Local Government Board. For this purpose a careful physical and geological examination was made over the district, extending from Little Eaton on the north-east, from whence Derby derives its supply, to Nottingham on the north west, and from the escarpment of the Lias on the east to the Millstone Grit

district around Melbourne on the south-west, comprising an area of upwards of 120 square miles. This area is bounded on the north by a main fault, which, so far as is at present known, forms the southern termination of the Derbyshire Coalfield, and is nearly wholly composed of the Red Marl formation, which, sweeping around from Cheshire and Staffordshire, extends down the valley of the Trent nearly to its junction with the Humber, the deep river valleys of the Trent, Derwent and Soar being cut down by erosion out of the solid formation, and filled in in the river valleys with drift gravel brought down from the higher grounds.

For many miles around Long Eaton the Red Marl is permeated with striated bands of gypsum, and at Chellaston, Thrumpton, Gotham, and East Leake the mineral is extensively worked, and forms one of the most valuable natural products of the district. The formation is an impervious one, and would be entirely barren of water but for the few thin bands of impure sandstone and gypsum which subdivide the mass of the Marl. Some of these bands have an outcrop on the sloping hill sides, and imbibe a moderate quantity of rainfall, but the water traversing them takes up so much of the mineral matter as in some cases to be utterly unfit for use.

The rivers Trent, Erewash, Derwent, and Soar, all of which join in the vicinity of Long Eaton, and any of which would in a new country form the natural supply for Long Eaton, were hopelessly out of the question for obtaining a supply of potable water. The Trent receives the sewage of Birmingham, Burton-on-Trent, and most of the Black Country, as well as that of the North Staffordshire Pottery district; the Derwent receives the whole volume of the untreated sewage of Derby; the Soar is the receptacle of the sewage of Leicester and Loughborough, as well as Melton Mowbray and several important villages on its banks, and although since these waterworks were commenced the Corporation of Leicester have carried out extensive works of sewage treatment, the condition of the river is still such that no one would dream of taking water for domestic consumption from it; and the Erewash at present forms the common sewer for all the mining population within its watershed, and although it may be said of the surroundings of Long Eaton that there is "water, water, everywhere," it is literally true that there is "not a drop to drink."

From the causes previously enumerated, which pertain to shallow wells everywhere, the gravel water under the town was probably as badly polluted as any of the rivers; and besides this, owing to the erosive action of the Trent whilst forming the plateau of gravel on which Long Eaton is built, it is evident that an underground ridge of Marl exists in a direction more or less parallel to the River Derwent, which arrests the percolation through the river gravels from that direction under Long Eaton, whilst the rainfall has a free outlet on the south side into the Trent. This erosive action has formed terraces of gravel at successive levels, and although the rain water is held up whenever the rivers are in flood, immediately the floods subside the underground water is rapidly passed off again.

The volume of water which can be obtained from any one well is therefore limited, and if it were attempted to supply the town by pumping from the gravel the works would certainly fail during a prolonged period of drought.

Although the district lying between Derby and Long Eaton is valueless as a source of underground water, it was thoroughly investigated to ascertain whether any suitable localities existed for impounding surface water. None of the streams were of sufficient height to allow of a gravitating supply; and in any case, if the water was impounded in a reservoir it would then have to be pumped to the higher ground for distribution, and to afford protection against fire. The watersheds throughout the area are very small in extent, and where the streams attain any considerable length and drain a fairly large district, they usually pass through one or more villages, and are made to act as the carriers of sewage.

The result of these investigations made it apparent that surface supplies were entirely out of the question, and that underground supplies to the north-west and north-east were unobtainable, and that the only hopeful direction would be the areas of Keuper Sandstone or Millstone Grit lying to the south-east.

Ultimately, after various experimental boreholes had been made, at Weston-upon-Trent and elsewhere, the works just completed for the supply of Long Eaton, Melbourne, and Castle Donington, were taken in hand, the sum of 44,768*l.*

being borrowed for the purpose, viz., 39,768*l.* for Long Eaton, 3,000*l.* for Melbourne, and 2,000*l.* for Castle Donington. Messrs. Price & Shardlow took the contract for Long Eaton at 33,954*l.*, and the supply provided is at the rate of twenty gallons per head of population per day. The pumps and engines were supplied by Messrs. Tangyes, Limited, and the air-valves, &c., by Messrs. Blakeborough & Sons. Mr. Hodson gave a detailed description of the works, which will be printed in the *Proceedings* of the Association.

Mr. A. T. Davis (Shrewsbury), in proposing a vote of thanks to Mr. Hodson for his paper, said he was sure the members of the Association would feel deeply grateful to Mr. Hodson for giving them the results of his great experience in waterworks engineering. The paper was a most exhaustive one, and would add greatly to their knowledge.

Mr. Thorburn (Birkenhead), who seconded the vote of thanks, said that Mr. Hodson had provided a water supply admirably adapted to a district like Long Eaton. The paper was so elaborate as to require very careful consideration, but speaking offhand, and from a cursory glance at it, he considered it most carefully explained the circumstances of the district, and the successful accomplishment of the provision of an underground supply.

Mr. Pritchard (Birmingham) said he thought the district was to be congratulated for not having allowed a company to look for water where there was no water to be found; and the people of the district ought to be thankful to the Long Eaton Local Board for having taken the matter into their own hands, and obtained the professional services of Mr. Hodson to provide them with a water supply. He begged personally to thank Mr. Hodson for the very able paper he had submitted to them.

The Vice-Chairman of the Long Eaton Local Board said that from the moment they called in Mr. Hodson to the completion of the works, he could not remember an instance in which fault had been found with him. It was only due to Mr. Hodson to say that the Board were perfectly satisfied with the scheme, and that he had justified their confidence. Although their mains passed through the territory of three other urban authorities, and two counties, Mr. Hodson had, by his ability and ingenuity, completed the scheme without litigation. In years to come Long Eaton and the districts supplied with water would have cause to be grateful for the work undertaken by the Board with the assistance of Mr. Hodson.

Mr. W. Santo Crimp (London) said the paper was an exceedingly interesting and valuable one, and he was sure would become a classic on underground water supply. The paper showed the immense value of a knowledge of geology when dealing with works of this kind. They were in a valley in which there was no indication of water on the surface, but Mr. Hodson brought his geological knowledge to bear, and he was rewarded by finding an abundant supply of water. This was not a chance find, but the reward of great geological knowledge. He would advise every member to study geology in its relations to underground water. He was a member of one of those much-abused bodies—a Local Board, and knew something of the other side of the question. They were simply custodians of the public purse, and had to satisfy themselves and the ratepayers at large that an undertaking would be a successful one. From what he had seen of those works he hoped all Local Boards would be as fortunate in the choice of their engineer as the Long Eaton Local Board in the choice of Mr. Hodson.

The President said before calling upon Mr. Hodson to reply he must add one word of congratulation both to Mr. Hodson and to themselves on having such a valuable paper on water supply. He could fully appreciate Mr. Hodson's difficulties in providing not only the means of supplying the water, but, as it were, the water itself, difficulties that northern engineers had not to encounter.

The vote of thanks having been accorded, Mr. Hodson, in reply said, he was pleasantly surprised that he had not a number of criticisms to meet and reply to. He thanked the members for the manner in which they had received the paper and for the approval they had expressed of the works.

The members then returned in brakes to Derby. The arrangements for the meeting were admirably supervised by Mr. A. T. Davis, County Surveyor of Shropshire, and Hon. Sec. for the Midland district.

THE MANCHESTER SHIP CANAL.

We recorded, a fortnight ago, a visit paid by the Incorporated Association of Municipal and County Engineers to the Barton section of the Manchester Ship Canal, and gave some particulars of the engineering works at Barton Locks, Barton-bridge, and Barton Aqueduct. We now give some further details of the work as a whole, which we cull from some particulars kindly placed at our disposal by the Engineer-in-Chief of the work, Mr. E. Leader Williams, M.Inst.C.E.

The Canal is the outcome of a series of long investigations in Parliamentary Committees in the years 1883, 1884, and 1885. Its supporters, who spent 150,000*l.* in obtaining the Act, were the manufacturers and merchants of Manchester and the neighbouring districts, and its principal opponents were the Corporation and Dock Board of Liverpool, and the railway companies.

The object of the promoters was to cheapen the cost of carriage by bringing large steamers and other vessels from the sea to Manchester, avoiding the heavy landing and carting charges at Liverpool, and reducing by one-half the railway and dock rates.

The original plan was to form a ship canal between Manchester and Runcorn, and from the latter place, to deep water near Liverpool, to dredge a channel down the centre of the tidal estuary of the Mersey. This channel was to be maintained by training walls, which were to be constructed of rubble stone on the slopes of the dredged channel, up to, but not exceeding, the height of the adjacent sandbanks. This proposed work gave rise to great controversy, the opponents of the Canal stating that it would cause the same accretion in the Mersey that had occurred in the Seine, Dee, and other rivers, where the training walls were carried up high above the sandbanks. Although the work as originally designed was passed by the first Select Committee of each House of Parliament to which it was referred in the Sessions of 1883 and 1884, it was not approved by the Committees who held the second and final inquiries in those years.

The promoters then resolved to adopt the plan the execution of which is now approaching completion, that, namely, of avoiding the centre of the estuary, and constructing a locked canal along its southern shore, in most cases inland, but partly on its foreshore where necessary to cross embayments to ensure a better line of navigation. The point selected for the entrance to the Canal from the tideway is at Eastham, six miles above Liverpool. Near this point there is a channel navigated by ferry steamers even at low water. This channel has been dredged to a depth that will give 30 ft. at high water of neap tides and 40 ft. at spring tides, so that large vessels will be able to navigate the entrance channel during a great part of each tide, and vessels of moderate draught almost the whole of each tide.

Locks have been constructed at Eastham which will admit vessels at almost any state of the tide; the lower sills of these locks are 3 ft. deeper than the entrance channel. These locks are three in number, of various sizes, viz.:—600 ft. long by 80 ft. wide; 350 ft. long by 50 ft. wide; and 150 ft. long by 30 ft. wide; and in addition there are two sluices of 20 ft. wide each for assisting in filling the Canal, the water level of which will be 14 ft. 2 in. above the Old Dock sill at Liverpool, which is about the level of mean high water. This group of locks will admit of the passage of a very large amount of shipping every tide, more particularly as on all tides above the ordinary level of the Canal all the lock gates will be open for a considerable period before high water.

Spring tides will rise from 5 ft. to 7 ft. above the ordinary level of the tidal portion of the Canal, which extends to the next group of locks at Latchford, a distance of 121 miles.

The total length of the Canal is 35½ miles. From Latchford to Manchester (a distance of 14½ miles) the canal will be filled with the waters of the Mersey, Irwell, and other rivers. The canal being designed to take the place of the Rivers Irwell and Mersey from Manchester to Latchford, it will thus become a canalised river, continuing to be the main drain for Lancashire and Cheshire, large sluices being provided at each set of locks to deal with land floods and surplus water.

Owing to the sewage of Manchester, Salford, and all the other towns on the Rivers Irwell and Mersey and their tributaries being allowed to flow into the rivers without purification, the state of the water has become very bad. Salford has now completed a system of intercepting sewers, and has constructed works for purifying its sewage at Mode Wheel. Somewhat similar works are

now being constructed by Manchester,* and as the turning of crude sewage into rivers or streams is contrary to the law as well as injurious to health, the other towns above Manchester are taking steps to prevent their sewage polluting the canal.

In the tidal portion of the Canal between Eastham and Latchford, twelve miles are inland, and nine miles on the foreshore or bed of the tideway; on this portion embankments have been formed. Where the foundation is rock or clay they are formed of clay hearing protected by heavy stone work. In some cases, where the bases of the embankments are on sand, close piling is driven on each side of the foot of the embankments. The embankments are generally 30 ft. wide at the upper surface, with outside slopes of 1½ to 1, and inside slopes of 1 to 1. At Runcorn, where the Mersey is not so wide as lower down the river, instead of an embankment, a concrete wall has been constructed.

In addition to the locks and sluices at Eastham to allow of the flow of the tide into and out of the estuary portion of the Canal, when the tide rises above the ordinary water level, three weirs, each 600 ft. long, have been constructed in the embankments. In the embankment opposite the river Weaver, ten large sluices, each 30 ft. wide, have been built to allow of the passage of the Weaver water out of the Canal. These sluices will also be used for tidal flow. They are on Stoney's patent, working on a movable frame of rollers, and being balanced, they work with great ease, only requiring slight power to lift them.

The River Weaver embankment will pen the water up that river to Frodsham, a distance of three miles from the Canal, thus forming a large sheet of water available, after dredging, as a dock for vessels of any size. This large dock is joined to the Weaver Navigation by a lock 220 ft. long by 42 ft. wide, which will admit the salt trade of Cheshire to the Ship Canal. Large locks have been built in the embankments at Weston Point and Runcorn to allow coasters and barges to enter and leave the Canal to and from the docks at those points. The shipping at Ellesmere Port will use the canal and locks at Eastham, this arrangement having been made to avoid the construction of a lock in the embankment at Ellesmere Port, as originally proposed.

At Runcorn, after passing under the viaduct of the London and North-Western Railway, the canal leaves the estuary through a deep cutting, and again approaches the Mersey at Old Randles, where two sluices, each 30 ft. wide, will enable tidal or river water to be let in or out of the Canal.

The Canal has been excavated throughout its whole length to a minimum width of 120 ft. at the bottom, and averages 172 ft. wide at the water level. The upper portion, from Barton to Manchester, is 170 ft. wide at the bottom, and 230 ft. at the water level. At the various locks the canal is widened out considerably, and will admit of vessels turning, if necessary. The width adopted will allow of large steamers passing each other at any part of the canal, and where works are built on the sides of the canal for manufacturing purposes, the Canal will be widened out to allow of shipping lying alongside wharves without interfering with the passage of vessels up and down the Canal. The minimum depth of the Canal will be 26 ft., the lock sills being 28 ft. below water level, to allow of future deepening of the Canal by dredging.

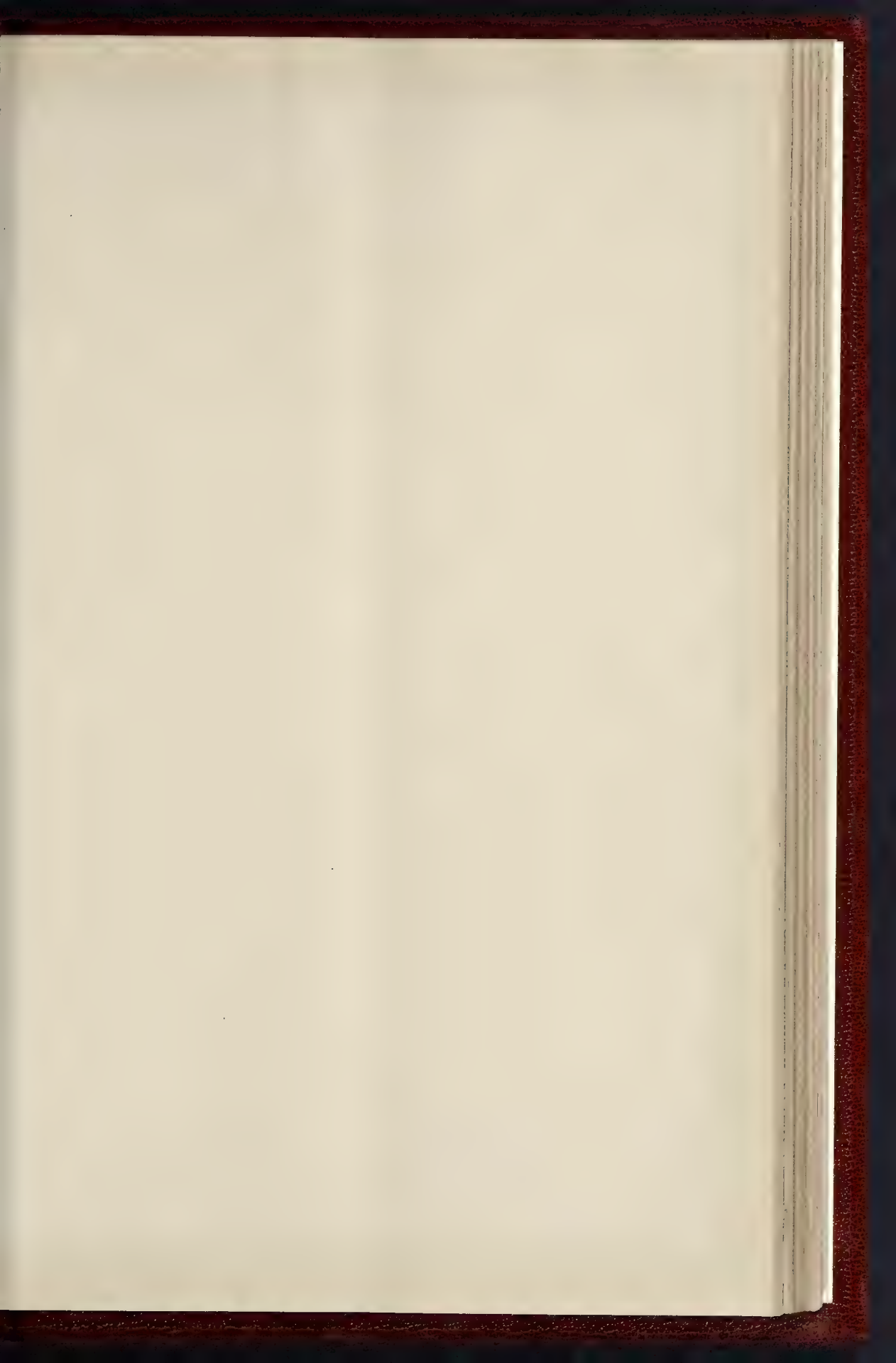
At Latchford the locks are two in number, the larger being 600 ft. long by 65 ft. wide, and the smaller 350 ft. long by 45 ft. wide. At Irlam, 7½ miles above Latchford, similar locks have been constructed, as well as at Barton, 2 miles above Irlam, and at Mode Wheel, 3½ miles from Barton. These last-named locks form the entrance to the Manchester Docks, which extend 13 miles above Mode Wheel.

The total rise from the ordinary water level of the Canal at Eastham to the docks at Manchester is 60 ft. 6 in. This rise divided between the four sets of locks gives an average rise of about 15 ft. 1 in.

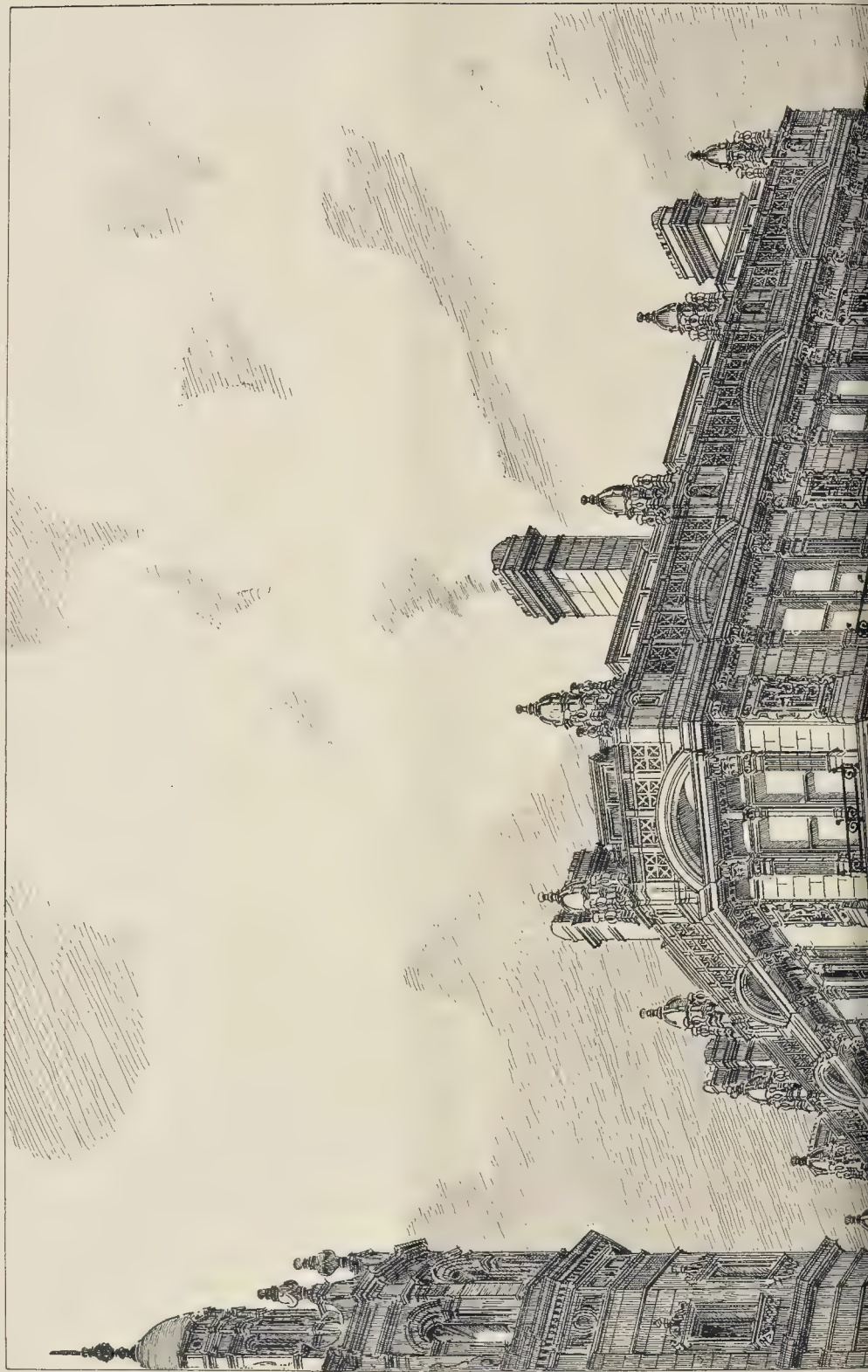
All the lock gates are constructed of green heart, a very hard wood imported from Demerara, which has been found by experience to be exceedingly durable, and the gates are less liable to damage than those made of iron. The gates are worked by hydraulic power provided at each set of locks; the engines and machinery are being constructed by Messrs. Sir W. G. Armstrong, Mitchell, & Co.

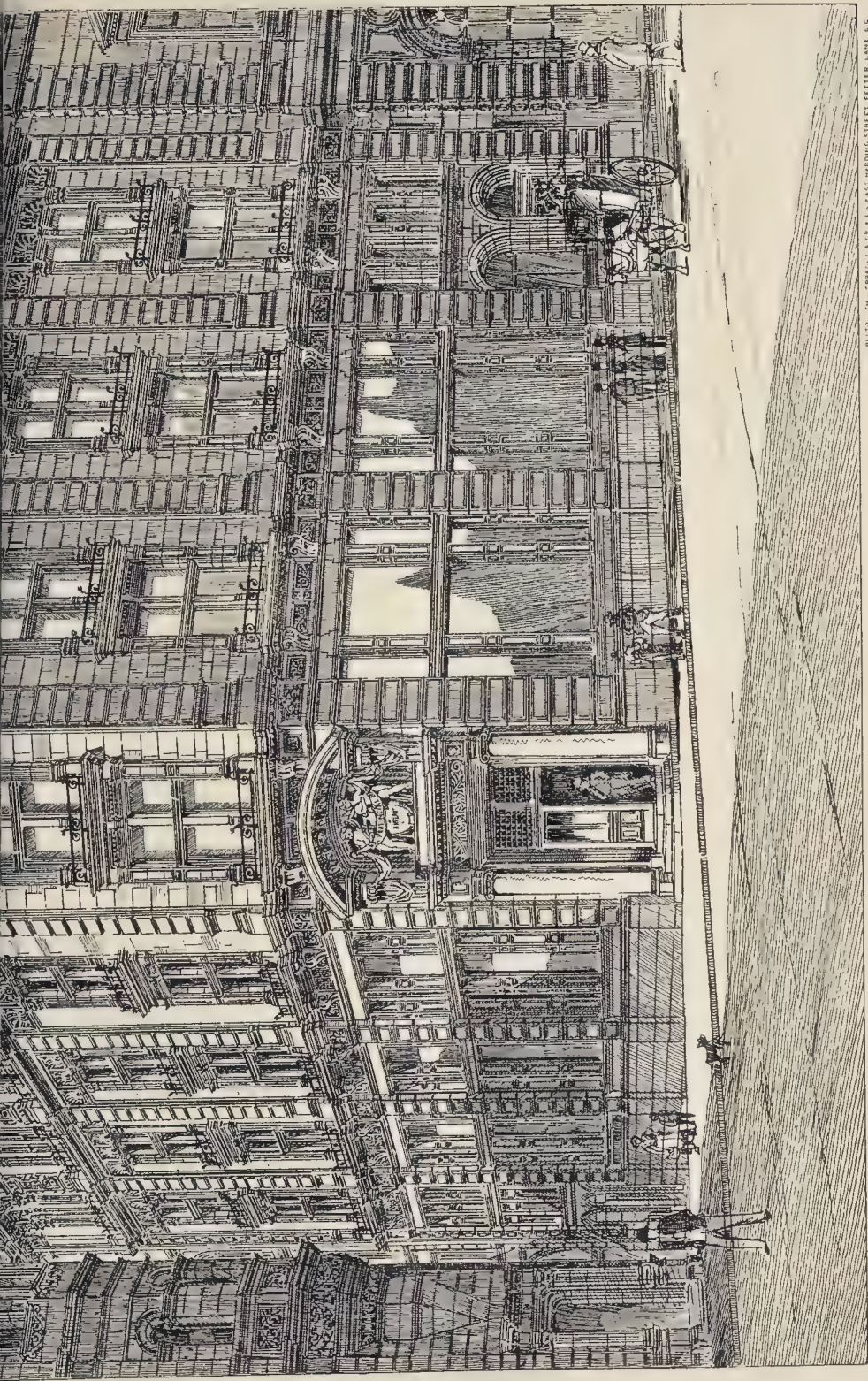
To let off flood and other spare water, sluices on Stoney's patent are provided similar in size and

* Described in detail in the *Builder* for May 6 last.



THE BUILDER, MAY 27, 1893.





DESIGNED BY MR. A. WATERHOUSE, R.A., ARCHT. FOR THE NATIONAL PROVINCIAL BANK OF ENGLAND, PICCADILLY.

NEW PREMISES FOR THE NATIONAL PROVINCIAL BANK OF ENGLAND, PICCADILLY.—MR. A. WATERHOUSE, R.A., ARCHT.

Royal Academy Exhibition, 1893.



design to the sluices erected at the mouth of the River Weaver. There are four of these sluices erected by the side of the locks at Mode Wheel and Barton, and five at Irlam. At Latchford only three are required, as the flood waters of the Mersey will flow down the river channel through Warrington from the point above Latchford, where the Canal leaves the river, taking an independent course inland until it enters the Mersey again at Runcorn.

Near Warrington, where the railway lines of the London and North-Western and Great Western railways cross the Canal, they have been raised by the construction of high level deviation railways (about $\frac{1}{2}$ miles long on each side of the canal) so as to allow of shipping passing under the railway bridges. The railways between Warrington and Stockport, and the Cheshire Lines Railways near Irlam, have also been similarly deviated at a high level. The total length of railway deviations is $11\frac{1}{4}$ miles. The railway viaducts over the Canal are in most cases considerably on the skew, and the clear spans of the openings vary from 266 ft. to 137 ft., these large spans being necessary to enable the full navigable width of 120 ft. being maintained for the canal under the bridges.

There are two high level road bridges and six swing road bridges between Runcorn and Barton; he span of these bridges is in all cases not less than 120 ft. The minimum headway under the high level railway and road bridges is 75 ft.

The swing bridges will be worked by hydraulic power, as well as the movable aqueduct which will enable vessels with fixed masts to pass the smaller canal at Barton. This work will have no openings of 90 ft., each which will be crossed by a long iron caisson resting on a central pier.

The docks at Manchester will have an area of water space of 114 acres, the area of quay space being 152 acres. The length of quays will be 51 miles. At Warrington there will be a dock having an area of 23 acres. At Parlington the Canal is widened out to allow steamers to lie on either side, and branch railways will be constructed with hydraulic coal tips to enable either Lancashire or Yorkshire coal to be expeditiously loaded into the shipping.

With the use of the electric light, steamers will be able to navigate by night as well as by day, and the whole length of the Canal will be traversed in about ten hours.

The Canal passes through either red sandstone rock or marl—alluvial deposits of clay, gravel, and, or loam overlaying the sandstone rock. These strata have been favourable for the work, the rock, where suitable, being used for pitching the slopes of the Canal where the soil is soft and requires protection from the wash of steamers, or buildings or concrete. Excellent clay for bricks has been found, and 450,000 bricks per week were made at the contractors' brickyard near Thelwall. Large quantities have had to be bought, as about 70,000,000 were used on the works. The gravel and sand have been used for concrete, of which 1,250,000 cubic yards were required.

Concrete has been used wherever practicable in dock and lock walls. The copings and hollow quoins are of Cornish granite, while hard sandstone from quarries in Yorkshire, Derbyshire, and Cheshire, and limestone from Wales, are used in their portions of the work.

All the brickwork is faced with blue bricks. The total amount of brickwork required was 75,000 cubic yards, in addition to 220,000 cubic yards of masonry.

The lower portions of the dock and lock walls are formed of concrete, the culverts being lined with masonry or brickwork. At the water level, granite or limestone fender-courses, slightly projecting from the face of the wall, are inserted, to protect the concrete facing. Above this level the concrete walls are lined with brickwork. Culverts are built in the upper portions of the dock walls for hydraulic and gas mains.

For the excavation of the canal more than 100 steam excavators of various types have been employed, some of which have been constructed in France and Germany. To convey the earth to the spoil grounds, and for other purposes, 173 locomotives and 6,300 waggons and trucks were one time employed, 223 miles of railway having been laid alongside or in the bed of the Canal. The rate of excavation has varied from $\frac{1}{2}$ to $1\frac{1}{2}$ million cubic yards per month. As much as 1400 cubic yards has been excavated in 10 hours by the German excavating machines, but their average would be less than 2,000 cubic yards. Like the French type of excavators, they are

land dredgers, suitable only for soft soil. The English excavating machines have in good soil at times reached nearly 2,000 cubic yards per day, but their average in all soils would be about 700 cubic yards. They are, however, capable of excavating very hard material, and even rock, when powder is used in advance of the excavator. There were 124 steam cranes, 192 portable and other steam engines, and 212 steam pumps employed on the works, and they consumed about 10,000 tons of coal per month.

The deepest cutting is near Runcorn, where, for a short distance, the depth is 66 ft. The largest cutting is at Latchford, where, for a distance of $1\frac{1}{2}$ miles, the depth averages 55 ft. The slopes of the cuttings vary with the nature of the soil, from 1 to 1 to 2 to 1. In the rock cuttings the sides are nearly vertical.

The total amount of excavation in the Canal and docks amounts to about 46,000,000 cubic yards, 10,000,000 cubic yards of which is sandstone rock. The spoil from the canal has been used in filling up the river bends which are cut off by the Canal, and in raising the low-lying lands near, so as to make them available for being used for ship-building and other purposes.

The Canal, from Warrington to Manchester, being free from tidal influence, the water level will be always the same, and lay-byes or side docks can be cheaply constructed at any point, as gate entrances will not be required.

A paper read by Mr. Leader Williams before the Institution of Mechanical Engineers in 1891, on "The Mechanical Appliances employed in the Construction of the Manchester Ship Canal" gives some interesting statistics as to the labour and plant which is, it need scarcely be said, the largest work of its class in this country. The number of men and boys employed on the works was at one time about 17,000, and about 200 horses were used. The 228 miles of contractors' railway cost 630¢ per mile of single line. The rate of excavation varied from 750,000 cubic yards to 1,250,000 cubic yards per month. As soon as the contractor, the late Mr. T. A. Walker, got possession of the land, he showed great energy in erecting huts, hospitals, and chapels for the workmen, and much honour was due to him, not only for the way in which he pushed the work forward, but for the care taken for the comfort and welfare of the men. The greater part of the plant was specially constructed for the work; the remainder was principally brought from Mr. Walker's contracts at the Severn Tunnel and Preston and Barry Dock Works. The total cost of the plant, &c., was 943,610¢.

Into the question of the cost of the Canal itself we will not here enter, beyond saying that the total capital of the Company in March, 1891, was 10,000,000¢, of which 9,000,000¢ had then been spent, and 3,900,000¢ more was then required. This has since been raised, we believe, by the assistance of the Manchester Corporation and other bodies interested.

As we have before stated, it is confidently expected that the Canal will be completed and opened throughout for traffic early next year.

ARCHITECTURAL SOCIETIES.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The annual meeting of this Association was held on the 10th inst. in the Royal Institution, Edinburgh, Mr. W. W. Robertson, President, in the chair. The reports of different officials were submitted, that of the treasurer showing that the income for the year, including a balance from the previous account, was 325¢ 19s. 6d., and the expenditure 250¢ 11s. 3d., leaving a balance of 75¢ 8s. 3d. at the credit of the Association at the end of the year. The total membership of the Association, it appeared, was 279. Mr. W. W. Robertson was re-elected President. The other appointments were:—Vice-presidents, Dr. Rowand Anderson and Mr. Thomas Ross; secretary, T. Fairbairn; treasurer, Mr. J. Johnston; and librarian, Mr. Ross. Mr. Hippolyte J. Blanc, A.R.S.A., then read a paper on Corstorphine Church. At the outset, the lecturer spoke of collegiate churches in general, and said they came next in importance to abbeys, and succeeded them. Corstorphine Collegiate Church, dedicated to St. John the Baptist, was erected by Sir John Forrester in 1429, and originally comprised a chancel, nave, with north and south transepts; and sacristy, western tower, and porch. The nave was enlarged and the north transept extended about the beginning of the present century. The tombs of the three members of the Forrester family were

next referred to, and reference was made to the sedilia, piscina, and other features of the church. At the conclusion of this paper, which was illustrated by lime-light views, the President delivered his valedictory address. Speaking first on the relations between the Royal Scottish Academy and architecture, Mr. Robertson referred to the fact that the Academy did not at one time recognise architecture as one of the fine arts. He next spoke of the steps which had been taken to remove that feeling, and said that at that time architects had thought their efforts had been fruitless, but they now found that such was not the case. Eighteen months ago there was not one architect in the Academy, and now there were nine. As soon as the hands of the Academy were free, it set itself as far as in its power to redress some of the things complained of. He thought they should give the Academy a word of appreciative recognition for that step, and wish for it a career of increased prosperity. Mr. Robertson next spoke of the new school of applied art, the success of which had exceeded their most sanguine expectations. Their paramount duty in regard to old buildings, he said, was preservation. Their discussions had shown no disagreement on that head, and they had also been useful in bringing out the great advance in their ideas of restoration—a word always doubtful but now inapplicable. The object in dealing with old buildings should not be to make pretty buildings, but simply to preserve them.

ARCHAEOLOGICAL SOCIETIES.

BRITISH ARCHAEOLOGICAL ASSOCIATION.—At the meeting of this Association on Wednesday, May 17, Mr. S. Rayson in the chair, the preliminary programme of arrangements for the Congress at Winchester, to begin on July 31, was laid before the meeting. Mrs. Dent, of Sudeley Castle, exhibited some photographs taken during the recent excavations at Winchester Abbey, showing portions of the remains which have been found. Dr. Fryer reported the recent subsidence of part of the area of the ancient camp on Clifton Down, and rendered particulars of the interments which still remain. Mr. J. T. Irvine described a recent discovery at the external angle of the north transept and north aisle of Peterborough Cathedral. Excavation for a vault for the gas-engine of the new organ blower has revealed two curious slabs of Norman date. Beside these, five stone coffins were seen next the transept wall, most of which still retained their heavy lids. A sketch of one of the slabs was exhibited. Mr. Irvine also reported the existence of an early sculpture in Warden Church, Northumberland, of much interest. A paper was then read by Mr. E. P. Loftus Brock, F.S.A., on the recent discovery of the remains of Winchcombe Abbey, Gloucestershire, the excavation of which he had superintended for Mrs. Dent. The outline of the Abbey Church has been traced, and it was found to exist almost in line with the Parish Church, the two buildings having been close together. Nothing was visible above ground, the site being an orchard and gardens belonging to various owners. The church consisted of nave and aisles, transepts and presbytery; at the west end were two large tower-like pinnacles, and the existence of the lofty tower at the crossing, mentioned by old writers, traditionally, has been proved by the discovery of the massive foundations of the supports. The nave had cylindrical piers of Norman date, as at Tewkesbury and other neighbouring churches. Only the rough foundations remain, so completely was the huge building demolished.

STREET IMPROVEMENTS, BARNSELEY.—Major-General Crozier, Inspector of the Local Government Board, held an inquiry at Barnsley, on the 17th inst., into the proposal of the Town Council to borrow 19,550¢ for street improvements. The money required is 15,000¢ for New-street widening, the present 17 ft. to be made 40 ft. wide; 3,500¢ for Church-street; and 1,050¢ for Doncaster-road. At Church-street, the road, now 32 ft., will be made 40 ft. wide. At Doncaster-road steps and palisades will be removed from the street. Mr. H. Hersfield (Town Clerk) and Mr. J. H. Taylor (Borough Surveyor) explained the facts, and the inspector viewed the premises.

THE ENGLISH IRON TRADE.—The Whitsuntide holidays have caused a suspension of business in most branches, and in but few cases are there any changes in quotations. Pig-iron continues to move off slowly, and in finished iron little is doing. Plates show but slight change. The steelworks are only moderately engaged. Shipbuilders and engineers do not report much improvement in prospects. The coal trade is quiet.—Iron.

* See Builder for May 6 last, p. 370.

"OLD PARIS" AT WEST BROMPTON.

THE "Gardening and Forestry Exhibition," opened on the 13th inst. by H.R.H. the Duke of York, may possibly possess some merits of its own. As to that point, we will take a future opportunity of speaking; but whatever may be the attractions of Gardening and Forestry, the promoters of the Exhibition have added two other attractions, viz., Captain Boyton's "World's Water Show," and "Old Paris and the Bastille." These two supplementary "shows" were opened on Saturday last. Captain Boyton's "Water Show" has supplanted Buffalo Bill's "Wild West," that which was last year the arena for horsemanship having been converted into a shallow lake for aquatic performances of various kinds.

Close adjoining, on the land formerly occupied by the wigwag of Buffalo Bill's red Indians, a full-size model of the Bastille, or of three sides of it (transplanted, we believe, from the Paris Exhibition of 1889), has been erected, together with a representation, more or less exact, of the Rue St. Antoine as it was in 1789.

It is stated that the exhibition in 1889 of the model of the Bastille was so great a success that it was continued the following year, when it met with an equal amount of support. It afterwards occurred to M. Eugène Colibert, the architect of the reproduction of the buildings, to place himself in communication with Mr. Robt. Emeric Tyler, F.R.I.B.A., with a view to reproducing the buildings in this country. At that time no land in London which adapted itself to the purpose was available, and it was not until recently that the ground upon which it has now been erected was brought to Mr. Tyler's notice. A site in the Earl's Court Exhibition was secured. The work was placed in the hands of Mr. Frank Kirk, the well-known contractor, who at once attacked it with such vigour that what was but five weeks since a mound of earth is now almost a small town. This result is due to the energy and resources of Mr. Kirk, who has employed from 400 to 500 workmen of all trades continuously during the period named.

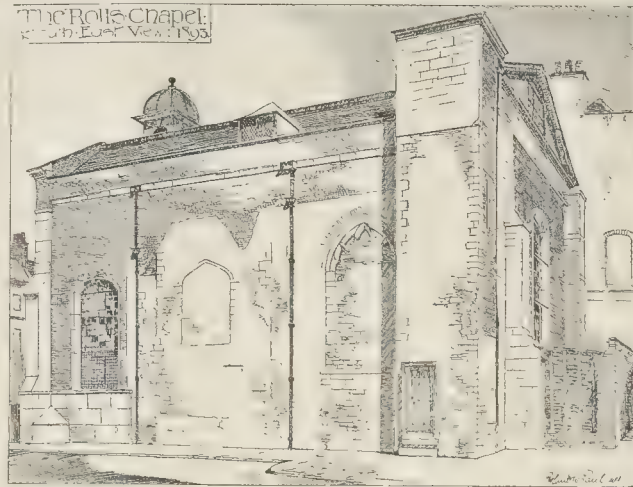
At the West Brompton end of the site, forming one of the two entrances to the exhibition, stands the Porte de la Conférence, leaving which, on the right and left, are picturesque buildings, amongst others being the Hôtel de Mayenne, which will be appropriated to the purpose of a restaurant where *dîners* and dinners in the French style of that period will be provided, and the auberge, where refreshments of a cheaper kind will be obtained. Adjoining the auberge is one of the most striking features of the Exhibition, viz., L'Eglise St. Marie, its lofty dome reaching to an elevation of 90 ft. The interior of the church is utilised for the exhibition of tableaux connected with incidents of the Revolution. Facing the church are the hostelry of the Lyon d'Or and the Distillerie, and in the rear is a garden containing a dairy. The Place de la Bastille, which is now reached, forms a large open space, surrounded by buildings, finishing on the left at the Porte St. Antoine, which forms the second entrance to the exhibition, and on the left at the Porte de l'Arsenal. At the end of the Place stands the Bastille itself, surrounded at its base by houses. The old fortress (commenced in 1369 and completed in 1383) had six towers, reaching to an altitude of upwards of 80 ft. On passing through the Porte de l'Arsenal the entrance is reached through a garden and approached by two drawbridges which cross the fosse, one leading to the dungeons and torture chamber, and the other to the interior of the Bastille, which forms a large hall capable of seating one thousand persons. At the end of the hall is a stage, upon which pantomime and other entertainments will be given.

The whole of the works have been carried out by Mr. Frank Kirk, from the drawings and under the directions of the joint architects, M. Eugène Colibert and Mr. R. E. Tyler, F.R.I.B.A.

REREDOS, ST. MARY'S CHURCH, PEMBROKE.—On the 18th inst. a new reredos, at St. Mary's Church, Pembroke, was unveiled. The new reredos cost 225*l.*, the work being designed by Mr. J. L. Pearson, R.A.

VALUE OF PROPERTY AT THE WEST-END.—We are informed that Messrs. Ball, Norris, & Hadley sold by auction last week the corner block of freehold property, comprising Nos. 241, 243, and 245, Oxford-street, two doors from Oxford Circus, for 16,300*l.*, a price equal to thirty years' purchase of the present rentals, or 23*l.* a square foot.

THE ROLLS CHAPEL.
South-East View, 1893.



THE ROLLS CHAPEL.

WE give a sketch (from the south-east) of the exterior of the old Rolls Chapel, which is shortly to be incorporated with the new buildings of the Record Office. The building, as at present existing is a simple rectangle with a projecting square stair-turret at its south-east angle. The interior has several interesting monuments of the past Masters of the Rolls, and in the windows north and south of the nave, and at the west end, is some good heraldic glass of the latter part of the seventeenth century. The Chapel is partly built of rubble stone work and partly of flint, this latter, with the windows, being an insertion of later date. One of the original windows, of fourteenth-century date, shows in our view, just west of the turret, and was found a little time back. It was of three lights—three cusped lancets under an enclosing arch. When the new buildings are complete, this chapel will be enclosed on the west and north sides, and it will not be possible to obtain a distant view of the south side.

Illustrations.

NATIONAL PROVINCIAL BANK, PICCADILLY.

WHEN the Directors of the National Provincial Bank of England acquired possession of the site upon which this building (the St. James's Branch of the Bank) stands, they found it occupied by a comparatively new and carefully designed block of ground floor shops with residential chambers above. The superior character of the building already holding the ground induced many efforts to retain the upper floors while re-arranging the ground and first floors to make way for the large banking chamber and its dependent offices, which were the chief requirements of the bank. It was gradually found, however, that such a course would not only entail many difficulties in construction, but would materially prejudice the arrangements of the new bank, and after all would absorb a very considerable percentage of the cost of a completely new structure. Accordingly it was reluctantly resolved to entirely pull down and rebuild from the foundations.

By adopting this course, not the least important advantage secured to the bank is the possession, in the basement of the new building, of an extensive range of well ventilated fire and damp-proof strong rooms lined with glazed brick.

The plan of the ground floor (see p. 409) needs little explanation. It will be seen that Piccadilly and Eagle-place form two sides of the site, the other two being occupied by the Museum of Practical Geology on the west, and by a large block of shops and chambers on the south. An entrance in Piccadilly, next the Geological Museum, gives access to the group of residential chambers, which occupy the whole of the building above the bank premises, from which

they are carefully cut off at all points. The bank has its principal entrance at the angle formed by Piccadilly and Eagle-place, and two minor ones at the south end of the Eagle-place front, giving access to the manager's private room, to the messenger's residence, and to the heating apparatus chamber, which is carefully walled off from the rest of the bank basement. The large banking chamber has ample (in addition to the windows) by a very large skylight over the clerks' space adjoining the museum, above which is an area lined with glazed brick, from which the chambers, staircase, and the various rooms at the back derive their light. The banking-room has two public waiting-rooms, and a special ground floor securities-safe; while in separate mezzanines are found a stationery-room and the messenger's residence, each with its separate stair of access. Clerks' luncheon and retiring rooms, coal places, and the like, are placed in the basement, completely severed from the cellarage allotted to the chambers. Of these chambers there are four suites on each of three of the upper floors, each suite having sitting and bedroom, bath-room, lavatory, w.c., and luggage space, all approached by both a good staircase and a passenger lift. On the fourth floor are only two suites of chambers (towards Piccadilly), the rest of this floor being occupied by kitchen offices, housekeeper's and female servants' rooms, while a small fifth floor is given to men servants' rooms, linen storage, &c.

The whole of the floors and partitions of the upper floors are of coke breeze, clothing a skeleton framework of iron and steel construction, while the roof is also fireproof, the rafters being of iron and the flats and gutters of concrete, covered with lead.

The banking chamber is, in great part, faience lined, with a ceiling of enriched plaster.

The exterior is entirely of Portland stone, with the exception of the two grey granite columns and the door casing of the bank entrance.

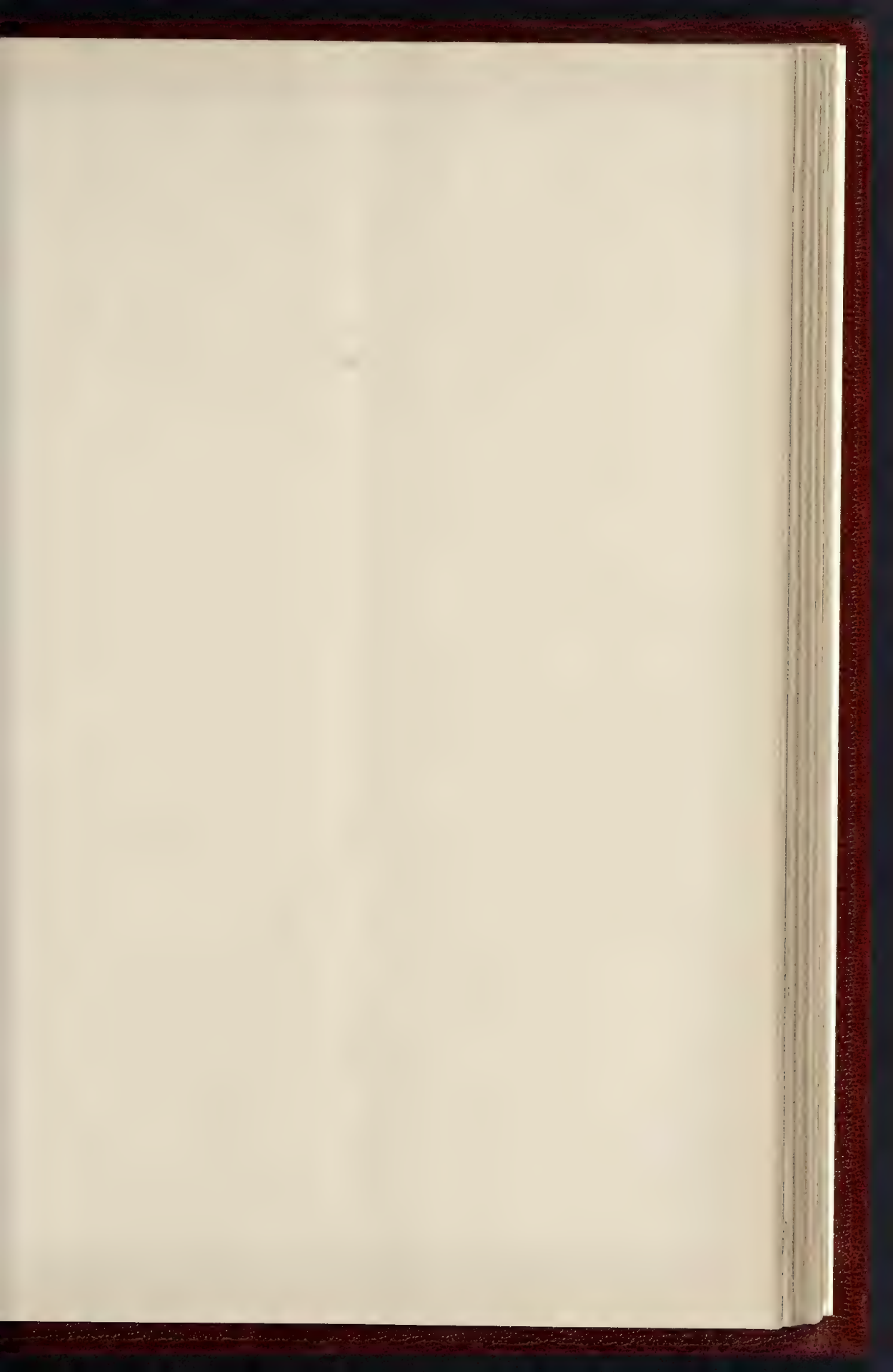
Messrs. W. Brass & Son have undertaken the erection of the building, while the iron and steel construction has been entrusted to Messrs. Handyside & Co., of Derby; the carving to Mr. Pomeroy and Messrs. Farmer & Brindley; the faience to the Campbell Brick and Tile Co.; and the ornamental ironwork to Messrs. Hart, Son, & Peard & Co.

The architects are Messrs. A. Waterhouse & Son.* The drawing is a line-shaded copy of Mr. Waterhouse's coloured drawing in the Royal Academy Exhibition.

GROVE HILL COTTAGE, HARROW-ON-THE-HILL.

THIS small house was specially planned for the site, which has a drop of 30 ft. in its length; the

* In describing the building on the plate as by "A. Waterhouse, R.A.," we have followed the Academy catalogue, according to which the design is exhibited in Mr. A. Waterhouse's own name only. The written description furnished to us since gives it as the work of "A. Waterhouse & Son."



An Architect's Home:
(ROVE HILL
HARROW COTTAGE:
-ON- THE -
HILL

DESIGN FOR THE
DRAWING ROOM



TILES IN THE
DRAWING ROOM
END

ENTRANCE FRONT



MANTEL
DRESSING



THE GARDEN FRONT



KEY PLANS



COLOURED FRIEZE
IN DRAWING ROOM

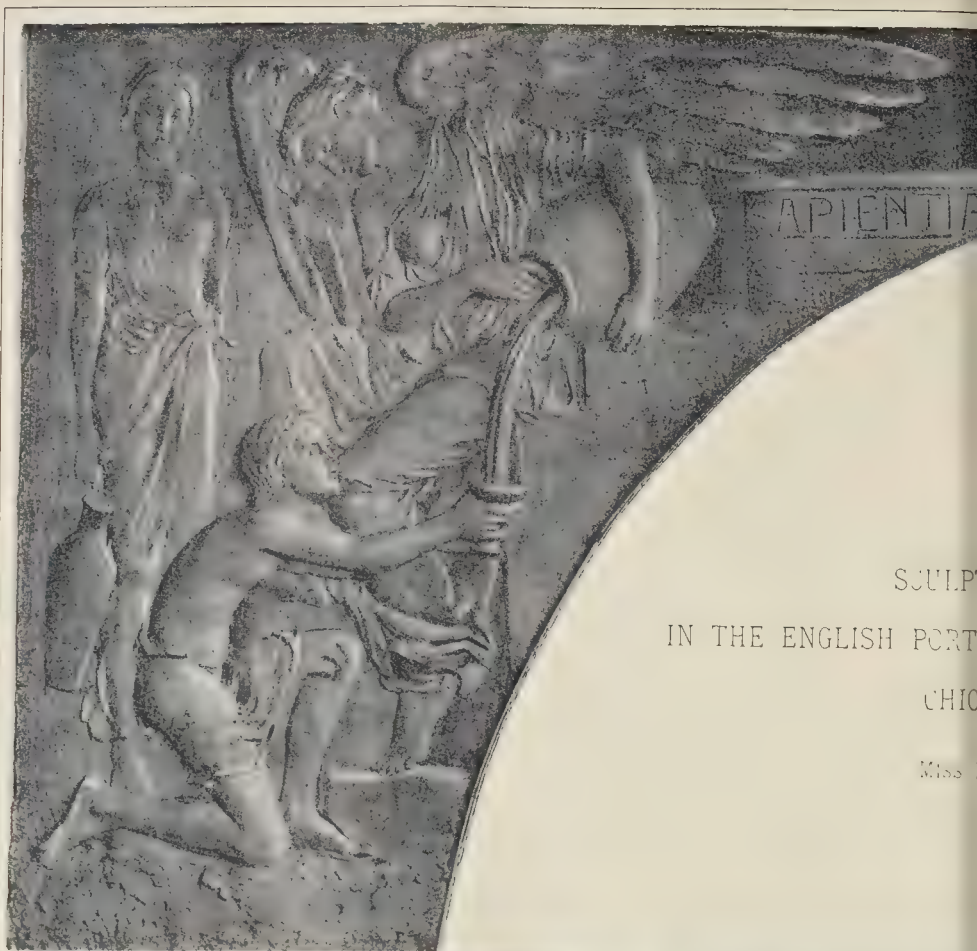
EMD.



APRON TO INGLE
WINDOW

Arnold Mitchell
Architect
16 Finsbury Circus, E.C.





SCULPTURE
IN THE ENGLISH PORT
CHICAGO
Miss

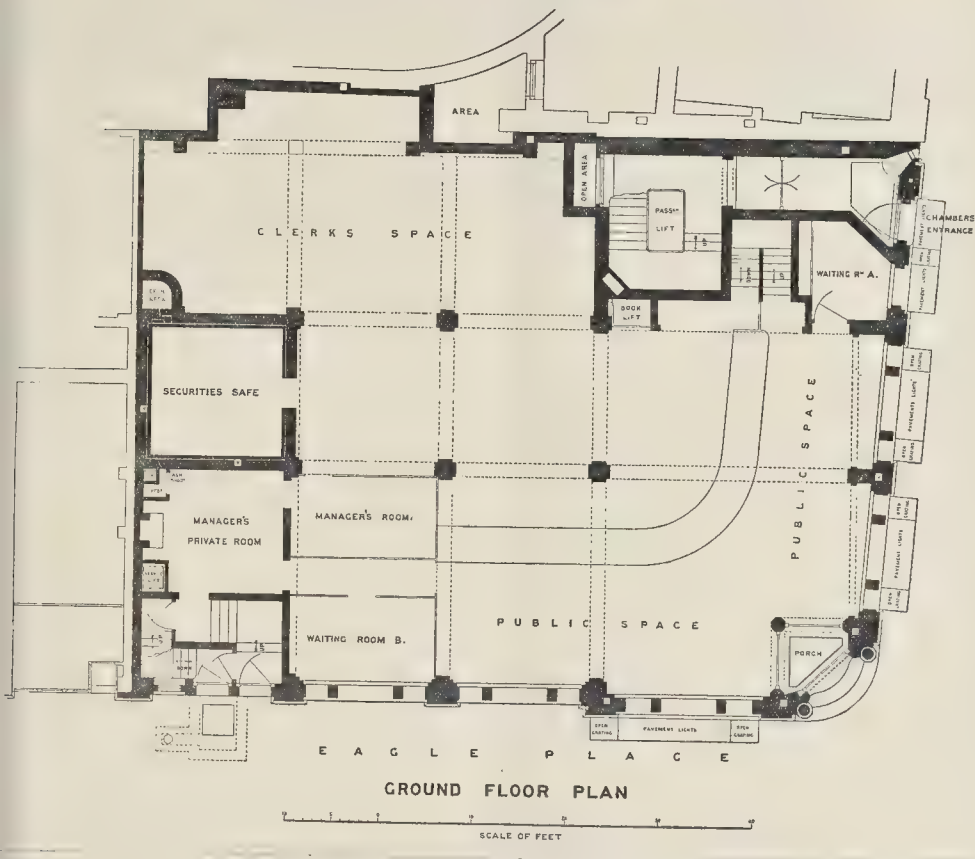




DECORATION
THE "WOMEN'S BUILDING"
EXHIBITION.
SCULPTOR.



THE NATIONAL PROVINCIAL BANK OF ENGLAND LIM^d NEW PICCADILLY BRANCH



oms therefore are placed at all sorts of levels, producing a more picturesque interior than appears from the plan. Red brick and tile are the materials employed. Mr. S. Grist, of Aylesbury, was the builder, without competition. Messrs. Hayward specially coloured the friezes. Mr. Hoggett carried out the decorations. The carving is by Mr. J. E. Knox. The plaster modelling modelled by Messrs. Jackson. The architect is Mr. Arnold Mitchell, and the drawing is exhibited at the Royal Academy.

CULTURAL DECORATIONS TO THE "WOMEN'S BUILDING," CHICAGO.

The bas-reliefs here indicated form part of the decoration in the vestibule of the English portion of the "Women's Building" at Chicago, which has been entirely designed by women, and is to contain examples of productions of art and industry by women. The two artists are Miss M. Rope and Miss Elinor Hallé, whose work as sculptors and modellers is well known in this country.

The work consists of bas-reliefs filling the arches of the arcade in the entrance vestibule. The subjects illustrated by Miss Rope are "Faith," "Hope," "Charity," and "Heavenly Wisdom," the *Zoëia* of the Greeks, who was reckoned as the mother of the virtues, and is giving rest from the fountain of wisdom. "Hope" is represented as struggling with despair; "Faith" as lifting the world with her lamp; "Charity" in the aspect of sheltering love.

Miss Hallé has taken subjects which illustrate specially womanly virtues—"Purity," "Fortitude," "Peace," and "Sympathy."

We may add here that the sides of the vestibule

are decorated with paintings by Mrs. Swynnerton and Mrs. Anna Lea Merritt, representing the occupations of women—such as teaching, nursing, embroidery, &c.

THE IMPERIAL INSTITUTE.

A FORTNIGHT ago we briefly chronicled the opening of this building by the Queen; but although we had previously given a general description of the building (see *Builder* for June 25, 1892), there are one or two special points to which we may now refer in detail.

Very complete arrangements have been made for warming and ventilation. Nearly the whole of the basement area of the front building is formed into air-chambers under the basement floor, with a sub-basement corridor running the whole length, and fresh air is brought into these chambers from the outside atmosphere at thirty-two different places, where it is filtered and moistened by passing through a water-spray. In the winter it is warmed in its passage over a series of gilled steam-pipes, and thence conducted to the various rooms in vertical ducts, discharging itself through air valves in the chimney-breasts, controlled by regulators. The whole of the warming is by steam, and the mains to the various heating chambers are carried in the subway, where they are fitted with control cocks to each separate section under the immediate supervision of the Engineer of the establishment, enabling him readily to regulate the amount of heat, without the necessity of going into the building. The fresh air admission valves are also worked from the subway, by which the quantity of fresh air which is admitted can also be regulated. The whole of the corridors and galleries can be

warmed by steam radiators, provided with fresh air ventilating tubes through each pipe, and having fresh air admitted to the bases from the outside atmosphere. The vitiated air is taken from every room and corridor by means of extraction shafts built in the walls, and fitted in the rooms with what are described as self-acting floating valves. The whole of these shafts are connected into four main trunks or ducts in the roof, and are carried to the central tower, where they discharge into the open air. To facilitate the extraction of this vitiated air, a pair of engines with a compressed air plant and receiver is fixed in the general engine-house, and the compressed air is taken to the roof and coupled up to the main trunks in several places, and the ends of the pipes are fitted with gun-metal nozzles for inducing a rapid outflow of the atmosphere of the rooms into the outer air, and to cause a constant renewal of the fresh air passing through the various rooms, warmed in the winter and cooled and moistened in the summer. The whole of the work was carried out by Messrs. Clements, Jeakes, & Co., who also carried out the fitting up of the extensive kitchens, larders, and sculleries, which are situated on the top floor, for the service of the Refreshment Department.

The lifting machinery, designed and erected by Messrs. Archibald Smith & Stevens, consists of eleven hydraulic lifts, with pumping engines and power storage plant. There are two passenger lifts running from the ground-floor to the second-floor; three lifts for the reception and distribution of coals and general stores; three appropriated to the kitchen department; one for the delivery of refuse from the engine and boiler-house; one heavy machine capable of raising a ton up to the central shaft of the east tower, and designed for dealing with stores and large objects for the

museum; and, finally, a 3-ton lift for raising extra large exhibits to the upper floor of the great gallery running east and west. All these lifts are supplied by water at 700 lb. pressure per sq. in., i.e., equal to the pressure which would be given by a tank placed 1,600 ft. high. This water is pumped by an engine into a weighted receiver or accumulator, wherein it is stored at the required pressure, and drawn off as required by any of the lifts. Immediately this occurs, the accumulator, by automatic mechanism, starts the pumps, which run till the accumulator is again full, when it automatically stops them till more water is required. All the water employed is returned by the lifts to the pumping machinery for re-use, and is therefore not wasted, but is kept constantly circulating. The cost of working the system is consequently only that of the coal burnt and the labour of stoking, no other attendance being required. In its outlines the system is similar to that adopted by the London and other Hydraulic Power Supply companies, and to that on which the lifts for the City and South London Electric Railway are worked.

The arrangements for the protection of the building from fire have been carried out by Messrs. Shand, Mason, & Co. A special steam fire engine of a powerful character, and capable of raising steam to full working pressure from cold water in four minutes, has been constructed by the firm and stationed in the building. This engine will be not only used to pump direct upon a fire, if required, but is also used to fill large water tanks erected at a height of 130 ft. from the ground, and holding 25,000 gallons of water. The fire mains, with eighty hydrants erected throughout the building by the same firm, are fed either by these tanks or by the water company's street mains, an automatic valve being provided by means of which the greater of the two pressures comes into service. The steam fire engine is also coupled to the fire mains, and forms a third source of supply. Most of the hydrants are contained in recesses in the marble walls, and are each provided with a new and expeditious method of running out the hose.

The following particulars of the "Alexandra" peal of bells in the "Queen's Tower," which have been cast by Messrs. John Taylor & Co., of Loughborough, may be of interest:—

Bell.	Diameter. ft. in.	Musical Note.	Weight. cwt. qrs. lb.	Name.
Treble	2 4 1/2	F	6 2 16	Maud.
2nd	2 6	E flat	7 2 21	Victoria.
3rd	2 8	D flat	8 1 5	Louise.
4th	2 10	C	9 0 19	George.
5th	3 1 1/2	B flat	10 3 14	Albert Victor
6th	3 4	A flat	12 1 16	Arthur.
7th	3 6 1/2	G flat	16 2 19	Alfred.
8th	3 11 1/2	F	20 3 24	Alexandra.
9th	4 4 1/2	E flat	27 0 0	Albert Edward.
Tenor	4 11 1/2	D flat	38 1 15	Victoria, R.I.,

Total Weight... 143 3 11

Each bell has cast around the shoulder:—

"ELIZABETH M. MILLAR GAVE ME—
THE LOUGHBOROUGH TAYLORS MADE ME."

On the eighth bell is the following additional inscription:—"The peal of which this bell forms one was by special permission of the Princess of Wales named after her Royal Highness.

The gold and jewelled key which was presented to the Queen for use at the opening ceremony was made by Messrs. Chubb & Sons, Limited. The wards of the key form the letters I. I., the initials of the Imperial Institute. The gold and diamonds of which the key is composed have been contributed by several Colonial Governments, and by India, so that different portions of the British Empire are represented by its various component parts. The design of the head is circular, with the Royal and Imperial crown on the summit, and the Maltese cross with *fleur-de-lis* of the Royal coronet forming the outer border. This joins the stem of the key by descending curves, decorated with shields and the enamelled national symbols, rose, thistle, and shamrock. The obverse shield bears the arms of the United Kingdom, the reverse those of England alone. The chief features of the head are the Grand Stars of the Indian and Colonial orders given in exact fac-simile on a slightly-reduced scale.

The electrical apparatus, whereby electric communication was made with the belfry to start the peal of bells on the opening day, was designed and erected by Messrs. Julius Sax & Co., Limited, under the personal supervision of Mr. Alfred Slater, their manager, as well as the electric lighting of the Queen's lift, and complete telephonic and bell communication throughout the building.

The following illustrations of the building have appeared in the *Builder* of the dates named: Mr.

Colclutt's design, as submitted in competition, July 2, 1887; plans and detail of *façade*, July 9, 1887; large perspective view, January 5, 1889; and a large coloured view of the central tower, June 18, 1892.

Correspondence.

To the Editor of THE BUILDER.

MUSEUMS OF SANITARY APPLIANCES.

SIR,—As I suggested in the *Times* before the public opening of the Highgate Museum that the example of the Highgate Local Board might be followed with advantage by other local sanitary authorities, I am very glad to see at the end of your account of the visit of the London County Council Committee to Highgate that "it was thought that if such an institution was established by the Council much good would result."

With the great resources at their command the London County Council should be able to eclipse all previous efforts in this direction and to give what is now most needed by students of sanitary science, which is experimental instruction on many sanitary problems which are at present in a nebulous state of theorism.

Both the Parkes Museum and the Highgate Museum have models of house drainage, but they are on such a small scale as to be practically valueless in illustrating the sizes of soil and venting-pipe necessary under varying conditions.

This is one of the points on which the sanitary safety of all, and more especially lofty buildings, in a great measure depends. Yet this subject is so much a matter of theory that an architect having a lofty building with many tiers of closets on one soil pipe has no scientific data to which he can refer to enable him to calculate, both in the sanitary and pecuniary interest of his client, what are the smallest pipes he could with safety use.

If this knowledge was only required by the architectural profession it might well be held responsible for the instruction of its own members, but it is equally necessary for surveyors, medical officers of health, and sanitary inspectors who are responsible for the administration of the Public Health Acts.

I should like to know how many of these public officers could lay down the law of drain ventilation and syphonage unless they happen to have had very exceptional opportunities of a practical study of the subject. It is to be hoped that the Sanitary Institute, with their recently acquired legacy, may also make their system of instruction more experimental.

ARTHUR BAKER.

TOMB IN WESTMINSTER ABBEY.

SIR,—Allow me to point out that the tomb figured on p. 388 of this week's *Builder* is not that of "the Duke" and Countess of Buckingham, but of *Sir George Villiers*, the Duke's father, and his second wife, the Duke's mother, created Countess of Buckingham in her own right after her husband's death.

H. E. THOMPSON.

* * Mr. F. D. Bedford, the artist whose signature is appended both to the drawing and the remarks, is responsible for the mistake. We merely published his drawing and comment, without accepting any responsibility for his statement.—ED.

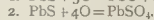
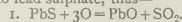
The Student's Column.

CHEMISTRY.—XXI.

Symbol Pb. Lead (Plumbum). Atomic Wt. 207.

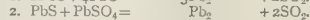
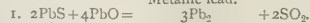
THE most abundant ore of lead is galena, a sulphide of lead, PbS. In smaller quantities ore consisting of carbonate, sulphate, and sometimes chloride of lead are found.

To reduce the ore to metallic lead, the galena is first roasted in contact with air in a reverberatory furnace until a certain proportion of the galena has become converted (1) into lead oxide and (2) into lead sulphate, thus—



When this stage is reached, air is shut out from the furnace and the temperature rapidly increased. That portion of the sulphide which was not converted into oxide or sulphate is now attacked by the lead oxide and sulphate which was formed by roasting, thus—

Metallic lead.



Lead obtained from galena usually contains an appreciable amount of silver, which was present in the ore. Until comparatively recent times,

this silver was left in the lead and hardened it to a very appreciable extent. The small percentage of silver is now extracted either by the Pattinson or the Parkes process. Pattinson's process depends upon the fact that lead containing silver remains fluid at a lower temperature than pure lead. The argentiferous lead is melted and then allowed to cool slowly. The lead which solidifies first contains only a trace of silver, and this is removed by means of a perforated iron ladle as fast as it appears, and consequently the liquid metal remaining in the pot becomes a richer silver alloy.

By repeating this process several times an alloy containing 80 ozs. or more of silver per ton is obtained, while the lead removed in the ladle contains less than 1 oz. of silver per ton, and is improved by the removal of the silver. The rich silver alloy is finally subjected to "cupellation." It is melted upon a bed of bone-ash in a reverberatory furnace, and exposed to the action of a blast of air. The lead gradually oxidises and sinks into the bone-ash, leaving almost pure silver upon the hearth of the furnace.

In the Parkes process the lead containing silver is melted with about 5 per cent. of zinc. This extracts nearly all the silver from the lead, and when the whole mass of metal is allowed to cool, the argentiferous zinc forms a cake upon the top of the purified lead. When this alloy of silver and zinc is subjected to distillation, the metallic zinc distils over and the silver remains in the retort.

Most of the lead of commerce contains minute quantities of silver, copper, zinc, iron, nickel, antimony, and other metals.

Lead is a bluish grey metal, which slowly tarnishes through oxidation when exposed to moist air. Lead salts act as cumulative poisons. The metal is appreciably soluble in soft water, and in water containing small quantities of CO₂ in solution. Although hard water has very little action upon lead, it is unadvisable to use lead tanks for the storage of any water that is to be used for drinking or cooking purposes. Lead is very ductile and malleable, but possesses very little tenacity. It is very soft, and is easily fusible. Cold dilute solutions of hydrochloric or sulphuric acids have very little action upon lead, but it is very soluble in nitric acid. Lead is much used for bullet-making. That used for making small shot for fowling-pieces is alloyed with about 5 per cent. of arsenic, while bullets for small arms are hardened by the addition of about 20 per cent. of antimony. The chief alloys of lead are pewter, solder, type-metal, and Britannia metal.

White Lead.

The powder known commercially as white lead is composed of lead carbonate, PbCO₃, and lead hydrate, PbH₂O₂. The proportions in which these two compounds occur differ somewhat in different samples. White lead cannot therefore be regarded as having a fixed chemical composition, although as a rule its composition approximates more or less to the formula 2PbCO₃ + PbH₂O₂.

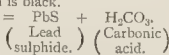
The best white lead, and that mostly sold in commerce, is still prepared by the old "Dutch process." In this process bars, sheets, or gratings of cast metallic lead, as pure as possible, are suspended in earthenware jars containing at the bottom a small quantity of crude vinegar (acetic acid). Several hundreds of jars thus charged with lead and acetic acid are packed upon a floor in a bed of stable manure or spent tan. This bed of jars is covered with loose planks and a second layer of jars similarly charged and imbedded in manure or spent tan is placed upon them. By repeating this process a stack is at length obtained which completely fills a chamber. The beds of manure or spent tan soon ferment, give off CO₂ gas, and become very warm, the temperature of the inner parts of the stack rising to 140 deg. to 150 deg. Fahr. The acetic acid at this temperature is slowly volatilised, and its vapour corrodes the metal, forming subacetate of lead, which, by the CO₂ vapour given off from the decaying organic matter is converted into carbonate of lead, with the liberation of acetic acid, which attacks a fresh portion of the lead. When this action has continued for from 6 to 10 weeks, it is found that all, or very nearly all, the lead has been converted into carbonate of lead, and that although the physical form of the castings is retained, they have considerably increased in bulk.

The material thus obtained is next passed through rollers, which crush the carbonate to a coarse powder and renders the separation of any unattacked metal easy. The white mass is then transferred to the mills, where it is ground into a

thin paste with water, and is reduced by successive washings into an impalpable powder; it is then dried in wooden bowls placed upon shelves over a stove, and finally appears as a dry, white, amorphous powder. If the metallic lead employed contained iron as an impurity, the resultant white lead possesses a yellow colour, while, if it contained silver, the powder assumes a brownish tint when exposed to daylight. The metal employed must also be *cast* lead; it is found that rolled lead will not answer the purpose.

There are many processes for manufacturing white lead by precipitating it from a lead solution, but as by these processes only carbonate of lead, $PbCO_3$, is produced, and not a carbonate containing a considerable proportion of hydrate as the "Dutch process," the product is an inferior article, for it is found that the hydrate combines better with oil to form a paint. *Chichy white* is produced by one of the precipitation processes. Purified CO_2 is passed through a solution of subacetate of lead, which causes carbonate of lead to precipitate out and fall to the bottom of the vessel, while ordinary lead acetate remains in solution. According to Abney's "Notes on the Chemistry of Building Materials," white lead prepared by the Dutch process requires only 9 lbs. of oil per cwt. to bring it to the proper consistency for the painter, while the precipitated white lead requires 16 lbs. of oil per cwt.

White lead is blackened by exposure to air containing sulphuretted hydrogen, on account of the partial decomposition of the carbonate into lead sulphide, which is black.



Sometimes a small quantity of Berlin blue is added to white lead, to give it a faint bluish tint and hide the yellow colour of any iron present as impurity in it.

White lead is frequently adulterated with barium sulphate ($BaSO_4$), sometimes termed heavy spar; it is less commonly adulterated with chalk ($CaCO_3$); calcium sulphate or gypsum ($CaSO_4 + 2H_2O$); zinc oxide (ZnO); or sand (SiO_2).

The following analyses of white leads published by Mr. J. F. Liveridge show that their price is no criterion of their quality.

Analyses of White Lead.

	1	2	3	4	5
Price (per cwt.)	22s.	20s.	18s.	18s.	—
$PbCO_3 + PbH_2O_2$..	78.71	67.11	64.86	88.04	87.77
Impurities	20.23	32.13	34.49	10.80	11.22
Moisture and loss	1.03	0.74	1.31	1.16	1.16
	100.00	100.00	100.00	100.00	100.00

Experiments. Group 12.

1. Make a qualitative analysis of some white lead ground in oil.

First remove the oil from a small portion by shaking it in a corked test-tube with benzoline. The white lead will settle down upon allowing the tube to stand for a short time, and the solution of benzoline and oil may be poured off. The powder in the tube should then be boiled with dilute HNO_3 . A brisk effervescence should be caused by the decomposition of the carbonate. The whole of the lead carbonate will be dissolved, but any barium sulphate or sand will be left in the tube as an insoluble residue. Sand may be distinguished from barium sulphate by the fact that barium sulphate may be completely dissolved with difficulty in a considerable bulk of strong H_2SO_4 , while silica is insoluble in this acid. Moreover, if barium sulphate is placed on a piece of platinum wire, and held in the flame of a Bunsen burner it will impart a green colour to the flame; silica will not. Having filtered off any insoluble matter, HCl is added to the clear filtrate, which causes a considerable portion of the lead to be precipitated as lead chloride. The solution should be cooled in a stream of cold water if at all hot, as lead chloride is soluble in hot water. Filter off the white precipitate and to the filtrate add a few drops of NH_4OH , but take care that the solution remains distinctly acid. The solution must be only moderately acid for successful subsequent treatment. Pass H_2S gas through the clear solution. All the lead that was not thrown out as chloride upon addition of HCl , will now be precipitated as black sulphide. When no further precipitation can be obtained, filter off the lead sulphide and to the clear filtrate add excess of ammonium hydrate, ammonium chloride and

ammonium sulphide. If zinc oxide, ZnO , was originally present a white precipitate of zinc sulphide will now be obtained, and must be filtered off. Boil the clear filtrate for some time, and then filter off any sulphur which separates out as a fine powder, produced by the decomposition of the excess of ammonium sulphide. To filtrate add ammonium carbonate; if chalk or barium carbonate ($CaCO_3$ and $BaCO_3$) was originally present, a white precipitate of calcium or barium carbonate will now be thrown down. To ascertain whether the white precipitate is caused by the presence of barium or calcium, collect and wash the precipitate, and then dissolve it in acetic acid. Add to the solution an excess of chromate of potassium solution. If a pale yellow precipitate is produced it indicates the presence of barium. If any precipitate is formed, filter it off, and to the clear filtrate add excess of ammonia and ammonium oxalate solutions. If a calcium salt was present, a white precipitate will now be formed.

2. Make a quantitative estimation of the oil and lead in a commercial sample of white lead in the following manner.

Weigh 5 grammes of the sample into a small beaker, then add enough redistilled benzoline to completely cover the white lead, and allow the beaker and contents to stand for a few hours. Then filter through a paper into a flask. Add another small quantity of benzoline, and again allow to stand for a short time, and filter off through the same paper. Repeat this process until it is found that no oily residue is obtained when a few drops of the benzoline are transferred from the beaker to a watch-glass and evaporated. Transfer the white lead which remains in the beaker to the filter-paper and dry it. The oil may be separated from the benzoline by distilling off the benzoline by means of a steam-jacket. The residue of oil should be dried at $212^\circ F.$, and weighed as soon as it is cool. It should not be forgotten that benzoline is a highly inflammable liquid, and therefore must not be brought near a naked flame.

Weigh 2 grammes of the dried white lead, from which the oil has been removed, and dissolve it by heating with dilute acetic acid. Filter off any insoluble matter, weigh it, and analyse it qualitatively. To the filtrate of lead acetate, which should not be too dilute, add a slight excess of dilute H_2SO_4 , and twice its volume of methylated spirit. Collect the precipitate of lead sulphate on filter, and wash it two or three times with dilute methylated spirit. Dry the precipitate at $212^\circ F.$, and then detach it as far as possible from the filter paper over a glazed sheet of paper, being careful not to lose any of the precipitate. Ignite the filter paper in a previously weighed porcelain crucible. Allow to cool, add one drop dilute HNO_3 and one drop dilute H_2SO_4 , and gently evaporate the acid to dryness. Finally transfer the whole of the precipitate from the glazed paper to the same crucible, heat the crucible and contents over a Bunsen burner, and when cool ascertain the total weight. The increase in weight is due to lead sulphate, $PbSO_4$, if the weight of the filter ash is disregarded. The object of separating the filter paper from the lead sulphate before ignition of the former is to prevent the decomposition of the latter by the carbon of the paper. Multiply the weight of lead sulphate obtained from 2 grammes of the white lead by 50 to give percentage amount of $PbSO_4$ yielded. White lead usually has a composition approaching the formula $2PbCO_3 + PbH_2O_2$; it is, therefore, necessary to multiply the percentage amount of $PbSO_4$ obtained by 0.8525, to obtain an idea of the amount of true white lead present.

$PbSO_4$ contains 68.316 per cent. Pb, while $2PbCO_3 + PbH_2O_2$ contains 80.129 per cent. Pb $68.316 \div 0.8525$, hence the above figure. Thus, 80.129 a sample which yielded 109.2 per cent. $PbSO_4$, is regarded as containing 93.09 per cent. of white lead.

GENERAL BUILDING NEWS.

CHURCH TRAINING COLLEGE, BANGOR.—On the 19th inst. the Lord-Lieutenant of Carnarvonshire (Mr. J. E. Greaves) laid the corner-stone of the new North Wales Church Training College, now in course of erection at Bangor. The site of the new college is on the summit of the rising ground overlooking the city, near the railway station. The building will provide accommodation for sixty students. The principal entrance will be from a terrace crowning the brow of the hill, and from which access is had into the principal corridor, 100 ft. long by 10 ft. wide, and from thence to the lecture-rooms, three in number, and to the common-room,

and by an intersecting corridor to the chapel, dining-hall, principal's study, &c. At the point of intersection, the main staircase, of York stone, is placed, and leads up to the two dormitories, each 100 ft. by 22 ft., with open roofs, and containing thirty cubicles each. Adjoining the dormitories are the assistant masters' rooms, the Principal's residence being placed at the west end of the block. From the south-east corner of the quadrangle a square tower will rise to the height of 60 ft. The style adopted for the external treatment of the buildings is Late Tudor Gothic of collegiate type. It is expected that the buildings, with the exception of the principal's residence, will be completed by the end of the present year. The total cost of the buildings, including fittings, will be about 10,000l. The architect is Mr. R. Grieson, of Bangor, the contractors being Messrs. Parnell & Son, Rugby.

MISSION HALL, BOLTON.—The foundation-stone of the Queen-street Mission Hall, Idle-lane, Bolton, was laid on the 20th inst. The building is of a plain but substantial character as to the exterior. Provision is made in the basement for a gymnasium, two large labour-rooms, and two bath-rooms. A soup kitchen with steam boilers, and a kitchen and heating apparatus room, complete the accommodation in the basement. On the ground-floor is the large hall, 66 ft. by 44 ft., with open pitch-pine roof, and with a gallery at one end; the body of the Hall will hold about 600. A large infants' room with gallery is provided, and four class-rooms of various dimensions, two of which can be opened to the Hall by means of revolving shutters, so as to provide additional space when desirable at public gatherings. On the upper floor is one large class-room, 24 ft. by 32 ft., and seven other class-rooms of various dimensions. The building will be heated with hot water. The contractors for the work are:—W. Kearns, excavator; J. Merrick, bricklayer; R. W. Kenyon, joiner; R. Walsh, plumber; J. Warburton, plasterer and painter; Gregson & Smith, masons; and J. Hodson, slater. Mr. W. J. Morley (late Woodhouse & Morley) is the architect. The total cost of the building and site will be over 4,000l.

PROPOSED ADDITION TO HOSPITAL, COOKRIDGE, YORKSHIRE.—It is proposed to erect a wing to the Cookridge Convalescent Hospital, to be called "The Edward Jackson Wing," in memory of the late Canon Jackson. The proposed addition will provide fifty more beds. The preparation of the plans has been intrusted to Mr. Walter A. Hobson, architect, of Leeds. The whole of the new wing is practically devoted to the provision of additional sleeping accommodation, with the exception of a portion which has been utilised for enlarging the existing dining-hall, and providing a men's new day-room. Externally, it will be carried out in harmony with the existing building, and will extend the present front 60 ft. to the east, and will run back to a depth of 72 ft. On the ground floor will be located the men's day-room, which will be 34½ ft. by 23 ft. This floor will contain a staircase hall, 12 ft. in width, and 22 ft. in length, giving access on either side to dormitories for eight and twelve beds respectively. On the first floor a men's dormitory, 34½ ft. by 24 ft., and with accommodation for eleven beds, is placed over the men's day-room, and at right angles to it there are other two dormitories exactly similar to that on the floor below. The second floor is practically a repetition of the first. A staircase running from the ground floor to the top story gives access to the dormitories, which are placed on either side of it, and which can be ventilated into it. The new wing is L-shaped, and the lavatories, which are provided for every floor, are placed in the angle of the building. The existing men's day-room will be enlarged into a dining-hall, 57 ft. by 23 ft. The open path at the rear of the present building will be roofed with glass, and will be used as a winter garden, besides which it will serve to connect the men's smoke-room with the new wing and the other parts of the building. The dormitories, day-rooms, and entrance-hall will be warmed with hot-water from the existing boiler. The contractors for all trades are Messrs. Cross & Carter, of Leeds; Messrs. Thomas Green & Sons having been intrusted with the carrying out of the heating arrangements. The cost of the building, when completed, will be about 4,000l.

PROPOSED HOSPITAL FOR THE LEWS, STOKNOWAY.—The movement for the establishment of a hospital at Stornoway, available for the whole population of the Lews, has been attended with such success that the committee have selected plans, which are to be carried out immediately, for a building of a commodious and substantial character. Some eight or nine designs were submitted by architects from Inverness and neighbourhood, and the committee unanimously chose the set sent in by Mr. John H. Gall, architect, Inverness. The approved plans show an arrangement for two wards to accommodate six patients each, separated by an administrative department embracing matron's room, doctor's room, central hall and vestibule, and two nurses' duty rooms. Behind these are the surgery and operation room, and the kitchen and kitchen offices. The laundry, washing-house, and mortuary are contained in a separate block. Above the administrative department are bedrooms for the matron, nurses, and kitchen staff, and a private or

separation ward with bathroom and other conveniences. Off each ward is an annexe containing lavatories and bathroom for the patients; and the whole arrangement has been so planned as to lend itself easily to future extension.

NEW MANUFACTURING PREMISES, BIRMINGHAM.—Alterations and additions have been completed at Messrs. Pickard & Lloyd's Tool Works, situated in Woodcock-street, Birmingham. This building, which was erected probably during the latter part of the last century, has practically been remodelled. The old blacksmiths' hearths and fittings, workshops, &c., have been removed, and others of a more modern and improved kind substituted. A large blacksmiths' shop, covered with glass, and with louvre ventilators, and a spacious tool-shop, &c., have been erected. The work has been carried out by Mr. Shergold, builder, of Aston, from plans prepared by and under the superintendence of the architect, Mr. J. Statham Davis, Birmingham.

MINERS' HALL, WEARMOUTH, SUNDERLAND.—On the 22nd inst. the foundation stones in connexion with the Wearmouth miners' new hall in Roker Avenue, Sunderland, were laid by Mr. Storey, M.P., Col. Gourley, M.P., Captain Fenwick, M.P., and others. Mr. J. W. Bell, of Sunderland, is the architect, and his plans provide for a structure of Sherburn brick, relieved with stone and terra-cotta embellishments, having a frontage of 123 ft., a depth of 44 ft., a height from the street level to the top of the ridge of 50 ft., and to the wrought-iron dome surmounting an ornamental tower, supported by the side walls of the entrance, 78 ft. There are to be three entrances from Roker-avenue. The principal means of ingress is immediately under the tower. It leads on the right to a pay office, a committee-room, a reading-room, and a billiard-room, with ante-room, &c. A staircase gives access to the level of the hall floor, which occupies the remainder of the main building. The hall is 68 ft. long, by 4 ft. across, with a height of 26 ft. to the ceiling-line. A gallery, 40 ft. by 20 ft., occupies one end; the platform is at the other end; and on either side there are retiring-rooms, with separate private entrances, and staircases leading to the rooms. The hall is estimated to accommodate 1,200 people. The gallery has its own staircase, and a way out of the back of the hall is provided. At either end of the main building is a house for the residence of the colliery checkweighman. The contract price for the hall is 4,123l. 9s. 9d. The work has been let to Mr. James Hudson.

GRAMMAR SCHOOL, DEWSBURY.—On the 19th inst. the Archbishop of York opened the Wheelwright Grammar Schools, Dewsbury, which have been built under the John Wheelwright Trust. The central elevation of the building faces the junction of Halifax and Birkdale-roads. The plan is on the Central Hall system. On the ground floor are the boys' rooms, the girls being accommodated on the first floor. In the basement are the dining-rooms, kitchens, workshops, lavatories, &c. The materials used in the construction of the building are Dolphinstone and Holmfirth ashlar dressings. The timbers are of pitch-pine, and the joiner's work is of yellow pine, stained and varnished. The architect was Mr. J. Lane Fox, of Dewsbury.

NEW POLICE-STATION, CARDIFF.—On the 19th inst. a new police-station was opened on the East Moors, Cardiff. The building occupies a corner site at the junction of Janet-street with Walker-road, and has a frontage to Janet-street of 70 ft. and to Walker-road of about 100 ft. It is constructed of Newbridge stone in narrow courses, with Bath stone dressings, and has a gabled front and projecting porches. The main building consists of inspector's quarters, police offices, and single constables' quarters. The inspector's quarters comprise parlour, kitchen, scullery, two bed-rooms, bath-room, &c. The police-offices contain:—On the ground floor, lobby and entrance-hall, inspector's office, charge-room, parade-room, store-room, lamp-room, boot-room, and six cells, each 10 ft. by 7 ft. by 10 ft. high; and on the first floor, men's mess-room, 18 ft. by 14 ft., four bedrooms, bath-room, lavatory, &c. The out-buildings consist of fire-escape and reel-shed, mortuary, lavatory, and exercise yard for prisoners. The cells and cell corridor are lined throughout with white enamelled bricks, and are heated by hot water on the small bore system, and are ventilated by two large Boyle's air-pump ventilators, fresh air being admitted by gratings in the walls. The whole of the cell corridor is immediately overlooked from the charge-room. The whole of the work has been carried out from designs prepared by the Borough Engineer, Mr. W. Harpur, the contractor being Mr. T. R. Waterman, and the clerk of works Mr. George Howell.

WELFARE CHURCH, BISHOPSTON, NEAR BRISTOL.—The main and side walls of the new Welfare Church, now being constructed at Bishopston, were laid on Tuesday. The new church will be a Gothic edifice of the Decorated period. The new church will provide seats for upwards of 600 worshippers, 500 being accommodated on the main floor, and about 100 in a gallery at the western end. The principal entrances are three in number, one facing the main road. The church will contain

two aisles, a north and south transept, and an apse at the rear end. A doorway in the south transept affords communication with the existing vestry, school, and class-rooms. The main walls will all be in Pennant stone, with dressings, mouldings, and window and door openings in moulded Bath stonework. The upper portions of the windows will be filled in with tracery, and the treatment of the heads of the several door openings will harmonise with them. The roofs will be of moulded and varnished pitch-pine, and will be open-timbered for about one-half the height, relieved with traceried panels between the curved ribs and other principal timbers of the roofs. All the internal wood fittings will be of varnished pitch-pine, and the artificial lighting will be by gas. All the windows and the screens and doors in the entrance lobbies will be glazed with cathedral glass in geometrical designs. The warming of the church will be by means of a low-pressure hot-water apparatus. The architect is Mr. Herbert J. Jones, of Bristol. The contractors for the new church are Messrs. R. Wilkins & Sons, the estimated cost being about 3,000l.

RESTORATION OF CHAPEL-EN-LE-FRITH PARISH CHURCH, DERBYSHIRE.—The reopening, after restoration, took place on the 19th inst. of the Church of St. Thomas à Becket, at Chapel-en-le-Frith. The work has been carried out by Mr. A. Hill, of Tideswell, under the direction of Mr. Smith, of the firm of Messrs. Darbyshire & Smith, architects, Manchester. The old features of the building have been retained and a new roof erected. A large window has been opened in the south side, and a west window in the north wall. An organ chamber has been erected on the south side of the chancel. Other improvements include a new pulpit and reading-desk, and the rearrangement of the chancel pews. All the monuments have been rearranged.

PUBLIC BUILDINGS, TREDEGAR, MONMOUTHSHIRE.—On the 17th inst. new public buildings at Tredegar were opened by Mr. J. Colquhoun, J.P. The buildings include a market-hall, which consists of butchers' stalls, twelve general shops, twenty open stalls, &c., and attached thereto a public slaughter-house. In addition to this, there is a Town-hall, which incorporates a county-court-room and offices, registrar's court and offices, store-room, local boardroom and offices, telephone office, lecture-room, judge's retiring and ante-room, high bailiffs' office, and four solicitors' offices. The architect was Mr. Hitchcox, of the firm of Messrs. Graham & Hitchcox, of Newport, while the structural portion of the work was executed under the direction of Mr. David Davies, contractor, Cardiff. Mr. Edward Morgan, Tredegar, builder, has acted as clerk of the works.

CHANCEL, ST. STEPHEN'S CHURCH, CINDERFORD.—Three years ago the nave of the Church of St. Stephen, Cinderford, was consecrated by the Bishop of the Diocese. The church lacked the chancel tower, spire, and offices. The architect was Mr. E. H. Lingen-Barker, of Hereford, and the chancel has now been built from his design, the builder being Mr. W. Jones, Gloucester.

RESTORATION OF MARCROSS CHURCH, GLAMORGANSHIRE.—The ancient church of Marcross, on the coast near St. Donat's Castle, is now being restored under the supervision of Messrs. Kempton & Fowler, of Llandaff. This church, says the *Western Mail*, has a very quaint chancel arch and south entrance of Norman date. A few days ago, while the walls were being stripped of the old plaster, the north side of the chancel arch was discovered, the north side of the chancel arch was discovered, the wall of the nave, with an incised fortified cross cut on the slab. The pillar piscina was also found. There is a leper window in the south chancel wall, low down. It is intended to clean and preserve the above, fix the piscina in its old position, and open out and glaze the small window. The roofs are all to be new, also most of the windows, floors, &c.

PUBLIC HALL AND INSTITUTE, TREHARRIS, GLAMORGANSHIRE.—On Whit-Monday a new Public-hall and Institute was opened at Treharris. The hall provides accommodation for over 1,000 people, and has a gallery. The stage measures 33 ft. by 19 ft. A broad flight of steps leads from the entrance up to the gallery, there being also three other exit staircases. Cloak-room accommodation has been provided. The institute comprises reading-room, library, recreation-room, committee-room, and lavatory accommodation. The contract for the erection of the building was let to Messrs. Morgan & Roberts, of Newport; the lighting has been carried out by Messrs. Arnold & Co., Newport, the whole being executed under the supervision of Mr. T. R. Bates, architect, Newport.

VILLAGE INSTITUTE, HAWARDEN.—On Whit-Monday a new village institute was opened at Hawarden by the Prime Minister. The new building library connected with the institute, which is also provided with a couple of billiard-rooms, a reading-room, a lecture-room, bath-rooms, &c. A portion of the building has been set apart as an armory. The institute building has been erected at a cost of about 1,500l. Messrs. W. & T. Bailey were the builders, and Messrs. Lockwood & Sons, of Chester, the architects.

NEW CATHOLIC CHURCH AT SUDBURY, SUFFOLK.—A new Catholic church is about to be erected here. Mr. Leonard Stokes being the architect, and Messrs. George Grimwood & Sons, of Sudbury, the contractors.

SANITARY AND ENGINEERING NEWS.

CHESTERFIELD SEWAGE TREATMENT.—The Corporation of Chesterfield have decided to effect several improvements at their Sewage Farm, and have instructed Mr. Theo. S. McCallum, A.M.Inst.C.E., of Manchester, to prepare a scheme for the precipitation of the sewage and for dealing with the sludge.

AIRE AND CALDER POLLUTION: ELLAND DRAINAGE.—The Local Board of Elland have engaged Mr. Malcolm Paterson, M.Inst.C.E., of Bradford, to prepare a preliminary scheme for the drainage and sewage treatment of their town. Elland being a woollen manufacturing town on the River Calder, the scheme is to make provision for both trade and domestic refuse, a thorough policy now becoming general in the West Riding, as the only practical means of remedying the evils of the universal river pollution of the industrial rivers of that district.

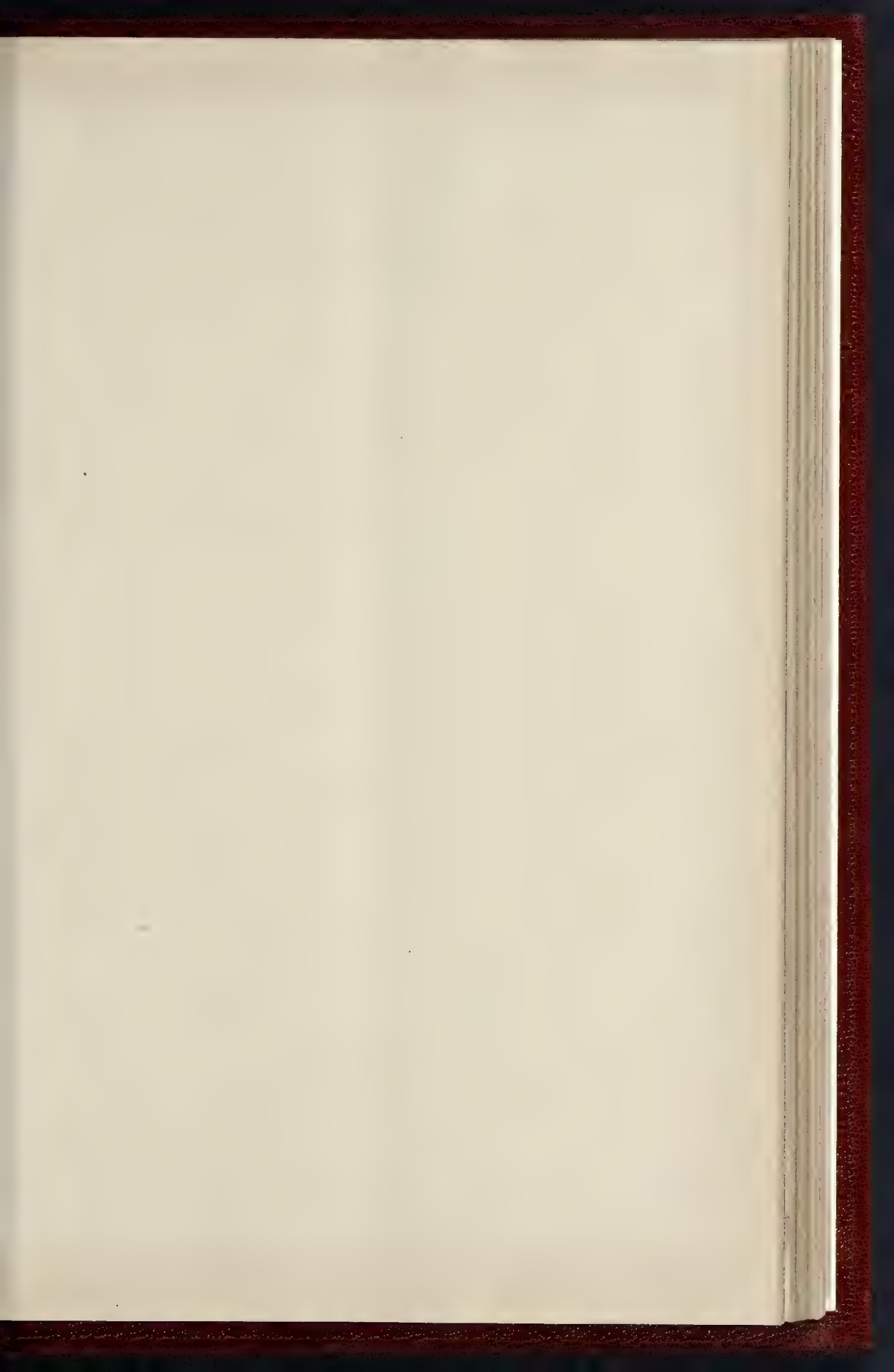
THE WATER OF LEITH PURIFICATION SCHEME.—A meeting of the Water of Leith Purification and Sewerage Commissioners was held in the City Chambers, Edinburgh, on the 10th inst. Provost Aitken, Leith, Presiding. The clerk read a special report by Messrs. Leslie and Reid, C.E., on the completion of the works in the landward district. The report stated that according to notices the occupiers of the mills and works proceeded with all dispatch to get connexions made with the regulating tanks of the Commissioners, and the engineers were able to report that all the connexions had been completed, and that the discharges from the mills and works were now passing down the sewer. They had not yet had time to get the quantity of water discharged by the mills and works properly gauged, as it varied from one hour to hour, and required a series of observations carried on for a considerable period to be able to say what might be taken as the average discharges from the mills and works into the sewer. They might say, however, that from the gauge already taken the total aggregate flows from mills and works above the special boundary would not exceed 200,000 cubic ft. per day, or 140 cubic ft. per minute. The quantity discharged from the compensation reservoirs at the present time was 1,200 ft. per minute. The quantity of water in stock at the present time in the compensation reservoirs in excess of the old capacity was 36,000,000 cubic ft. The effect of the removal of the sewage and the discharges from the paper mills and other works on the water of the river was very apparent, but the river bed was in rather a polluted condition, and the full effect of the purification works would not be obtained until the river bed had been thoroughly scoured out by successive floods. Bailie Archibald said the report was very satisfactory. They had now practically completed this great scheme of purification, and although it had cost a little more money than was first intended, he thought it would be apparent that, considering the purity of the stream which they might expect now and the great advantage to the manufacturers on the river, from a health point of view this money would be well spent indeed. He suggested the present would be a fitting time to make an inspection of the whole works, to see the marked difference in the stream after expending about 230,000l. He moved accordingly. Ex-Bailie McLachlan seconded, and it was remitted to the Works Committee to make arrangements.

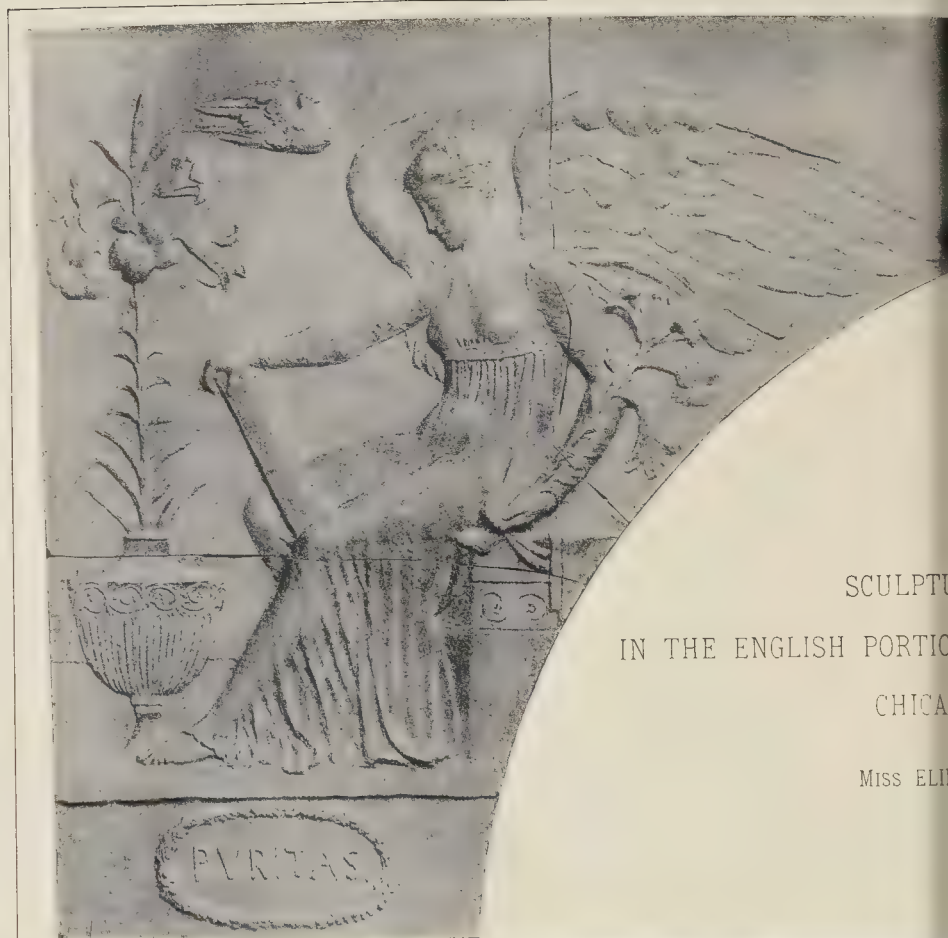
NEW WATER SUPPLY FOR MATLOCK BATH.—An additional water supply for Matlock Bath, Derbyshire, was inaugurated on the 18th inst. The engineer has been Mr. W. H. Radford, of Nottingham.

THE PROPOSED NEW HARBOUR AT KIRKCALDY.

—At a special meeting of the Kirkcaldy Harbour Commissioners, held on the 22nd inst., Mr. Hall Hlyth's report on the proposed new harbour for Ravensraig was again under consideration. The report was unanimously adopted. The undertaking is estimated to cost 300,000l.

NORTHAMPTON SEWAGE DISPOSAL.—The Northampton Town Council have obtained a Provisional Order for acquiring further land in extension of their sewage farm at Ecton, rendered necessary by the rapid increase in the population of the town. It is to be laid out for irrigating and intermittent filtration, the Corporation preferring this method of dealing with their sewage, to the adoption of any chemical treatment. At the inquiry there appeared for the Town Council, Mr. Balfour Browne, Q.C., Mr. E. Bailey Denton, M.Inst.C.E., whose firm's report (Messrs. Bailey Denton, Son, & North) the Corporation had adopted, Mr. W. D. Gibbins, A.M.Inst.C.E., Assistant Borough Engineer, and Col. Jones, V.C., C.E.; while General Sotheby, the landowner, who opposed the Order, was represented by Mr. Rickards, Barrister-at-Law, Mr. G. Chatterton, M.Inst.C.E., and Mr. Everard, of Leicester.

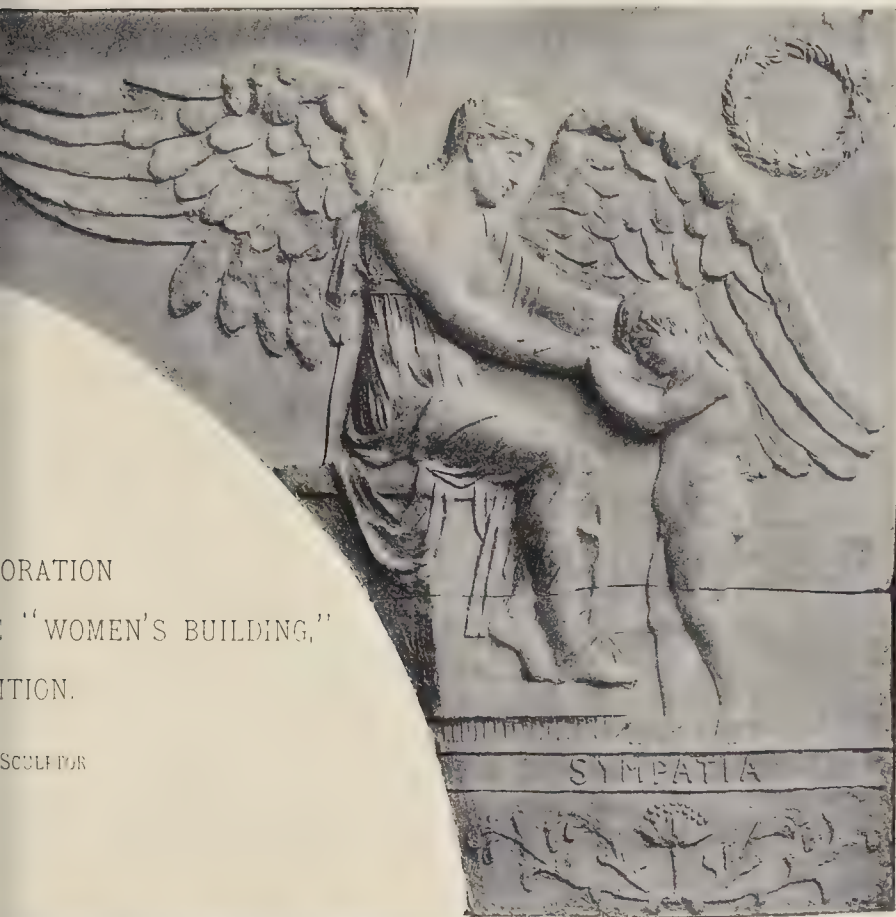




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CHICAGO

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ORATION
"WOMEN'S BUILDING,"
TION.

SCULPTOR





MISCELLANEOUS.

MEETINGS.

MONDAY, MAY 29.

TUESDAY, MAY 30.

WEDNESDAY, MAY 31.

THURSDAY, JUNE 1

SATURDAY, JUNE 3.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

1000.—VENTILATORS AND CHIMNEY COWLS: *R. R. Gibbs and E. H. Madcock*.—These ventilators are of two kinds, one for drawing in fresh air, and the other for expelling air. In the former, the improvement consists in enlarging the mouth or outlet of an ordinary "Tobin" tube, and in the expanded part thus formed fitting a loose tray made up of one or more tubes of perforated zinc or other suitable material, which is so arranged that the air passing through the object being so to increase the surface that, whilst admitting the full quantity of air, instead of it entering all in one body, to cut it up into a number of small columns of air, by which the effect of avoiding draught is secured. The second and more important part of the invention consists in the use of wind ventilators for extracting air or gases from buildings, ships, soil-pipes, chimneys, &c., and consists in arranging in the head of the ventilator a series of tubes or pipes, which are so placed that the air or gas is drawn towards the centre, and towards each other, the one end of each tube being stopped, and the other end opening into a chamber communicating with the extracting shaft. In the central space, towards which all the slit openings converge, is formed a core or pillar of such shape

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Cambridge-st. Dimling u.t. 11 yrs., no g.r. 1,000l.

RUSHDEN (Northamptonshire).—For the construction of wells, engine-house, and cottage, covered service reservoir, for the Local Board. Mr. Reginald E. Middleton, engineer, 17, Victoria-street, London, S.W. 1.
 Suddons & Freeman £7,500 Smith & Sons £6,150
 S. Higwell 120 S. Smart 6,144
 Hughes & Gotta 6,777 H. Shardlow, Nottingham* 5,730
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SANTAL H. K.—For the erection of a bridge over the canal-house, &c., at the "Gange Porra Arms," for Messrs. Ryden. Mr. H. B. Wilson, surveyor, Canterbury.—
 Parnor & Son £7,795 o o J. Newby Bros. £7,752 12 o
 Wise 795 o o Deane & Son, Deal* 715 o o
 * Accepted.

WANSTEAD.—For the erection and fitting-up of the "Lord Rookwood" public-house, Cann Hall-road, Wanstead, E., for Mr. Chas. Wan. Emery. Mr. Fred. A. Ashton, architect, 3, Crooked-lane, E.C. 4.
 W. Shumner £4,350 J. & H. Cocks £4,600
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<div> <div>Durham Cathedral</div> <div> The Galilee, from the North-West Angle The Nine Altars, from Choir Triforium East Side of South Transept, from Nave Triforium View in South Aisle of Nave, looking North-West.—Drawn by Mr. H. W. Brewer Bishop Hatfield's Tomb.—Drawn by Mr. F. D. Bedford, A.R.I.B.A. </div> </div>	Double-Page Photo-Litho. Single-Page Ink-Photo. Single-Page Ink-Photo.

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Architects and the Geological Survey.



THE appearance of a two-volume "Memoir of the Geological Survey" * containing much information as to the economics of the region to which it relates, affords a convenient opportunity

for reviewing not only the book in question but the general work of the Survey in so far as it affects architects, especially in regard to building stones.

We may state that the Jurassic rocks of Yorkshire are confined to the north-east portion of the county, and according to the memoir before us many valuable building stones are found therein, along several horizons. Passing over the quarries in the neighbourhood of North Grimston, of little value, we may notice the stone at Hildenley, of Coral Rag age, which is said to be the best for interior ornamental work, in the district. It consists of a fine-grained limestone, well adapted for carving, except that small pieces of silicified shell occasionally occur in the stone, which interferes with its free working. This material was employed for the interior of Kirkham Abbey, where it has stood remarkably well. The chapel at Castle Howard was also built of this stone. The formation known as the Lower Calcareous Grit is employed as a building stone along the whole range of its outcrop, from the coast at Scarborough to the Hambleton Hills and throughout a great part of the Howardian Hills. It is, however, usually too soft to be of much value, and is certainly inferior to many other beds in the district, according to the observations of Mr. Fox Strangways. The stone found along the southern outcrop is, in general, of better quality and consequently all the more noted quarries are situated in that part. Amongst them are—Park quarry, at Castle Howard; Brow's quarry,

at Malton; and Birdsall quarry, all of which have produced considerable quantities of good material. The Kellaways rock has supplied excellent freestone, but the principal quarries at Hackness and Levisham have not been much worked of late years. The sandstones of the Lower Oolite formation in that part of Yorkshire are largely employed for building purposes. As a rule they are coarse in texture, massive, and suitable for structures where great strength is required, and also for general outside work. The principal quarries in this stone are at Cloughton, Old Fold, at the head of Riccal Dale, and Hayburn Wyke, where it is finer in grain. The rock known as the "Millepore bed" occurs along the coast south of Scarborough, and has been employed in the construction of the pier to the harbour of that town. It is a very hard siliceous rock, breaking up into rough, irregular blocks, well suited to the formation of breakwaters and other similar structures.

The massive sandstones of the Lower Estuarine series have been worked at numerous places, but the most important quarries are in the vicinity of Aislaby. Examples of the use of this stone may be seen in Whitby Abbey, Covent Garden Market, the foundations of Waterloo Bridge and London Bridge, and the piers of Whitby, Ramsgate, and Margate. In Rosedale, flagstone of exceptional quality is obtained from the same horizon.

The chief road-metal found in north-east Yorkshire is the "whinstone," an igneous rock obtained from the great basaltic dyke traversing the Jurassic rocks from near Stainton in Cleveland, to Fylingdales Moor. The thickness of this dyke varies considerably, even in the same locality; thus at the top of Cliff Ridge, near Ayton, it is only 20 ft. in width, whereas, at the bottom, 80 ft. have been proved, and its occurrence is somewhat irregular. It is quarried at various points along its outcrop, especially at Lease Rigg, Sleights Moor, Sneaton High Moor, and Fylingdales Moor. These works are connected by a tramway, and with the railway station at Goathland.

Lithologically, the whinstone road-metal is

a bluish grey or nearly black, finely crystalline rock, rather compact, with conchoidal fracture. Although generally known as basalt, Mr. Teall has shown that it should be more correctly termed an augite-andesite, and he has given * the following chemical analyses of the material from Great Ayton:—

Chemical Analyses of Whinstone.

	I.	II.
Silica	57.57	59.25
Alumina	14.25	16.75
Ferric oxide	6.04	4.00
Ferrous oxide	3.95	4.82
Manganese oxide	.27	—
Lime	6.87	6.88
Magnesia	4.24	3.81
Potash	1.08	1.92
Soda	2.98	2.56
Sulphur	.19	—
Carbonic acid	.30	trace.
Phosphoric acid	.15	—
Water	1.25	—
	99.74	99.99

Specific gravity 2.77

It is stated that 43,601 tons of whinstone, including 70 tons of "gannister," were worked in 1886, valued at 4,448*l*.

Many of the harder Jurassic rocks are also used locally as road metal, though they are inferior in quality to the whinstone. Special mention may, however, be made of the stone from Spindle Thorn, on Spaunton Moor, where it is more than usually calcareous, dark in colour, and finely crystalline in texture. The well-known Brandsby road-stone quarries in the same series have now been closed. Sandstone, locally called "white flint," found in the upper part of the Moor Grit is extensively used over the district north of the Esk. A siliceous material, known as "Dogger," is sometimes employed as road-metal, especially in the neighbourhood of Scarborough.

The principal sources of cement in north-east Yorkshire are from the "cement stone" of north Grimston, and from the nodules in the upper part of the Lias. The former is a close-grained argillaceous limestone, occurring in the district south of Malton, between the villages of Langton, north Grimston and

* Mem. Geol. Surv.—"The Jurassic Rocks of Britain," Vols. I. and II., Yorkshire. By C. Fox Strangways.

* Teall, *Quarterly Journal of the Geological Society*, vol. xl. (1884), p. 224.

Birdsall, and elsewhere. The lime is known as "Blue Lias lime," or "Lias Hydraulic lime," and has considerable analogy with that from Lyme Regis. This cement, which was first worked in 1856, has been employed in several important structures at Scarborough and vicinity. The nodules of the Upper Lias referred to, when calcined and ground, form a Roman cement. They have been worked at Sandsend, Loft House, Peak and Grosmont. According to the *British Association Report* for 1863, p. 713, "about 20 cwt. of this mineral is found in every 60 tons of shale, and the greater proportion is sent to Hull, where it is manufactured into a cement, sold under the name of Mulgrave cement." It is noteworthy that the first steam-engine introduced into Cleveland, was used for grinding these calcined nodules.

The manufacture of lime is carried on at many places in the district under review, the principal rock used being the Upper Limestone at Seamer, Pickering, Malton and North Grimston.

The occurrence of ironstone in the district, and questions dealing with water-supply are treated of at some considerable length in the memoir before us, as well as matters of less economic importance.

Speaking generally, we have to congratulate the Director-General of the Geological Survey on the publication of so much that is of use—especially to architects. The memoirs of the Survey, as a whole, are not noted for dealing at any great length with questions relating to building stones and the like; in fact, if we exclude those on the "Geology of Cornwall, Devon, &c." (a very old work), the "Geology of the Weald," the "Geology of Rutland," and one or two others, it may be said that next to nothing has hitherto appeared in a connected manner on the subject, in spite of the long career of the Survey. Even where information concerning building stones is vouchsafed, we not infrequently find that it is second-hand, and not of that calibre which might reasonably be expected at the hands of professed geological surveyors. It is true that, in the remarks explanatory of the maps, sundry details are given of the thickness of beds in certain quarries, and if the reader takes sufficient pains he might, by wading through the ponderous reports, be enabled to get together a list of principal quarries in the several districts treated of, but the amount of practical information derived even from this tedious process is not very encouraging. No systematic experiments on stone are carried out by the Survey—not even inexpensive ones; their weathering qualities (a subject eminently suitable for investigation in the field) are only alluded to spasmodically, and often in such a general manner as to render the remarks next to useless. Thus the building stones of such and such a "district," or along this or that "geological horizon," are alluded to—as if the stone could be spoken of in that fashion. What we should like to see is a complete account of each quarry (worthy the name) in the district comprised in the memoir, giving full particulars as to each workable bed of stone, together with its chemical and physical properties, and especially as to its mode of weathering; the Government Geological Surveyor should have ample opportunity of furnishing information on these lines. It is of no use to quote the analysis, crushing strength, &c., of a stone unless the actual bed in the quarry from which it was obtained is specified. And here we may remark that it is ridiculous to keep on citing chemical analyses, or other properties made and ascertained fifty years ago, of and on certain stones which have ever since been vigorously worked. The results may or may not appertain to the material as at present exploited—at all events, it is time to make fresh observations, even if only to confirm the old experiments.

There is another point also to which attention may profitably be directed. For some years we have from time to time published articles in the *Builder* strongly advocating the use of the microscope in investigating

the qualities of building stone. When we first touched on the subject, but little notice was taken of it; and certain petrologists who had, apparently, never examined building stones in this manner in their lives, sneered at the possibility of getting much practical result in that way. Since then, however, we have observed the gradual development of microscopic methods of examination of building stones, especially in America, where a textbook has been written taking up the matter with great warmth. American technical journals, also, have done much to encourage this method of investigation. We note that of late the subject has received some consideration in England, and it is now on a fair way to become the most important adjunct in dealing with questions affecting the durability of stone. We do not intend, on the present occasion, to again dwell on the advantages of the microscope in this branch of study, but we certainly think that after what has appeared on the subject, the recent memoirs of the geological survey might have contained something about the minute structure of building stones. More than that we will not say.

Now, in speaking thus, we must disclaim all intention of depreciating the value of the works issuing from the Survey Office, from some other points of view. More accurate stratigraphical descriptions of the formations met with in mapping areas it would be impossible to conceive—the works bristle with facts on every page. But these facts, however useful they may be to the geologist from the purely philosophical standpoint, are not of much value to the architect or engineer. We do not wish now to criticise the maps accompanying the memoirs, more than to say that we have seen much more useful maps in a practical sense in Russia, in Germany, and in Belgium.

It may be objected that we are expecting too much from the Survey; that the annual grant at its disposal is not sufficient to enable it to carry out all these suggestions; or, it may be urged that the primary function of the Geological Survey is to produce accurate geological maps and descriptions of the same, all other considerations being subordinate. We do not know if these be the opinions held by the Survey, but we feel sure that the public entertains entirely different views. True, good geological maps, both "solid" and "drift," are a necessity, but the public regards the survey in the light of officers paid by the State, whose function it is to publish also as much useful and practical geological information of economic value as can be had for the money. The traditions of the Survey might lead its officers to imagine that their primary object is to lay down geological boundary lines, and to write elaborate and erudite theses to be comprehended only by other geologists; and they may also think of questions of economic importance as beneath their notice, or, at best, only to be referred to casually; but we may assure them that the sooner such ideas are exploded, the better. The teaching of the science from the philosophical standpoint might well be left to museums of natural history, universities, and colleges. The public wants to see something of commercial value in exchange for the disbursements from the national purse, and the information should be made as public as possible—we say this advisedly.

We admit that the amount of the annual grant is absurdly inadequate for the purposes of carrying out anything like a model survey—such, for instance, as the construction and publication of detailed agronomic maps, or of special geological maps for engineers, or for the medical faculty, or of making a large number of detailed experiments of any kind. But we think that the grant might be made to go much further from an economic point of view than it does at present. By way of illustration, let us for a moment consider the memoirs of the class represented by that on the Jurassic rocks of North-east Yorkshire now under review. We find that this is one

of a series of monographs on special formations, and that its predecessor was devoted to the "Pliocene Rocks of Britain." Both give excellent stratigraphical details respecting the formations to which they refer, and from that circumstance they will undoubtedly become classical memoirs. Their authors are unquestionably well suited for the task imposed upon them, and they have displayed a depth of learning of no mean order—as stratigraphists. But when we analyse list after list of fossils from the Pliocene beds, and turn to the second volume on the Yorkshire Jurassics which is devoted almost exclusively to lists of fossils and their geological range, we ask ourselves, first, whether other than specialists in each group are now capable of correctly naming all these fossils, and, secondly, assuming them to be rightly determined, is the publication of such lists of prime importance? Or, to put it in another way, could not that portion of the Survey funds devoted to drawing up lists of fossils, &c., be expended in a more judicious manner? Instead of commencing a new series of monographs on "formations," why not spend the time and money in issuing monographs on subjects of greater economic value? The Survey would then become much more popular than it now is, and if we mistake not would have a much larger annual grant voted for its purposes.

But these criticisms are by the way; we make them, not as strictures, but as suggestions only. The Geological Survey is a very useful institution of which we have the most profound admiration, and far be it from our purpose to add to that disgraceful and unmerited attack made upon it, apparently from personal motives, in the columns of a daily contemporary not long since. Our primary object is to lay some of the claims of architects before the Director General for his consideration, in the hope that he will see his way to cause more attention to be given in future to the practical aspects of geology in so far as they relate to architecture.

THE ARCHITECTURAL DISFIGUREMENT OF UNIVERSITY COLLEGE.

THE intention in regard to the new buildings at University College turns out to be in one sense worse than we expected. We were under the impression that it was the intention to keep the centre portion of the buildings to the street to one story, with the object of avoiding the crowding up of the space and shutting out circulation of air from the quadrangle; and however mean the building would have looked, there would have been at least practical sense in this. It now appears that the whole side towards Gower-street is eventually to be built up the same height as the side wings, leaving only a narrow opening in the centre. By this operation the only fine piece of architectural effect in the neighbourhood is to be removed and the intention of Wilkins's design entirely altered. As if to put themselves in the worst position possible, the authorities—whether with or without the advice of their architect we know not—have not scrupled to assert that they are carrying out Wilkins's design. Sir Douglas Galton, following the tactics which have been long pursued by Lord Grimthorpe when subjected to any criticism in this journal, has made a demonstration on the subject in a daily paper, appealing thereby to the general public, who know and care nothing about architecture or about the questions under dispute, and asserting that he and his colleagues are completing the building according to Wilkins's intentions; in doing which he has left himself in the dilemma either that he has purposely misled the readers of the *Times* as to the facts, or that he has been making positive assertions on a matter about which he knows nothing; which is nearly as bad.

The small plan and drawing preserved among the portfolio of Wilkins's designs in the library of the Institute of Architects, and

described in the title as the "Accepted Design" for University College, shows clearly enough what Wilkins's intentions were. The side wings were to be continued up to the street, and connected by a low, narrow building marked "ambulatory" on the plan, with a gateway pavilion in the centre, and a colonnade towards the quadrangle. Whether there was to be a solid wall towards the street is not quite clear from the plan; the walls of the main building are shown by thick black single lines, the portion towards the street by a double thin line. But in any case it would only have been a low screen wall, as the first floor plan shows the space absolutely open between the ends of the wings, forming a quadrangle enclosed on three sides only. Even the treatment of the end of the side wings, as now finished, is obviously not what Wilkins intended. His plan shows the ends of the wings not flat, but with a break and a wide projection in the centre, and plan and elevation show that he intended to make a projecting pediment over the central portion, carried by four detached columns, thus giving force and effect to the street elevation of the wings, and balancing the treatment of the central portico. The present treatment, with a pediment over the whole width of the wing and four widely spaced pilasters, is very tame and flat in comparison, and entirely different from what Wilkins intended.

In contrast with this treatment of the low screen and central gateway, we are now to have two return wings three stories high, with a small gap left in the centre. In regard to this again there has been blundering or worse in the statements made in the Press on behalf of the College authorities. The reporters of the daily papers were told on Monday that the *Builder* was all wrong, that the new buildings were in accordance with Wilkins's intention, and that there would be an opening 100 ft. wide in the centre between the new return wings. Anyone with an eye in his head could see at a glance that there could be no opening of such width left; but to make this more certain we stepped the distance in yards, which anyone accustomed to estimate distances in that way can do with a very near approach to accuracy; and the result is that if a building corresponding in length to the new one were projected from the north side, there would be rather less than 80 ft. left between the ends of the new buildings. But the new wing is not yet carried out to its contemplated length, as the engraved elevation which has been handed about shows; it has to come about 20 ft. further to complete the design, leaving an opening of about 40 ft. wide in the centre. The only way in which the 100-ft. opening could be obtained would be by making the north return wing shorter than the south, thereby destroying the symmetry of the front, and making the exterior opening out of centre with the interior portico; and that would be such an architectural barbarity as we should think not even the authorities of University College would contemplate. This story about the 100-ft. opening in the centre has however been told to the representatives of the daily press, and dutifully repeated by them, and we should like to know how it arose and who is responsible for it.

We should be the last to wish to put architectural effect before practical requirements, though we must say that the destruction of the architectural effect of one of the best buildings of its class in London is not in any case a light matter, and that the erection of a lofty building to the street, where there was formerly an open space, and the practical closing up of the quadrangle, are operations to be avoided on sanitary as well as architectural grounds. If however the University College authorities had frankly said, "We do not care about the architectural effect of the building, but we must have the additional rooms for our educational work," that would have been a

comprehensible position. But to assert that they are carrying out Wilkins's design when they are doing nothing of the kind, and to prime the representatives of the daily press with unjustifiable statements in order to put themselves right with any of the public who happen to care about the architectural question, and to misrepresent an architectural journal which has criticised their doings, is a kind of proceeding which is neither comprehensible nor creditable.

NOTES.

FROM what we read in the daily papers there seems to be some possibility that the much vaunted Chicago exhibition will not prove such a success as has been expected. The immense and varied buildings which have been erected there, and the decorations, though not all so superior, we imagine, as they are vaunted to be by American critics, are nevertheless solid facts, energy and talent expended with something to show for them; but suspicion and mismanagement seem to be already rife, and seventeen countries have withdrawn from competition for awards owing to the absolute want of any satisfactory information as to the constitution of the jury who are to make the awards: and considering the national tendency of America to brag and to boast herself the best in everything, which we fear is not yet by any means eradicated, we should think that foreign exhibitors in an American exhibition would be wise to insist on the most rigid balance of nationalities in the composition of the jury, if they wish the awarding of medals to be anything more than a mere farce. It appears moreover, that the system of extortion in regard to the necessities of life has already shown itself in even a more rampant form than was expected. The crowded quarter of temporary and slightly built hotels, too, must evidently be a danger in case of any accidental outbreak of fire; and one begins to think that it is better to read interesting accounts of the Chicago exhibition in the illustrated magazines than to visit it. Things may work out better presently; but the fact cannot be disguised that the Americans are much better hands at trumpet-blowing and advertising than at organisation; and we have still here the recollection of the American exhibition at Earl's Court, which was exploited in advance as one which was to eclipse all previous exhibitions; for which a special journal was started; into which every railway in England was to be connected; and which ended in an absolute fiasco. It was a disappointment at the moment, but it gave us a useful lesson in the American way of doing things.

THE Railway Rates question enters upon another stage this week, the Select Committee appointed by Mr. Mundella having now commenced their labours. The Committee is a very representative one, comprising statesmen of great experience in railway legislation, and business men possessing practical knowledge of the working of railway traffic and the incidence of the charges thereon. The terms of reference include not only an inquiry into the manner in which the railway companies have exercised the powers conferred upon them, but also an instruction to report upon the best means to be adopted for settling differences arising with respect to the rates and conditions of charge. The trading interest will be looked after by the Mansion House Association,—who decided upon a course of procedure at a special meeting last Friday—and it may be taken for granted that the companies will not be behindhand with evidence relating to the reductions they have been making. Whatever may be proved from a railway manager's point of view, nothing will entirely justify their arbitrary action of last January, to which, of course, must be attributed the

clause directing the Committee to consider the desirability of adopting fresh means of settling future disputes. It will be easy enough to show that the conditions obtaining at the present moment approximate pretty closely to those of last year—indeed, we should not be at all surprised if it were demonstrated that the numerous concessions recently made have effected a net reduction on the old figures. But it will be a difficult matter for the companies to convince the Committee that, but for the unprecedented outcry raised throughout the country, they would not be enforcing many charges now, which, when the maximum rates were fixed, it was clearly understood were to be imposed only in cases of extreme necessity. For any prejudice that exists at the commencement of the inquiry, they have certainly only themselves to thank.

A TRANSLATION of a pamphlet on "The Cholera Germ,"* by Dr. Jaeger, which has been sent to us, is mainly occupied with medical considerations, but includes also some remarks on the conditions of dwellings in places where cholera has prevailed, which are of interest. Some extracts from the report of the Hamburg Sanitary Commission on the cholera epidemic there give a classified schedule of the nature and situation of the dwellings in which the epidemic was most violent. Among the worst of these are (naturally) cellar dwellings. Next come "large houses in flats occupied by several families. In one such house, out of eighteen cases of cholera fifteen were in the middle rooms, which are almost without any light or fresh air, the closets being pitch-dark and quite unventilated." These must of course have been very badly-planned examples of houses in flats, but in the present increasing tendency to build houses of this type in London it is a point to be considered, whether the chance of infection is not much greater in houses where several families live between the same walls and roof than in separate houses. In regard to the position of the closets in the interior of the house, with no direct ventilation, it is probably little known how many of the older houses in some parts of London are no better in this respect. There are many on the Bedford estate, houses in good streets and squares and letting at good rents, where the water-closets are in the centre of the house, opening off the staircase, and with no window to the outer air; in some cases, we believe, no ventilation at all except into the house itself. In case of a cholera epidemic, we should expect to find that those houses were the most liable to the disease; and it is a question whether the wealthy owners of some of these large London estates ought not to be compelled, in the interests of public health, to alter all houses which have been so planned. Another class of houses mentioned in the Hamburg Report, are houses with the back rooms looking on a small and confined yard; "the odours of a large cellar in which potatoes were stored, or stables on the ground floor, of a dung-pit in the yard, of the closets, were unable to get away, and permeated these rooms." This is a piece of statistics which has a direct bearing on a subject touched upon in another "Note" on this page. We may observe that Dr. Jaeger considers English cities to be far superior in cleanliness and sanitary condition to those of Germany, and we have no doubt he is right; but we must not on that account shut our eyes to the fact that there is much to be done in our towns yet, before they can be considered to be as healthy as modern cities can and should be made.

WE have received a pamphlet consisting of various letters* published lately in the *Newcastle Daily Chronicle* on the subject of back yards and back streets. The object of the writer, "A. V.," who started the correspondence is to suggest, as we under-

* Waterlow & Sons.

stand (for the letters are not very clearly expressed), that gardens should be substituted for back yards in the inferior class of houses, by doing away with the division walls and laying out the space in the rear as a garden common to the row of houses, with only a wall at each end. Another correspondent, Mr. F. L. Newcombe, suggests "one main road, no back street, the entrance door on the side facing the road, and the best rooms facing a garden at the back," and also suggests, in the arrangement of sites for workmen's dwellings, "dispensing with the front streets, using the space between the fronts of the houses for gardens, with a footpath four or five feet wide up the centre, the cart access being by the back streets as at present." One or two plans appended to the pamphlet* would have enabled us to understand better the arrangement which is deprecated and the improvements which are suggested, for more than one of the correspondents speaks as if the "craze for back yards and back streets" was a special feature of northern towns, and refers to the example of London and other cities in the south; whereas every one familiar with the views from London railway viaducts knows that the back yard system, with its divisions of back walls in parallel rows, is as common in London as anywhere, and a wretched spectacle it makes from the bird's-eye point of view. There can be no doubt that this shutting up of the spaces behind small houses with high brick walls is a very insanitary system, and that a great improvement in the conditions of life in the poorer quarters of cities would be achieved by some such arrangement as that suggested by "A. V." and the other correspondents whose letters are included in the pamphlet in question, and the Newcastle public should be indebted to "A. V." for drawing attention to the subject. The suggestion made by one correspondent, to build the smaller class of houses in quadrangles with a garden in the centre, is not one to be recommended; it checks the free circulation of air to the houses; they are much better in parallel rows open from end to end.

THE last report of excavations at Athens (issued in the 4th Heft of the Athenian *Mittheilungen* for 1892, just published), contains many items of interest. First come the discovery of a portion of the ancient city wall to the east of the Acharnian gate at the corner of the Sophocles and Aristides streets. The material of the wall consists of great blocks of breccia stone, and from this it may safely be concluded that we have not to do with the original wall of Themistokles, which was built of limestone on clay tiles, but with a restoration not earlier than the fourth century B.C. The newly-discovered wall has been carefully photographed, and prints can be obtained from the German Institute at Athens. The wall was of very remarkable strength, the foundations measuring a little over 5 metres, which would allow for the wall above ground being about 4.90 metres. At about 7 metres distance a second and thinner wall has been found, the purport of which is at present not made out. To the south of the Acropolis a whole row of drums of marble columns have been found near the Katastamatis silk manufactory. They were built in to strengthen the old city wall, and probably belonged to the Stoa of Eumenes. They must have been utilised for their new purpose in quite late Roman days, or even in the Middle Ages. We are promised very shortly a discussion of the whole question of the ancient topography of the city, especially of the much-contested passage in Thucydides, ii., 15, as to the lie of the primitive city.

AT Eleusis Mr. Philios has found another piece of the city wall, and sufficient remains have now come to light to make the whole line intelligible. He has also found an

ancient well, which he thinks is the famous Well of the Fair Dance, *Kalixorou φρένα* (Paus. i. 38-6), where the Eleusinian women first danced and sang to Demeter. From Delphi comes the news of the first substantial discovery as yet made. The excavators have laid bare the "Treasure House" of the Athenians, a building in the form of a small Doric temple, decorated with sculptured metopes. Five fragments of these have been discovered, and are archaic in style. Inscriptions to the amount of 150 fragments have also been found, and they put the attribution of the temple beyond a doubt. Pausanias, it will be remembered, mentions (x., 11) the Athenians' Treasure House, with those of other people's, just before he passes to the Stoa of the Athenians which still remains in part above-ground. He says that spoils from the victory of Marathon were dedicated there.

LEGISLATION has been busy of late with London churches. In pursuance of an Order in Council, made in March last, notice is given by the rector and churchwardens of their application to the Consistory Court for a faculty to remove the remains of persons buried beneath the floor and in the vaults of St. Martin Ludgate. The church, which is believed to stand on the site of a Roman cemetery, was rebuilt by Wren at a cost of 5,379*l*. The fabric of St. Martin's is one of the four churches that are preserved from demolition under the Union of Benefices Act, 1860, by clause fourteen of that statute. The Ecclesiastical Commissioners' scheme for the union of the parishes of All Hallows-the-Great and All Hallows-the-Less, with St. Michael Paternoster Royal, and St. Martin Vintry, has been finally approved, and involves the destruction of the church of All Hallows-the-Great, in Upper Thames-street, which was closed in 1890 owing, it was said, to its insanitary condition, by order of the Commissioners of Sewers. To that church, designed by Wren, the Hanse merchants, to whom Henry III. had granted a settlement in the neighbouring Steel-yard, gave the carved oak screen which is illustrated in the late George Godwin's "Churches of London." Godwin says:

"It was manufactured at Hamburg, and presented to the church by the Hanse merchants, in memory of the former connexion which existed between them and this country, so that it is probably the work of a foreign artist. No mention of the date of the presentation appears in the parish books, but common report ascribes it to the reign of Queen Anne."

In All Hallows was buried Theodore Jacobsen, architect of the Haslar Royal Hospital, Gosport, and governor of the Foundling Hospital, London, for which he made a plan and elevation. The churches of St. Martin Vintry, and All Hallows-the-Less (its site latterly occupied by Calvert's, since the New City of London, Brewery), were not rebuilt after the Great Fire: so St. Michael's will serve for the four united benefices. The union of Holy Trinity, Minorities, with St. Botolph, Aldgate, is now ratified; we understand that the former church will not be pulled down, as was originally intended, but will be converted to the purposes of a local mission-room. Holy Trinity—rebuilt of brick, in 1706—represents an abbey of Poor Sisters of St. Clare, or Nuns Minorities, established by Blanche, Queen of Navarre. We printed an account of the church, and the decapitated head preserved there, vulgarly known as the "Duke of Suffolk's," on Jan. 9, 1886.

THE "Old Paris" erection at Earl's Court, including the representation of the interior of the Bastille on its full scale, is one thing, and perhaps the only thing, in connexion with the so-called Forestry Exhibition, which is really worth going to see. The street of houses does not convey any impression of realism, partly because the old Paris pavement and gutters are not repre-

sented, and because the buildings which line the street are mostly not on full scale, and the street appears much too wide in relation to them. The "Eglise Ste. Marie" is a mere model, and we hope the innocent spectator is not beguiled into thinking that it represents the true scale of a Paris edifice of that type and date. In this respect the "Old London" exhibition of former days was much better, as the majority of the houses, buildings of a smaller and more fragile type, were shown to pretty near the right scale. We admit that it could hardly be expected that a whole street such as this should be built up full size for a temporary exhibition, when it is a mere piece of accessory to the principal object, the Bastille; we only wish to point out that it is not to be taken as realistic. But the Bastille arises, full size, in all its gloomy and portentous grandeur, and with a completely successful imitation of the effect of time-stained masonry; it is really well done, and after seeing it one feels better able to realise in the imagination the historic scenes of which it was the centre.

WE learn that extensive deposits of the so-called Mexican onyx marble have recently been discovered to the south-east of San Diego, in the peninsula of Lower California. The prevailing tints are rose, light green, and white, variously veined. The stone occurs in good-sized blocks and takes a high polish. It is, as usual, not stamagmitic in origin, but like the Mexican deposits of the same class of material, it is a travertine, or deposit from springs. Specimens are to be cut and polished for exhibition at the World's Fair. Quite recently also some onyx quarries have been opened up near Prescott, Arizona, at a place called Cave Creek. The main onyx ledge here lies on the western slope of a low basalt-capped hill, and the maximum thickness workable is about 10 ft. The tints are very striking, being green and yellow, with veins of ochreous brown and red. The occurrence of chalcidonic quartz in the stone, however, is a considerable drawback, though it is believed that this will disappear as the rock is worked into. A large quantity of ornamental stone is annually imported by the United States (about 600,000 dollars' worth), but much attention has of late been given to the development of its own marble resources. The discovery of these onyx deposits, together with those found about two years since in the Ozark Mountains, Missouri, which are now being exploited, seriously menace the employment in America of the well-known Mexican onyx.

THE Cathedral Church of St. Giles, Edinburgh, has just been enriched by a noteworthy mural monument to the late Lord President Inglis, who died nearly two years ago at the ripe age of eighty-one. The monument is from the designs of Dr. R. Rowand Anderson, and is placed on the eastern wall of the beautiful Preston Aisle. From the south side of the same aisle projects the chapel of St. John the Evangelist, built and endowed by Walter Chepman, Scotland's first printer, in 1513 (the year of Flodden), in which the mutilated remains of the great Marquis of Montrose were buried, ten years after his execution, in 1660, and where, since 1883, has stood the very noble monument erected to his memory, also from the designs of Dr. Anderson. The two monuments by the same architect naturally provoke comparison in spite of their difference of scale. Both are of rich materials, marbles and alabaster, profusely sculptured, coloured and gilt; both are Renaissance in style; but the earlier monument is much more distinctly Italian in feeling, while that now erected to Lord Inglis has more Jacobean, and even local, character. It consists of a central panel of marble and alabaster, bearing the inscription and the arms of Glasgow and St. Andrews, flanked

* Published, under the title "Beautiful Homes," by Mawson, Swan & Morgan, Newcastle-on-Tyne.

by disengaged black marble columns, standing on a deep plinth course, and carrying a rich entablature surmounted by armorial bearings, sculptured and coloured, with seventeenth-century ornament, florid but good, in some profusion. The monument is corbelled out from the wall on carved brackets, bearing arms of Edinburgh and Aberdeen—Lord Inglis was Chancellor of the University of Edinburgh—as well as the late judge's own crest. The whole is dignified and very rich, and worthy of its designer, though perhaps scarcely so successful as the much more important Montrose monument hard by. The conventional drapery in alabaster of the centre panel is open to criticism as a field for a memorial inscription; and the black marble obelisks surmounting the entablature above the columns are slightly obtrusive and disturbing. The columns themselves would be better if less highly polished, but this is a defect which, in common with the over-wealth of gilding and colour, time in a northern climate will only too quickly and effectually cure. The whole monument is, perhaps, somewhat too big for its position between a large flamboyant window (greatly in need of stained glass) and the very delicate Gothic pier of the aisle arcade. It is, however, on the whole very beautiful, most carefully studied, and full of refinement, a welcome addition on the grey walls of the fine old church, whose bareness modern piety is tardily adorning, after the wanton and deplorable "restoration" of 1829, and the more excusable, if infuriated, zeal for destruction and "purgation" of 1859.

FROM some correspondence in the *Perth Constitutional* it appears that it is proposed to fill the large east window of the East Church, Perth, with a stained-glass in commemoration of the life and work of John Knox. The idea seems a good one, though it is rather amusing to think of Knox being commemorated by a form of decoration which he would probably have been ready to denounce as a Popish and superstitious addition to a church.

FROM an account published in the *Evening Dispatch* (Edinburgh) of May 25, we learn that there is to be a restoration undertaken of the crypt of the parish church of St. Nicholas, Aberdeen, known as St. Mary's Chapel, said to be "the only example of ecclesiastical stone vaulting in Aberdeenshire." The chapel is identified by the Marquis of Huntly as being the "Cocklarachie Isle of St. Mary," founded early in the fifteenth century, and endowed from lands of Cocklarachie, by Elizabeth Gordon, who by her marriage with Alexander Seton (who took her name) became the ancestress of the Earls and Marquises of Huntly and the Dukes of Gordon. The chapel, we gather from a sketch published in the *Evening Dispatch*, is now fitted up with pews and seating, and the architectural features, except the vault, much decayed and knocked about. The following statement is given in the *Dispatch* as to what is now proposed to be done:—

"At a public meeting recently it was resolved to accept the offer of Messrs. A. Marshall Mackenzie, A.R.S.A., G. Jenkins, and W. Kelly, to act as an architectural committee, and issue a statement from which the above facts are gleaned. The chapel consists of a central portion with an apsidal end, and a north and south aisle. Down these aisles there had formerly been stairs from the East Church above, and the two side aisles had been at a higher level than the chapel proper. In the reconstruction the old levels are to be restored, and by doing this the proportions of the building will be much improved and the chapel better seen. The chapel is very rich in carved woodwork of the seventeenth century, which had been originally partly painted, and it is proposed to line the walls with this material up to a height below the spring of the arches. The floor, which is at present of wood, will be relaid with granite pavement in geometrical patterns. The whole of the square-headed windows are to be taken out in the inside and filled with properly-designed

tracery and rear drop arches; while the vaulting of the chapel, which had been plastered; is to be decoratively painted."

We fear there will be a good deal of difference of opinion as to the real value of so drastic a "restoration" as this. When in process of time the new work ceases to look new, there may be some difficulty in ascertaining what is genuine old work and what is nineteenth-century restoration. The careful preservation of what now exists would be more to the purpose.

WE have received from Messrs. Raphael Tuck & Sons a series of coloured miniatures of panels of flower and figure groups, intended to be affixed to the panels of doors as decorations, with a few full-size specimens of the panels. They are designed by Mr. W. S. Coleman, Miss Bertha Maguire, and other artists, and are good examples of work of their kind, but not in our opinion sufficiently conventionalised to be classed as true ornament; they are rather chromolithographed flower paintings. We cannot say that this method of decorating door-panels commends itself to us; but if there is a fashion for having flower paintings on door-panels, and people are content to do it in a cheap form by fixing on chromolithograph reproductions, they will find these useful in satisfying their own tastes and those of their friends, and good of their kind, though we hardly think they will find acceptance with those who have an artistic view of what house decoration should be.

AN attempt is to be made at the Special Meeting of the Institute on Monday next to persuade members to upset the procedure of the Council in petitioning against the Architects' Registration Bill. The motives of the movement are obvious enough, and those members who wish the action of the Council to be supported will do well to attend the meeting.

ARCHITECTURE AT THE ROYAL ACADEMY.—V.

1584: "New Banking Premises Chester"; Messrs. T. M. Lockwood & Sons. This is evidently an attempt to produce a building which looks solid enough for a bank but is nevertheless in keeping with the picturesque style of the old (and some of the new) Chester architecture. It is a modern Elizabethan building in solid masonry, with large semicircular headed windows to the Bank-room, rising from the subbase moulding; a certain castellated effect is conveyed by the two circular turrets corbelled out at the canted angle of the building, the open cupolas of which, carried on small columns, have a pretty effect. There is no plan, but perhaps one can hardly expect that the plan of a bank should be made public property.

1587: "Oxford Municipal Buildings; one of the five premeditated designs"; Messrs. Cheston & Perkins. The original "sketch competition" elevation apparently; a good and suitable Gothic one with a low tower with octagon finish, square-headed mullioned windows below and larger segmental headed late tracery windows above, with a sculptured frieze between. We think this is one of those which we noted, in reviewing the competition, looked so much more satisfactory on the small than on the large scale; if so, the authors have probably been wise in sending their small sketch. They should have added a plan. Another of the sketch designs, that by Mr. Pennington (No. 1,591) is hung, as a "commoded design"; it is unobjectionable in taste but not much more. The larger drawings of Oxford Municipal Buildings designs by Mr. Hare and Mr. Rüntz (Nos. 1,588, 1589, 1590) we have already spoken of.

1,593: "New Music Room, Marlborough College"; Mr. C. E. Ponting. Is this an inspiration from the new American style? There is rather a wigwam look about it—a brick building with an over-sailing tiled gable, apparently supported in the centre by a bay window; octagon turrets at each side with the plainest of builder's house windows below, and immense extinguisher-looking slated roofs above, crowned with the now fashionable cupola or gazabo on colonnettes. A

columned porch runs across the lower story, stopped by the turrets. A small plan shows a centre music room with corridors and practising rooms round. The whole is picturesque but somewhat eccentric.

1,594: "Guildhall, Cambridge"; Mr. W. M. Fawcett. This is what we should call an exceedingly "correct" building, with its rusticated basement with round-arched windows and its pilaster order above, but surely some little touch of originality is needed to give interest; it looks like a kind of pattern building. The drawing is not adapted to add any interest to the design, being somewhat cold and formal. No plan.

1,595: "The Bury, King's Walden, Herts"; Messrs. Beeston and Burnester. A good drawing of a good country-house, to which a small but carefully-drawn plan, with a north and south point, is attached. The plan is a good one in the main, but the corridor from the entrance door to the hall is rather a long step, and the w.c. in the women's yard seems disagreeably near the bakery. The house is in a quiet quasi-Elizabethan style, shown in a good pen-drawing. An octagonal ice-house inserted in the line of boundary wall of the yards makes an incident in the design.

1,596: Stables to the last-named house, by the same architects. The small plans appended hardly show what all the rooms are, though one can distinguish stables and loose boxes. The buildings are not in any "style," but are unobtrusively picturesque, with wide spreading eaves and high pitched roofs. By the same architects again are

Nos. 1,597 and 1,598, "Hurstborne, Hants," entrance front and view from south-east. The latter is a good pen-sketch of a house of Elizabethan character, which derives some special effect from the two large octagonal turrets which flank the further wing, otherwise it is like many other houses in this style. The drawing of the entrance front is a rather hard and mechanical one, showing a carriage porch and the staircase block in the rear, both richly treated with the accepted kind of rather corrupt ornamental features proper to the style, but not showing any invention.

1,599: "St. Matthew's Church, Morningside, Hants"; Mr. Hippolyte J. Blanc. A rather dull and lifeless-looking pen-drawing of an admirably grouped bit of building, a cross church of early Gothic type, seen from the north-east, with an octagon vestry in the angle of chancel and transept, a flèche on the roof ridge near the east gable of the nave, and a tower with a light and slender spire, standing rather clear of the general group at the north-west angle. The whole makes an admirable bit of architectural composition, and merited a better and more effective drawing.

1,600: "Donhead St. Andrew's Church; Proposed Chancel and Aisle"; Mr. C. E. Ponting. A bit of modern work in late Gothic manner tacked on to what seems to be a cemented or rough-cast church of the ancient churchwarden type. The interior shows a heavy cambered and moulded tie-beam with open geometric tracery in the spandrels between that and the rafter. The building is illustrated in pretty and effective little water-colour sketches on toned paper.

1,601: "Proposed Town Hall and Offices, Farnworth"; Messrs. Bradshaw & Gass. The front is effectively treated, but the whole is a little too much like a slice of front, with nothing to call architecture round the corner. In the upper story there is an effective treatment of coupled pilasters rather wide apart, with niches and statues between them, and round-headed mullioned windows with rusticated arches. The finish of the tower is rather awkward in outline. No plan.

1,604: "The Music of Life"; Mr. H. Granville Fell. A decorative study of figures conventionally arranged, with a background of gold across which rise the stems of trees, the foliage of which forms a canopy over the figures. The colour effect is rich and harmonious, the two nude children representing childhood are a very pretty group, and contrast effectively with the crimson robes of "Amor," the next figure in the procession. As a treatment of figures in the decorative manner but with a symbolical meaning, this is a very successful piece of work.

1,605: "Town Hall, Brescia, Italy"; Mr. James C. Watt. A beautifully executed elevation of a fine bit of Renaissance building, with an order plainly treated on the ground story, with arches between, and a very richly decorated order in the upper story. A small scale plan is given. A very good piece of illustrative drawing.

1,606: "House at Surbiton-on-Thames"; Messrs. Kidner & Berry. An unpretending house

in what may be called English Domestic style; there is an amusing little bit of eccentricity in the treatment of the entrance porch, where the arch is returned round at the springing, projecting inwards towards the porch and ending in a small scroll on the top of a pedestal. It looks a little too much as if it were meant to sit on, or would probably be used for that purpose.

1,607: "L'Eglise Protestante Française de Londres," interior; Mr. Aston Webb. A large pen drawing of the interior of this church, of which we illustrated the exterior in the *Builder* for June 27, 1891. It is a very fine solid interior in what may be described as a round-arched Gothic style (not Romanesque), with a great deal of special character. The arches are fully and finely moulded, the walls are treated in bands of differing stones. The nave arcade shows strongly moulded semi-circular arches, the mouldings dying into the piers without impost, except that the soffit member is stopped by a capital and small coupled shaft. A kind of triforium balustrade, with heavy square balusters alternating at every fourth space with small coupled shafts, runs under the clerestory windows, and is carried out on large corbels round the piers, in a manner recalling a somewhat similar treatment of a balustrade in the nave arcade of St. Etienne du Mont at Paris, only that in that case the balustrade goes round the pier below the main arcade. The ceiling is a segmental timber one with boarding at back of the rafters. The east end shows an apse, with narrow heavily moulded windows above, and the front of the organ below, following the line of the apse and kept nearly flush with the wall line except for the two projecting turrets. This looks very well in an architectural sense, but the organ must be very much out of the building, and rather badly placed for sounding, though by no means so badly as in the usual "organ-chamber." The central portion of the organ front is interrupted by a large panel forming part of the architectural design, into which the orthodox inscription of the Commandments is worked, with a title panel supported by two angels above it. The whole design is most original and effective in treatment; we shall publish a lithograph of it next week, our space this week being entirely occupied by the illustrations of Durham Cathedral.

1,608: "Gamekeeper's Lodge in the Ardennes"; Messrs. Kidner & Berry. A small stone-built house with ball finials at the feet of the gables, and a peculiar form of stone chimney which may be of the district, or may be an imitation of a favourite form of Norfolk chimney.

1,609: "Design for a Large Town House"; Mr. A. Hart. This was illustrated in the *Builder* of January 23, 1892. It is a rich and striking design in modern free Classic style, but rather wants restraint and simplicity. The cornice is very heavy and not good in profile, the upper members being decidedly too large for the lower portion, and we should consider the wide semi-circular windows of the ground floor too much of the character of a business building rather than a private house. The middle portion, with the mullioned windows between columns, and the decorative panels between the first and second floor windows, has a very good effect, but the cornice and some other details are hardly in scale with it. However, it is an ambitious and spirited attempt, with a great deal of merit.

LETTER FROM PARIS.

It is hardly worth while to bestow any space on the exhibition of the "Union Libérale," an exhibition which is of no value to anyone, and is only another edition of the "Salon des Refusés" of a former year. We have become somewhat weary of exhibitions of eccentricities, and what at one time seemed amusing becomes now only rather irritating.

At the Palais de l'Industrie the jury which was to settle the awards of the year has made its report. After two turns of voting, 194 votes have been recorded in favour of M. Roybet as the recipient of the "Médaille d'Honneur." M. Roybet was born at Uzès in 1840. After having for a long time ceased to exhibit, his reappearance at the Salon has been a complete success. After having received a medal in 1866, he received a decoration in 1892, twenty-six years later, and has now obtained the highest honour the Salon can award. Among his principal works may be mentioned "Un Fou sous Henri III." (Salon of 1866), and in 1868, "Les Joueurs de Trictrac."

In sculpture, the Médaille d'Honneur has been awarded to M. Charpentier, author of the fine

monument at Avignon, which was recently published in the *Builder*. He obtained the "Prix du Salon" in 1890 and the Legion of Honour in 1892. He exhibits this year a group in marble, "Les Lutteurs," and a plaster statue, "Les Hirondelles."

In the section of architecture, M. Defrasse, the author of the "Restauration de l'Enceinte Sacrée d'Epidaure," has obtained the Médaille d'Honneur by forty-three votes, against seven given to M. Fournieu, author of the restoration of the royal pagoda at Vât-Cheng, five given to M. Coiquart, and two to MM. Godefroy, Bauhain, and Paul Normand. M. Defrasse, a pupil of M. André, obtained a second medal in 1882 and the Prix de Rome in 1886.

In engraving, the Médaille d'Honneur has been awarded to M. Ch. Lamothe, pupil of Henriquel Dupont, who this year has exhibited two fine engravings, "Les Bergers," after Nicholas Poussin, and the "Amateur d'Estampes," after Meissonier.

The minor awards we need only mention in regard to architecture. The First Medal has been given to M. Emile Camut for his restoration of the Baths of Mont Dore; second medals to MM. Godefroy, Bauhain, Nodet, Paul Normand, and Robin; third medals, MM. Auguste Rives, P. Bernard, Ch. Naudin, H. Petit, P. Heneux, G. Majou, and C. Yperman.

It appears that, in default of bidders, the demolition of the buildings of the old Sorbonne is postponed for some months. This is only a delay, however; and the archaeologists, who lament over the destruction of the remains of old Paris, are bitter (not without reason) against both the Government and the Municipality of Paris for the implacable manner in which they are uniting their efforts in a crusade against historic monuments of Paris. Nothing can prevent the ultimate destruction of these old buildings of the Sorbonne, the stern and sombre originality of which accorded so well with their function as the home of the ancient school of learning. It is much to be regretted that M. Nenot did not include in his scheme the preservation of the Cour d'Honneur, as he has preserved the chapel, by incorporating it in the new buildings.

Not far from here there has disappeared recently another vestige of Old Paris. The celebrated hôtel built by the Chancellor Juvénal des Ursins, situated near the Quai de la Cité, has just been destroyed. The work of demolition has brought to light a part of what was formerly the chapel of St. Aignan, a curious specimen of Romanesque architecture built in the twelfth century under Chancellor de Garlande. Some remains of the vaulting, and some curiously-carved capitals belonging to this erection, have been discovered. Several neighbouring houses dating from the middle of the sixteenth century have shared the same fate, giving place to the heavy and commonplace buildings which surround Notre Dame. While the administration is thus pitiless in regard to ancient structures, it shows on the other hand an exaggerated care for more modern ones, and is now expending a considerable sum on the restoration of the Fontaine Saint-Michel, one of the most commonplace monuments built under the Second Empire, from the designs of Davioud.

On the Marché aux Fleurs, opposite the façade of the Palais de Justice, there is to be inaugurated in a few days the statue of Théophraste Renaudot, physician to Louis XIV., and said to be the founder of French journalism, and also of the Assistance Publique. The statue is the work of M. Alfred Boucher. On the Place de l'Odéon the statue of Emile Augier is shortly to be erected, the execution of which has been entrusted to M. Auguste Barrias. There is also talk of erecting in the garden of the Luxembourg, not far from the Delacroix monument, a statue to Henri Murger, who preserved in his well-known novels the memory of the old habits and life of the students of the Quartier Latin. As to the monuments to Balzac and Alfred de Musset, commissioned some years ago by their respective subscribing committees, no date has yet been fixed for their erection, and it is believed that the models for them are still far from completion.

Passing from the left to the right bank of the Seine, we may observe first the present state of the decorations of the Hôtel de Ville. In the Salon Loban M. J. P. Laurens is at work on the set of historic scenes to which his large picture of the "Voute d'Acier" was the prelude, and of which the next in order was "Etienne Marcel Protégé du Dauphin." The artist is now occupied on a large composition entitled "Louis le Gros Donnant aux Parisiens les Franchises Municipales." On the grand staircase one can now see

a small portion of the decoration by MM. Olivier and Merson, who are ornamenting the cupolas of the side galleries with paintings representing the twelve months. Each cupola is subdivided into four compartments decorated with small symbolical figures surrounded by garlands, constituting a collection of forty-eight different compositions, of very good effect in regard to colour, but which would gain by being somewhat simplified and treated in a larger and broader style than is the case with the portion now executed. On the same staircase there will shortly be completed two cupolas, accompanied by pendentives, executed by M. Schommer and Joseph Blanc. The first has chosen for his subject "Les Chansons des Rives de la Seine," the second, "Les Mois du Calendrier Républicain." In a neighbouring gallery M. Henri Martin is at work on a large allegorical ceiling painting, of very fine and harmonious colour effect, and as it is placed high up, the rather woolly effect of the peculiar manner of execution, touch by touch, which he has made his own, will not be so apparent as when his pictures are seen from a nearer point of view. In a few weeks the jury of the Hôtel de Ville decoration will have to decide on the second competition for the decoration of the Salle des Banquets. Of the three artists engaged, M. Georges Bertrand seems to have the most chance of obtaining the execution of the work.

After the exhibition of 1889, the Ministry of War collected, in a gallery on the Esplanade des Invalides, an exhibition of ancient arms, uniforms, and other objects, some from the museums of Paris and the provinces, others lent by other Government departments or by private collectors. After the close of this exhibition, the collectors and artists, with Meissonier at their head, formed a society with the object of reconstituting this collection in a permanent form. M. Edouard Detaille now presides over this society, which is called "La Sabretache," and by its efforts it is hoped that a museum of real interest will be constituted at Paris, and which will find in the Hôtel des Invalides, where there is now plenty of space to spare, an appropriate home, in which also the Musée de Marine may be accommodated.

The Spitzer sale continues with the same success as at first. At the moment of writing, the receipts have attained to 6,484,825 francs. We may mention in this connexion the sale of the artistic collection of M. Coquelin aîné, which has produced 581,000 francs, a remarkable sum for the mere collection of an amateur. In a few days will take place also the sale of the works in the atelier of the lamented artist Voillemon. This will include, as well as his own works, a good many pictures by others among the most notable painters of the day.

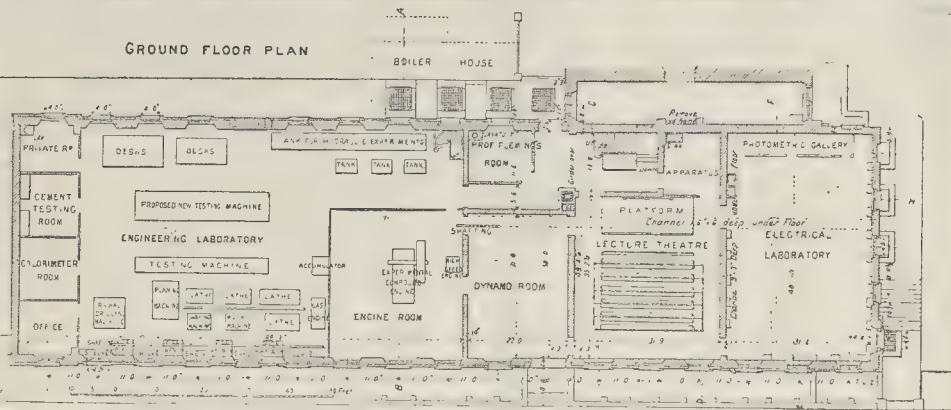
The Congress of French Architects will meet this year on Monday, June 19, the session lasting till the following Saturday. We shall be able to publish the programme shortly.

It is with great regret that we have to record the death of M. Alfred Darcel, Director of the Cluny Museum, in which capacity he had succeeded M. du Sommerard. M. Darcel was born at Rouen, in 1818. After having carried on his studies in his native town, he came to Paris to pass through the course of the Ecole Centrale. He was occupied at that time with chemistry, but soon quitted science for art, and, after having been attached in 1852, to the "Service des Expositions," he in 1862 received permanent appointment in the Louvre. His refined taste for archaeology and his learned researches in that field, soon brought him into further notice, and in 1871 M. Jules Simon, then Minister of Public Instruction, appointed him director of the national tapestry manufactory of the Gobelins. He occupied this important post until 1885, when he was entrusted with the management of the Cluny Museum.

M. Darcel was the author of a number of works on Art History, especially on tapestries and textiles, and contributed to various reviews, from time to time, some very learned and able articles on theatrical costumes and decoration. His successor at the Cluny Museum has not yet been selected.

MR. BATSFORD'S CHANGE OF ADDRESS.—Mr. B. F. Batsford, the well-known architectural bookseller and publisher, asks us to mention that after June 5 his business (which has for over forty years been conducted at No. 52, High Holborn) will be removed to more convenient premises, No. 94, High Holborn. We comply with pleasure, and wish Mr. Batsford continued prosperity in his new quarters.

GROUND FLOOR PLAN



Plan of New Engineering and Electrical Laboratories, University College.—Ground Floor.

THE NEW LABORATORIES AT UNIVERSITY COLLEGE.

THE New Engineering and Electrical Laboratories in University College, London, were opened by H.R.H. the Duke of Connaught on Monday afternoon last. Professors Fleming and Beare, who have charge respectively of Electrical Engineering and Mechanical Engineering at the College, met the representatives of the Press at 11 a.m., and courteously conducted them over the buildings, explaining the arrangements which were contemplated, and the circumstances which had rendered this extension necessary, and providing each with an official account thereof. We are compelled largely to rely upon this account in what follows, for the engineering laboratory was filled with two galleries for the accommodation of the visitors to the afternoon ceremony, the platform between them occupying the space opposite the door, where lathes and milling machine are indicated on the plan. We will first of all quote from a description of the buildings written by the architect, Mr. T. Roger Smith, F.R.I.B.A., Professor of Architecture and Construction in University College:—

The main building of University College, London, was erected from the designs of Wilkins, and, with the dome and fine portico, is an excellent example of his skill as a designer. This building has been already enlarged by the erection of a south wing, occupied by University College School, in 1869, 1873, and 1876, and by the erection of a north wing in 1871 and 1881, occupied partly by the Slade School of Fine Art and partly by some of the science departments, both from the designs of Professor Hayter Lewis. So extended, the buildings occupied three sides of a square, open to Gower-street on the fourth side. Considerable enlargement having again become necessary, the Council, not without reluctance, came to the conclusion that it was unavoidable that the fourth side of the quadrangle should be occupied by the new buildings required, and of these a first instalment is about to be opened. There is room towards Gower-street for a southern block measuring 210 ft. by 55 ft., and a northern block of greater length by the same depth, still leaving open between them a central space of ample width to connect the quadrangle with Gower-street, and to afford a view of the central dome and portico.

Of these two possible blocks the southern is the one which has been begun; at its south end it is carried to the full intended height, and a basement is constructed, affording in all, four stories. The northern part of the block (which is not yet carried quite to its full extent northwards) has no basement, so as to afford solid foundations for the machinery which is to be placed there. This part has only been carried up one story, and is provisionally roofed in at that level. This portion of the building is to be used as the new engineering laboratory, to which a space measuring 50 ft. by 98 ft. 3 in. clear of the walls, is appropriated. It contains an engine-room and an office, a calorimeter-room, cement testing-room, and a private room for the professor, besides the general laboratory, and is spacious, airy, and extremely well lighted.*

* Much better than it will be in the future when the build-

The southern part of the ground story (see plan) is appropriated to the electrical department, and contains a dynamo-room, a lecture-theatre, with an apparatus-room adjoining, and electrical laboratory, and a private room for the professor, all compactly and conveniently disposed. The basement-story under this part of the building contains the accumulator-room, the heating apparatus, lavatories, and a large pattern shop and carpenter's shop, and communicates with the boiler-house, which is not under any part of the buildings.

The first floor is occupied by a theatre, with its apparatus-room and photographic dark room, for use by the classes of engineering and of graphics, a class-room, a professor's room, and a museum for engineering specimens.

The whole of the second or topmost floor is a room for engineering and geometrical drawing.

The entrance to these departments will be from the quadrangle, and a staircase in Walker's artificial stone, with an open well-hole left clear for purposes of experiment, communicates with all floors.

The building is constructed of brickwork, or Fletton bricks laid in cement, faced with Portland Stone on the face next the quadrangle and next Gower-street, and partly so on the return or south face, and rests on a cement concrete foundation. The internal walls of the engineering laboratory, the lecture-theatre, and several other portions of the buildings are lined with white glazed facing-bricks. The roofs are constructed with steel trusses and slated, and have ample skylights.

The architectural treatment of the original building has been followed on the front next the quadrangle without any variation. On the Gower-street front, in dealing with which the architect was not so rigorously compelled to conform to the original, all the main lines of cornices, strings, &c., are equally carried through, and the architectural details are adhered to, but such minor variations as convenience called for have been introduced; as, for example, the windows of the ground story are slightly larger than in the old building, and for part of the front an upper range of windows, to give light to the top story, has been introduced.

Of the elevation towards Gower-street only six bays of the south block are at present completed to the full height, and eleven more are carried up to the string-course above the ground-floor windows.

The whole of these new buildings are to be lit electrically by incandescent lamps; but provision has also been made for gas-lighting throughout. The advantages of the electric lighting in the lecture-rooms and drawing-room will be manifest.

The present engineering laboratory of the College will be rearranged for the use of the Department of Physics. A New Physical Laboratory has already been built in the rear of the College, and is now in use.

This building forms a compact block measuring 34 ft. 3 in. deep by 88 ft. 6 in. long, the centre part being two stories high, and the sides one story only. On the ground floor three laboratories are provided: two are large ones,

measuring each 33 ft. x 32 ft., and with an open roof; the centre room measures 25 ft. x 18 ft., and a fourth room of the same dimensions is provided above it. Ample light and good ventilation have been provided, and in the three principal laboratories a firm floor of solid deal blocks on concrete, resting on the earth, furnishes a stable base on which any kind of delicate apparatus can rest free from vibration. Solid stone slabs resting on stone corbels carried by the walls themselves are supplied throughout, and gas and water are carried to every part. The building is so arranged that an uninterrupted length of 86 ft. is available for experiments on light. In connexion with the upper room, a complete dark room, with all the fittings required for photographic work, has been introduced. A second floor can be added over either or both the large laboratories if found desirable. The whole has been solidly but simply constructed in brickwork, and provides part of the accommodation required by the professor of physics.

The classes which cannot be taught here will be provided for in the two lower floors of the library wing, most of which has hitherto served as an engineering laboratory and lecture-theatre. Here a general and an electrical laboratory, a lecture-theatre, apparatus-room, class-rooms, professor's room, balance-room, and other accommodation will be furnished; and this very important department will be far better housed than it has hitherto been, while the removal of Professor Carey Foster's classes and laboratories will render it possible to provide enlarged and improved accommodation for the Professor of Hygiene and his laboratory, and for bacteriology in connexion with hygiene. A lecture-theatre and rooms in the same division of the building will also be appropriated to the classes of pure mathematics. In each case fittings and other appliances are to be rearranged, a course which no doubt adds to the expense of the present undertaking, but with the result that the important department of physics will reap almost as much benefit from the changes being made as the two departments for which the new buildings are being specially provided, and that the conduct of other branches of the college work will be facilitated.

We will now proceed to speak in detail of some of the arrangements of the new laboratories, which are to be opened for work in October next, at the commencement of the new term:—

The cement testing-room will be fitted with stone benches for gauging work, with cement tanks beneath, in which the briquettes may be placed to set; another bench carries the testing-plant and other accessories. The Calorimeter room will be fitted with lead-covered tables and sinks, and with benches for chemical work. Here fuels will be tested for their calorific power and furnace gases analysed, &c. The arrangement of the other parts of the engineering laboratory can be clearly seen from the plan which we give. The engine-room will be screened off by a glass and wood partition. The engine will be a 25 h.p. vertical compound engine, and power will be taken up by rope brakes. It will be used only for experimental purposes. In the same room it is proposed to have a small high-speed engine of the type largely used in electric lighting; this

ings are completed, for in addition to the windows on the east and west sides the provisional roof (which will be jacked-up as the building is increased in height and will form the permanent roof of the top story) is provided with a skylight.—E.L.

will be used both for testing and for power purposes. Steam will be supplied to both from a boiler to be set up in the boiler-house, which is on the basement level, but outside the walls of the laboratory. The gas-engine just outside the engine-room is a 8 h.-p., and will drive the lathes, milling-machine, &c., by a main line of shafting carried on brackets on the walls, and countershafting supported on A frames.

In the dynamo-room is another gas-engine of 9 h.-p. (which will indicate up to 19 h.-p.), by Messrs. Crossley Brothers. The exhaust-box and silencing chamber, and a new starting gear (both features of much interest), are placed in brick pits in one corner of the room; over these are water tanks and pipes, to supply a continuous stream to the cylinder jacket. There is further an arrangement for giving this supply through water-meters for the purpose of thermo-dynamical measurements. From this engine may be driven a Crompton to h.-p. shunt-wound dynamo, by means of one pulley; from the other pulley is driven a counter-shaft, which is carried through into the engineering engine-room, so that the counter-shaft can be driven by steam when required. This gas-engine is the only machine at present *in situ*. Its silencing chamber, filled with pebbles, will, it is stated, entirely prevent the disagreeable noise of the exhaust, and which would not be at all conducive to the well-being of the patients in University College Hospital, just opposite.

It is proposed to place in this room a machine expressly for testing and experimental purposes, whose design is as follows: There are four machines bolted into the same bed-plate, two of these are similar Kapp continuous current motors, and on the same shafting with each is a Kapp alternator, which will be driven by the motor. These alternators are side by side, and can be rigidly bolted together with the armature bobbins in any desired relative position. The motors can be driven by accumulators placed in the basement, or one of them can be run as a motor and the other as a generator.

South of the dynamo-room is a lecture-room, and behind the lecture-table are placed the battery, switch-board, and switches for controlling the supply of current to the whole of the rooms and to the lecture-table. This last is supplied with alternating and continuous current, and also with gas and water for illustrative experiments. A large apparatus-room behind the lecture-room is similarly supplied, and will contain the lecture apparatus and instruments. Beyond there is a large electrical laboratory, the chief feature of which is the large stone slabs built into the wall to serve as steady tables for the more delicate instruments. The electric mains are carried in chases across and around the floor of the room, which are covered in by floor-boards. The photometer will be in a small gallery 30 ft. long and 6 ft. wide at one end of the laboratory, and there is a dark room at the end of this gallery for photographic work.

In the basement, besides the accumulator room (for which ample provision for ventilation is made), there will be a carpenters' shop and pattern-room, and a forge. The upper stories of the building are not yet complete. On the first floor will be the Engineering lecture theatre, with its apparatus-room, a class-room and private-rooms, and another photographer's dark-room. Adjoining will be a museum which will contain specimens of ore, manufactured iron, cements, &c., and models of mechanism and structures. On the top-floor will be the drawing-office, lighted by skylights in addition to the windows. The well of the staircase affords an opportunity of testing long wires or carrying out pendulum experiments. The floors are made sound proof (with silicate cotton or slag-wool), a matter which is of some importance in view of the near neighbourhood of the engine and dynamos.

The general contractors for the new wing are Messrs. A. Bush & Son, and the constructional steel and iron work has been furnished by Messrs. Richard Moreland & Son. The contractors for the Physical Laboratory were Messrs. Brown, Son, & Blomfield.

THE SANITARY INSTITUTE'S EXAMINATIONS FOR INSPECTORS OF NUISANCES.—At an Examination for Inspectors of Nuisances, held in Exeter on May 26 and 27, nineteen candidates presented themselves. Questions were set to be answered in writing on the 26th, and the candidates were examined *vis à voce* on the 27th. Thirteen of the candidates (one being a lady) were certified to be competent as regards their sanitary knowledge, to discharge the duties of Inspector of Nuisances.

CHELSEA INFIRMARY EXTENSION.

It is proposed by the Chelsea Board of Guardians to build additional accommodation for, and adjoining, the present Infirmary in Cale-street. The site is a corner one, being at the junction of Cale-street and Sydney-street, with a frontage of a little over 70 ft. to the former and 60 ft. to the latter. The accommodation required was for a medical superintendent's house, and bedrooms for forty-two night and day nurses, and two superintendent nurses. It is to be a building of four floors, standing on a basement. The frontage in Cale-street is to be kept back to the line of frontage of the existing Infirmary.

Six sets of designs have been sent in, and will be on view at the offices of the Board in King's-road until June 6. We are given to understand that the award has not been yet made, but will be shortly.

The various sets of designs have been distinguished by letters. The plans vary but little from each other, the rooms forming the doctors' residence being placed on the Sydney-street side, whilst the nurses' rooms face Cale-street, and have access to the Infirmary. In the basement a large recreation room for the nurses has been provided, as well as bath-rooms and other offices and stores. The doctors' residence is provided with two sitting rooms, and a study and several bedrooms, the rest of the building being entirely taken up with bedrooms for the nursing staff.

Although the site is not quite rectangular, "O." and "H." have designed these blocks with the frontages at right-angles to each other, the differences in width being given in the areas. This has a more symmetrical look on plan, and not much space is apparently wasted. The others have drawn their frontages parallel with the lines of the site. A separate staircase conducts to the nurses' rooms, with an entrance from Cale-street. In most cases this staircase is placed at the back of the block; in one case, however, it forms a special feature in the front. With respect to the elevations, not much can be said; few are above the commonplace, and more than one is bad. "X." has a simple frontage with a slightly projecting centre to the Sydney-street front, and circular windows in the top story. A slight projection with a gable is shown at the angle of the site, balancing the projection at the opposite end (of the existing building), and a far more satisfactory feature than the angle turrets shown on some of the others—a feature which we must confess to be somewhat tired of in our London street corners.

THE ARCHITECTURAL ASSOCIATION:

CLOSING MEETING OF THE SESSION.

THE final meeting of this Association for Session 1892-93 was held on Friday evening, May 26, in the meeting-room of the Royal Institute of British Architects, Conduit-street, Mr. H. O. Cresswell, President, in the chair.

Mr. A. M. Husbands was unanimously elected a member.

On the motion of Mr. E. S. Gale, Hon. Sec., seconded by Mr. E. A. Rüntz, cordial votes of thanks were accorded to the A. A. Lyric Club for the entertainment they provided on the occasion of the Members' *Soirée*; and to Messrs. Broadwood & Co., Messrs. Sugg & Co., Messrs. Colls & Sons, and Messrs. Brass & Co., for their assistance on the same occasion.

Mr. Gale also announced a donation, by Mr. R. Holmes (one of the Instructors), of 8*l.* 8*s.* to the general fund of the Association. A hearty vote of thanks was accorded to the donor.

Mr. F. T. W. Goldsmith, Hon. Sec., announced that the first Summer Visit this session would be made this Saturday, June 3, to Chenies, Bucks.

Election of Officers and Committee.

The scrutineers appointed to count the votes in the election of officers then made their report, the result of which was declared to be that the following were elected:—

PRESIDENT: Mr. E. W. Mountford, F.R.I.B.A.
VICE-PRESIDENTS:—Messrs. W. D. Carce and E. S. Gale.

MEMBERS OF COMMITTEE:—Messrs. J. Begg, A. C. B. Booth, H. O. Cresswell, A. W. Earle, F. R. Farrow, Theo. Moore, E. A. Rüntz, W. H. Seth-Smith, Paul Waterhouse, M.A., and E. Woodthorpe, M.A.*

* The names are here given in alphabetical order, as at first announced. Subsequently it was resolved that the number of votes given to each candidate should be announced, with the following result:—H. O. Cresswell, 212; P. Waterhouse, 191; E. Woodthorpe, 185; F. R. Farrow, 180; E. A. Rüntz, 107; A. C. B. Booth, 162;

HON. TREASURER: Mr. H. W. Pratt.
HON. LIBRARIAN: Mr. J. W. Stonhold.
HON. SECRETARIES: Messrs. F. T. W. Goldsmith and B. F. Fletcher.

[The foregoing form the Committee.]
HON. SOLICITOR: Mr. W. H. Jamieson.
HON. ASSISTANT LIBRARIANS: Messrs. C. H. Freeman and A. T. Griffith.
HON. AUDITORS: Messrs. E. C. Pinks and B. Dicksee.

ASSISTANT SECRETARY AND REGISTRAR: Mr. D. G. Driver.

Mr. Woodthorpe, in proposing a cordial vote of thanks to the retiring Hon. Sec., Mr. E. S. Gale, referred in appreciative terms to Mr. Gale's labours during the past four years, especially in connexion with the new educational scheme of the Association.

The President, in putting the motion, expressed his cordial agreement with what had been said of Mr. Gale's services.

Mr. Gale briefly replied.

The Travelling Student's Notes: Norfolk.

MR. T. A. Sladdin then read the following paper, descriptive of a tour he made as last year's A.A. Travelling Student:—

Having been awarded the Travelling Studentship I consulted some authorities, and decided upon Norfolk as my field for operations.

I find when the time comes to read the paper that choosing such a well-known county makes it very difficult to say much that is not already known to most of you, so that you will find this but a brief outline of my tour.

I may say here that my tour was made the more pleasant by having two friends with me most of the time, consequently, throughout the paper, I am constantly using the plural pronoun we—and I must take this opportunity to thank Mr. Newton for allowing me to add some of his sketches to my own in order to more fully illustrate my remarks.

Norwich was my first stopping-place, and I must say that my feelings on first seeing it were those of disappointment at the insignificant situation the Cathedral occupied; it seems difficult to understand why the founders did not select a more imposing site—such as the high ground which rises directly on the other side of the river—in fact, the only spot from which a really good view of it can be obtained is from the river opposite a delightfully picturesque old fifteenth-century archway known as *Falls Ferry*. The fine outline of the tower and spire is here seen to advantage, although a closer inspection discloses some hideous detail.

Those who have seen Norwich Cathedral will agree with me that the finest part is undoubtedly the interior. Entering from the west end, which externally is so poor in design, one is at once impressed by the magnificent range of Norman arcading and perpendicular vaulting. The choir, which is of great length, has some exceedingly fine stalls, good examples of fifteenth-century woodwork.

The whole of the east end, including the choir, was undergoing restoration, and I was grieved to notice, particularly in the south transept, that the stonework was being scraped down, and the mellowing effect of ages was being totally destroyed.

In the south aisle of the chancel is a most beautiful font in rather a mutilated condition. The carving in the panels represents the Seven Sacraments and the Crucifixion. The way in which the small shafts are treated, running up under the body of the font, with angels filling up the space between, is very pleasing, and to my mind the whole design is most happy. It belonged at one time to the Church of St. Mary in the Marsh, a church that has now been demolished some years; the people of this parish, curiously enough, are allowed to use one of the two chapels in this aisle as their place of worship.

The other chapel in the south aisle is the Beauchamp Chapel, used now as the Consistory Court. It has in it a fine shrine of that period when Perpendicular was at its best.

South of the Cathedral, and reached from the south aisle of the nave, are the well-known and much-admired cloisters. I have no time in a paper of this length to describe them, but any students visiting Norwich will find them well worthy of careful study.

Theo. Moore, 154; A. W. Earle, 150; W. H. Seth-Smith, 142; J. Begg, 136. A motion to read the number of votes given to unsuccessful candidates for the Committee was rejected. The scrutineers reported that they received 26 papers, of which nine were informal, the number of valid papers being thus 252. The Association, we may add, has about 1,200 members on its roll.

It may interest you to know that a charge of 4s. 6d. a week is made for sketching in the Cathedral. I think this is a case for our secretary.

Turning our attention now from the cathedral. On the upper side of the extensive market place and hemmed in on all sides by old houses, stands the fine Perpendicular church of St. Peter Mancroft, restored some years ago by the late Mr. Street. This is one of the few churches in Norwich that is not faced with flint work, and like several others in this district has its clearstory windows very close together, two over each nave arch.

The church has numerous interesting features inside, the most noticeable one being the Baptistry near the north porch, which has lately been most admirably restored by our late President, Mr. Daggall. The entrance lobby, of which I have measured drawings, is in the south transept, and has a carved frieze unusually fine in design.

In the small church of St. George Tomland, is a very remarkable font and cover; the measured drawings which I am able to show you have been kindly lent by Mr. Newton. The outline of the sturdy little granite font gives one at first the impression of its being of pre-Norman times, but the pointed arches behind to the shallow panels on the body of the font, fix its date, I think, to the early part of the twelfth century. The cover is late Jacobean, and seen in perspective the whole thing is exceedingly picturesque. In the church at Knapton there is a font identical in design, though slightly larger.

In the same church is an oak pulpit with sounding-board over; it formerly stood on wooden posts, but unfortunately no trace of these remain, and at present the pulpit stands on a hideously modern solid base. The small staircase has some very delicately moulded balusters; but perhaps the most noticeable point about the pulpit is the ivory inlay, which is profusely used in the panels and soffit of sounding-board. Such work is rare in England at least.

In one of the chief churches of Norwich, called St. Andrew, Broad-street, is an extremely fine wooden screen. The west tower is open towards the nave, and this screen stretches across the opening and reaches from the nave floor up to the ringing chamber in the tower. From the time of the Reformation, and I believe, until recently, it was covered over with lath and plaster; when uncovered it must have been in a very dilapidated condition, because all the present mullions and panelling in lower part are new, only the old jambs and tracery over remaining. Unfortunately when the screen underwent restoration, by some mistake, its original height was reduced by a foot. In my measured drawing of it the error is rectified.

The chief landmark in Norwich is the Castle, standing as it does on a tremendous mound. It is supposed to have been built in 1020, but externally little remains by which one may judge, the whole of the present outside casing being about fifty years old. From the terrace, which runs all round, a good view is obtained of the city, and some idea can be formed of the great number of churches it contains.

In all directions their towers can be seen peeping up above the trees, which abound everywhere. One is immediately struck by the great similarity of design between all these towers, which is still more observable on closer inspection. This sameness, of course, detracts greatly from their interest, and, indeed, a visit to two or three of the forty churches of Norwich will be found amply sufficient to gain a general knowledge of their characteristics.

There are numerous places of interest within easy walking distance of Norwich; some of these I visited. Thorpe, I think, is the nearest; this straggling village is very pleasantly situated on the river, east of the city on the Yarmouth road. The old hall was built on the site of a Bishop's Palace, and is a sleepy looking old house with very pleasant garden surrounding it. We took a boat here, and by going with the stream for about three-quarters of a mile we reached a half-timbered house, nicknamed by the wherry-men the "Monkey House." It is occupied by the people who have charge of the ferry at this spot, and I thought quite merited a sketch.

Not far from Norwich, but in the north-west direction, and also on the river, is an interesting old Elizabethan house. It was once the Palace of Bishop Hall, built in 1587, but is now used for quite a different purpose, being known as the "Dolphin Inn." It stands some distance back from the road, with square courtyard in front. The entrance gates are gone, but the large

* For view of the restored font and canopy, see *Builder*, Jan. 4, 1890.

gate piers still remain. I had intended bringing away some record of the front, but unfortunately the weather at the time was not favourable for outside work, and I had to content myself with sketching the ceiling in the bar parlour.

A mile or so further on is the diminutive village of Hellesdon, with a church in proportion, but I saw nothing very noteworthy.

At Costessy, which is in the same direction, but about five miles from Norwich, is the seat of Lord Stafford. I was extremely curious to see the house, as my guide-book laid particular stress upon the beautiful chapel, which was designed by one of the family; but I was not fortunate enough to gain admission. The church, however, well repaid the journey. It is Late Decorated, with good altar-screen, and some curious Transitional windows. For a water-colour study, it would form a good subject, with its brick tower and wooden spire.

From Norwich we went to North Walsham, which forms a capital centre for reaching such places as Trunch, Knapton, and others which have no railway communication.

The only drawing I made in North Walsham was of the wooden font cover which is suspended from a beam across one of the nave arches.

Trunch is a three-and-a-half mile walk from North Walsham, and as in most of the villages, I saw the church was the chief attraction. It has a splendid hammer-beam roof, which is so well known as to need no description of mine. The baptistry, which is of wood, is in marvellous preservation, and is certainly one of the best things we saw; it is of very similar character to that in St. Peter's Mancroft.

Knapton is about the same distance from North Walsham, and is famous for not having refreshment for "man or beast." The church itself is like a large empty box, but the roof is exceedingly fine. I attempted a sketch of the roof, but not being very successful, and feeling for once rather slack, and being very near the coast, I walked on to Mundesley, a quiet little watering-place not boasting any railway communication, but I must in fairness say that it is possible to get something to eat here.

The church—St. Mary's—is in a very ruined state, but the tower has been lowered and roofed in, and is now used for service. We had a pleasant coach-ride back to North Walsham.

Whilst staying at North Walsham, we spent one day at Worsted, which is a particularly pleasant walk. The village now is a mere shadow of its former importance, but fortunately the magnificent church still remains a monument to the former wealth and liberality of the Flemish inhabitants. I am sorry to say that the church is now neglected; it is very dirty, and the roof does not fulfil its purpose. I have sketches of the south porch and nave roof, and one of Mr. Newton's of the western screen between tower and nave.

Our next move was to Aylsham, the leading town in this part of the county. The church is of considerable size, and still retains traces of its former interest, in spite of the most thorough restoration:—

"You may break, you may shatter the vase as you will,
But the scent of the roses will cling to it still."

In the restoration of the church the upper part of the old chancel screen was removed, and now does duty as a reredos. I am glad to say the lower part still remains in its old position, and is noticeable for its delicate Gesso work. The proportions of the church, to my mind, were totally destroyed at the same time by the introduction of solid backed pews, which are everywhere sprinkled with tasteless carving.

The font is of great interest. The eight sides are filled with sculpture representing the emblems of the Passion, the four Evangelists, and the Crucifixion. Carved on the base are the arms of the founder of the church, John of Gaunt, inserted in richly-traceried panels. This font owes its splendid state of preservation to the fact that, until lately, it was hidden from view under a mass of rubbish in one of the aisles.

Another good feature in the church is the ringing gallery under the western tower, which seems to be a general arrangement in Norfolk. This gallery is supported on wooden posts from which spring arches, the spandrels being filled with delicate tracery, and the whole retains its original colouring. The fine old Early English pinnacles at the western entrance do not benefit by being attached to painfully new doors. The tracery in the windows shows an extraordinary amount of variety, and adds greatly to the interest.

The pulpit is a typical example of Jacobean woodwork, with its panels in false perspective.

The stairs are a recent addition, and are the best modern work in the church.

The exterior is a charming example of a characteristically English church, rising, as it does, from the greenest of turf, and backed by magnificent cedars. The south porch, which was quite the finest I saw in my tour, is worthy of close study, not only on account of the beauty of its proportions, but also for the refinements of its mouldings.

Aylsham contains more than the usual amount of that delightfully quiet domestic work, the charm of which is largely to be attributed to the hand of time.

The end of my tour was spent at Blickling, which is a tiny village clustering round the gates of Blickling Hall, the magnificent seat of the Marquis of Lothian. No words of mine can convey the exquisite charm of this stately home. The approach to the house lies between yew hedges 15 ft. high, which are clipped with marvellous precision. The upper part of this forecourt is flanked by low wings, the one on the left containing the kitchens, and that on the right the stables; these are connected to the house by colonnaded screens.

The house forms an oblong on plan, the corners being accentuated by towers; it is surrounded by a moat, which is now dry and laid out with flower-beds. To enter the house you cross a bridge and pass through a massive door into a small inner court, out of which open the grand hall and staircase, so well known. The iron knocker on this door I have just mentioned is a unique specimen as far as my experience goes. Worked into the design is the Bull's Head—the crest of the "Kerrs"—which also appears in other positions in the building, and forms a valuable precedent for the treatment of armorial bearings in a decorative way.

Proceeding to the first floor, the doors at each end of the gallery, which lead to the State apartments and bedrooms respectively, are worthy of study. As will be seen in my sketch, the stonework is very cleverly treated, and the carving has a marked resemblance to foreign work of the same period.

The ante-room to which one of these leads is a square apartment, the ceiling of which is more severely treated than any of the others, as will be seen from the plan. The transition from the square to the octagon is skilfully managed. This room is one of those which overlooks the wonderful garden, which, when seen ablaze with flowers, under a summer sun, will not be readily forgotten. This ante-room opens on one side into the State drawing-room, the most noticeable feature of which is the impressive chimney-piece (sketch); the proportion of this is very fine—the rich colour of the woodwork blending very harmoniously with the delicate white of the elaborate plaster ceiling. This room contains a wealth of art in the shape of furniture and portraits of notable people by notable artists.

The other room opening out of the ante-room before mentioned is the library, a noble apartment 120 ft. in length, sadly spoilt by the introduction of a rabid Gothic hooded chimney-piece and equally unpleasing bookcases which do not in the least harmonise with the character of the room.

I was informed that to make way for these alterations a splendid Jacobean chimney-piece was removed, which was at once bought by a well-known art collector and re-erected in his own country house. Lately restorations have happily been unattended by such disastrous results. The ceiling in this room is also of marvellous richness, a perfect mine of ideas, the ceiling in each projecting bay window being very freely treated with strap-work ornament, birds, flowers, and fruit carved with all that vigorous spirit peculiar to this period when plaster-work probably attained its highest development.

The modern stained-glass inserted in the window at the end of the room compares favourably with much of later date. Before leaving this room, mention may be made of the noble collection of books, one of the finest in England, and which are very jealously treasured.

At the end of the Library a door leads into the suite of apartments furnished in honour of a visit of one of the Georges, and presenting a most interesting contrast to the sturdy vigour of the other part of the house; being that of weak but delicate style known as the Adam's period, which is so much studied by some of our rising men at present. The further apartment contains the King's bed, and some other excellent pieces of furniture.

To mention in detail the many other features of this fine old mansion would dip too deeply into your time, which I know you require for the

pressing business of the evening, but I may tell you that some of the most pleasurable moments of my tour were spent when I was making the sketch of the entrance front. At the close of the afternoon, when the sun slowly sank to rest "and all the air a solemn stillness held" the opalescent tints of the sky, combined with the mellow old brickwork, and varied shades of green in the trees and grass, softened in the fading light—to make up a picture infinitely precious to the jaded London draughtsman. At such moments my feelings of gratitude towards the Architectural Association were lively. My thanks are also due to Lady Lothian for her extremely kind permission to sketch both inside and outside the house.

The interest of the Hall so overshadows that of the church that I need only mention the latter briefly.

It was fully restored by the late Mr. Street, who also added the tower. The interior contains some good brasses, and the curious "Clere Monument," with its numerous fictitious coats of arms.

The late Marquis of Lothian's monument (his reclining figure supported by angels) is a magnificent piece of sculpture by Watts, R.A.; it is a pity that the immense block of marble is veined in places.

The country round Blickling abounds in interest, but I deemed it better to confine myself to the thorough study of one place, than to roam about the country getting rapid impressions and making hurried sketches. One Sunday I walked out to see Barningham Hall, which lies in lovely country, and is considered an admirable example of that late seventeenth-century work which has been reproduced with such success by that accomplished architect, Mr. Ernest George. Some distance from the house are the remains of a Late Decorated church, which curiously enough have to be passed through to enter the present church. Walking back I observed the fine tower of Erpingham Church, which I was unfortunately unable to enter. I was astonished to see the name of Cardinal Wolsey on a tombstone in the churchyard, as I had not known that that famous prelate was buried in this out-of-the-way spot. But on further examination I discovered that half the occupants of the churchyard had borne the name of Wolsey in life, and that the "Cardinal" in this case was only a christian name conferred on her offspring by some ambitious mother who wished to render her son immortal.

It was with feelings of regret that we bade adieu to the hospitable host of the "Blickling Arms," who with his charming daughters did so much to render our stay under their roof an enjoyable one.

Norfolk people, in my opinion, bear off the palm for genuine hospitality. I was everywhere treated with unflinching kindness, and every facility put in any way for the proper study of our noble art.

I have noticed with pleasure that the A.A. excursion this summer starts from Beccles, which is within easy range of the district I have traversed to-night, and I feel that my paper will not have been altogether in vain if it should induce any member who has not already decided to take part in it this year, to do so at once.

In conclusion, gentlemen, I have only to express my thanks for the great honour you conferred upon me by giving me the studentship, which, besides affording me the pleasantest of holidays, has been to me an invaluable opportunity of study, and however imperfect my efforts may appear, I can assure you I have striven to the utmost to make profitable use of my time.

In the discussion which followed,

Mr. Walter Millard said he had great pleasure in proposing a vote of thanks to Mr. Sladdin for his paper. With regard to his remark about the situation of Norwich Cathedral, it should be remembered that there were other cathedrals situated on low ground—Salisbury and Winchester, for instance. The tall spire at Norwich helped considerably in giving dignity to the cathedral; a curious thing about it was that it was the only ancient tall stone spire that he had met with in the whole county of Norfolk, although there were a few lead ones. He did not want to blame Mr. Sladdin for sticking so much to old work when on his sketching tour as Travelling Student of the Association; but he should have liked to hear what he thought about another cathedral now being erected in Norwich—viz., the Roman Catholic Cathedral, which was being built on the high ground under the direction of one of the most distinguished architects of the

day, Mr. Gilbert Scott. He did not think that the young architect of the present day should altogether ignore new work, but should go about with his eyes open to see what was good both in new and old work, for after all it was all one, only chopped up into lengths, for convenience, by the writers of books. In addition to the ceiling at the "Dolphin" inn, spoken of by Mr. Sladdin, there was a very interesting new staircase. North Walsham, Trunch, and Knapton formed a cluster of places containing as fine work as it was possible to see, and he thought that Mr. Sladdin deserved credit for having devoted some attention to those places, as well as for having kept himself to a limited district; at the same time he must have gone very near to some very fine things which he had not mentioned. To pass away from the immediate subject of Mr. Sladdin's paper, he (the speaker) hoped he might be permitted to say a few words upon sketching tours generally. He thought that students generally would do well to remember that there was a far more important question for them to consider than the way in which they should make their sketches, viz., that of deciding what to sketch. The mere execution of sketches was quite a secondary thing, although it was necessarily the first thing which the student thought about. It was only when a man became a little advanced, and had had time to think, that he perceived the importance of considering what he should sketch. What a student knew before he started determined, to a very great extent, what he wanted to know. If he had any independence of mind he would probably start on a sketching tour with some sort of fondness for some of the different kinds of things which he would see; and he thought it was no bad thing for the young student to be pretty strongly influenced by the work of older men, or even by that of some one man. A little hero-worship was a good thing for a student to build himself upon. Let him look out for work such as So-and-So did; let him say to himself, "Well, if I do not know my own mind as to what I want, I will try to see what somebody else seems to have studied." The young student who approached his work in that spirit, if he had any independence of his own, would soon find his footing, and know what to do to develop his own powers. It was far better to adopt that course than to go aimlessly about making sketches because one had to make them. There was one other point about which he wished to say a word, viz.: that while the Association did a great deal for what he might call the indoor education of the young architect, it did very little for his outdoor education—in the way of teaching him from the buildings themselves. He should like to see the Association with a dozen Travelling Studentships at its disposal, instead of only one, for he was afraid that young architects did not think enough about learning directly from the buildings themselves. He had been greatly struck lately in reading Quatremère de Quincy's "Lives" at the extent to which the great architects of the Italian Renaissance carried the practice of learning from buildings themselves. Bramante and others, although they were duly apprenticed to various arts, travelled about studying from executed works. Of course it was quite true that there were few books in those days to study from. He did not wish to speak lightly of books, but architecture could not be learnt from books alone.

Mr. E. W. M. Wonnacott said he had great pleasure in seconding the vote of thanks to Mr. Sladdin. He thought that one advantage of having the Travelling Studentship, in addition to that derived from the opportunities of sketching which it afforded, was that it induced at least one member to come forward annually and face an Association meeting with a paper for the first time. He wished to make one suggestion which he thought was worth consideration, viz., that in future when the Travelling Student of the year read his paper and submitted the sketches which he had executed as the Travelling Student, that he should exhibit at the same time the work by which he gained the Studentship. He thought that it would be interesting to see both sets of sketches side by side.

Mr. P. E. Newton, who was called upon by the President, said that although he had had the pleasure of accompanying Mr. Sladdin during part of his tour, he feared he had nothing to add to what Mr. Sladdin had already said, except with regard to the new Catholic Cathedral at Norwich, which he should certainly have mentioned himself if he had been writing a paper about the architecture of Norwich. Although he thought that the exterior of the building was rather flat, he

was very much struck by the interior, which he thought was one of the finest pieces of modern Gothic work that could be seen.

The President, in putting the vote of thanks to the meeting, said he thought that Mr. Millard in his remarks had made some very good suggestions which future Travelling Students of the Architectural Association would do well to attend to, especially with regard to keeping their eyes open for new work of good character. There was a great deal to be learnt from the study of old work and new work side by side, and he thought it would be very unwise not to study new work by men of acknowledged repute as architects. It was, of course, one of the great difficulties of a young man on his first sketching tour to know what to select and how to select it. Perhaps Mr. Millard's suggestion was as good as any that had been made—to follow the lead of some man who had been before him. Mr. Sladdin had very wisely confined himself to a small district and had studied that thoroughly. He (the President) remembered that Mr. Waterhouse, in an address which he delivered to students at the Institute some two years ago, said that students in the present day seemed to have some of the energy begotten of the steam-engine and they went flitting about the country at a great rate, seeing a great deal, spending a great deal in railway travelling, but learning very little. He was glad to think that students were beginning to see that they could learn a great deal more by keeping to a limited district at one time and studying the work of that district thoroughly. Mr. Sladdin had done that and had confined himself to a small number of churches. He was rather afraid at first that Mr. Sladdin was going to treat of nothing but church work, but he was very pleased to find later on that he had not neglected domestic work, and that he had reserved to the end of his paper some remarks about one large building which he had studied very thoroughly, viz., Blickling Hall. The student who was going on a sketching tour should choose his buildings carefully, and he would do well to consult beforehand someone who knew something of the district which had been selected. Above all, he should endeavour to select some one or two buildings that he should study thoroughly from top to bottom. Such a course of procedure would not only be economical in respect of both time and money, but would be really more instructive to the student, as he would learn a great deal more in this way than in passing hurriedly from one building to another and taking note only of details here and there. Mr. Millard had suggested that the Association might perhaps do more than it did at present to encourage the out-door architectural education of its members; but there were, of course, difficulties in the way of doing that, desirable as it was, for he quite agreed with what had been said as to the importance of studying architecture from buildings themselves, and not merely from drawings and books. He thought, however, that Mr. Millard had rather forgotten the Spring and Summer visits of the Association, which did something to enable the members to study architecture from buildings, both old and new. It was, of course, quite true that those visits were very brief and hurried, but he thought that members who desired to study at greater leisure the buildings thus visited would be able to obtain consent to do so—in most cases, at all events. He thought that Mr. Wonnacott's suggestion—that the A.A. Travelling Student of the year should exhibit the work by which he had gained the studentship, as well as the work which he had done as the Travelling Student—was not a bad one. Possibly the fact that the student knew that his work done in two separate years would be exhibited side by side would serve as a wholesome stimulus to him—not that he thought that, so far, their Travelling Students' work had shown any falling off as compared with the work by which they had gained the studentships.

The vote of thanks having been carried by acclamation,

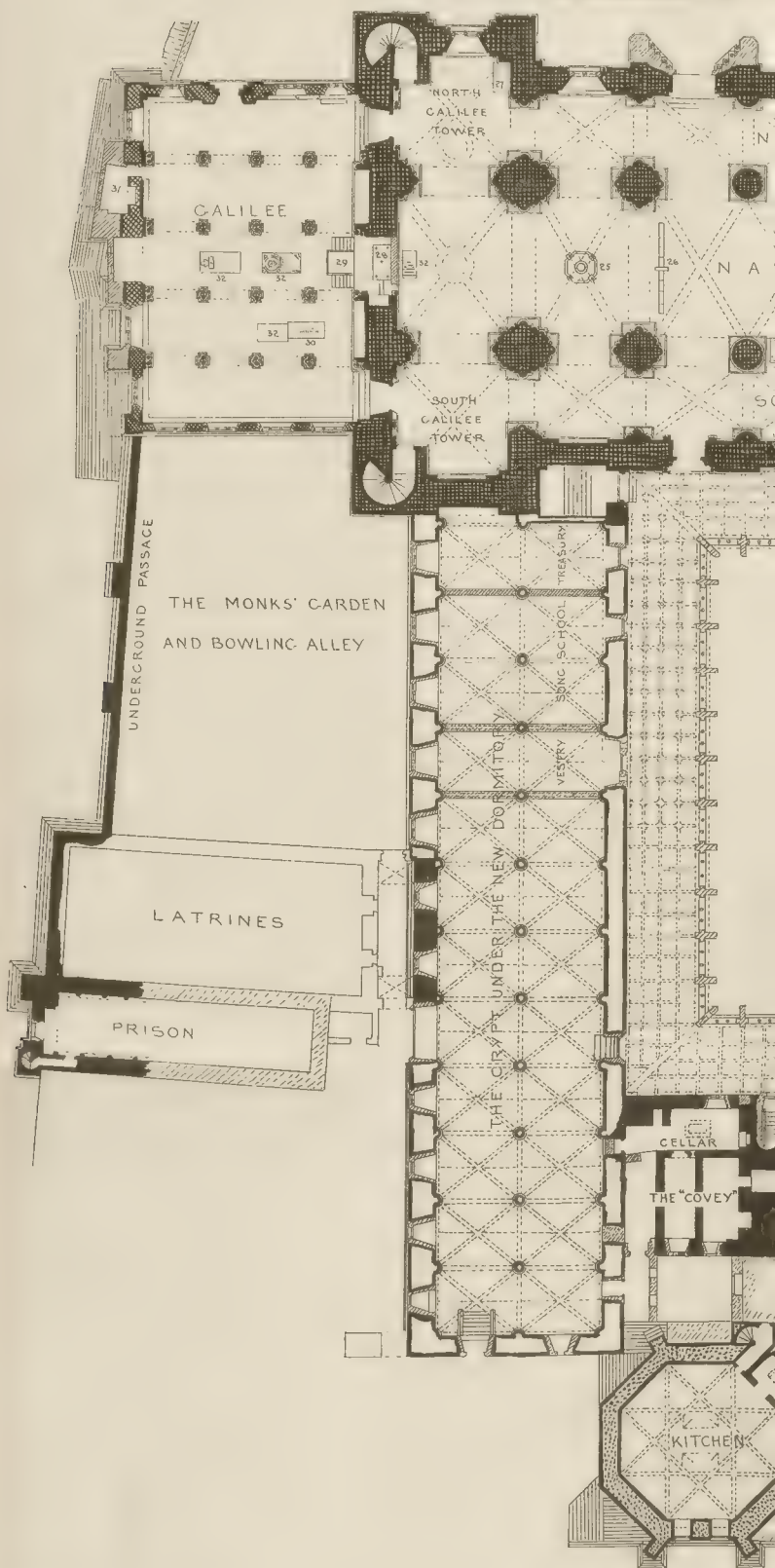
Mr. Sladdin, in reply, said he thanked the meeting for the kind way in which they had received his paper, and Mr. Millard, Mr. Wonnacott, and the President for the suggestions which they had made. With reference to the new Roman Catholic Cathedral at Norwich, he had intended to refer to it. It was in a splendid position—the finest that could be had in Norwich—on the high ground. He agreed with Mr. Newton's remarks with regard to the new building in his (the speaker's) opinion the windows were too shallow; they had not sufficient reveal, and several of the main mouldings seemed to him to be very hard, and appearing almost like cast-iron.

one have been the the College some few years ago and the of shrinking, though they bear aloft a tower
not May 6 disappeared.

DURHAM CATHEDRAL AND MONASTERY

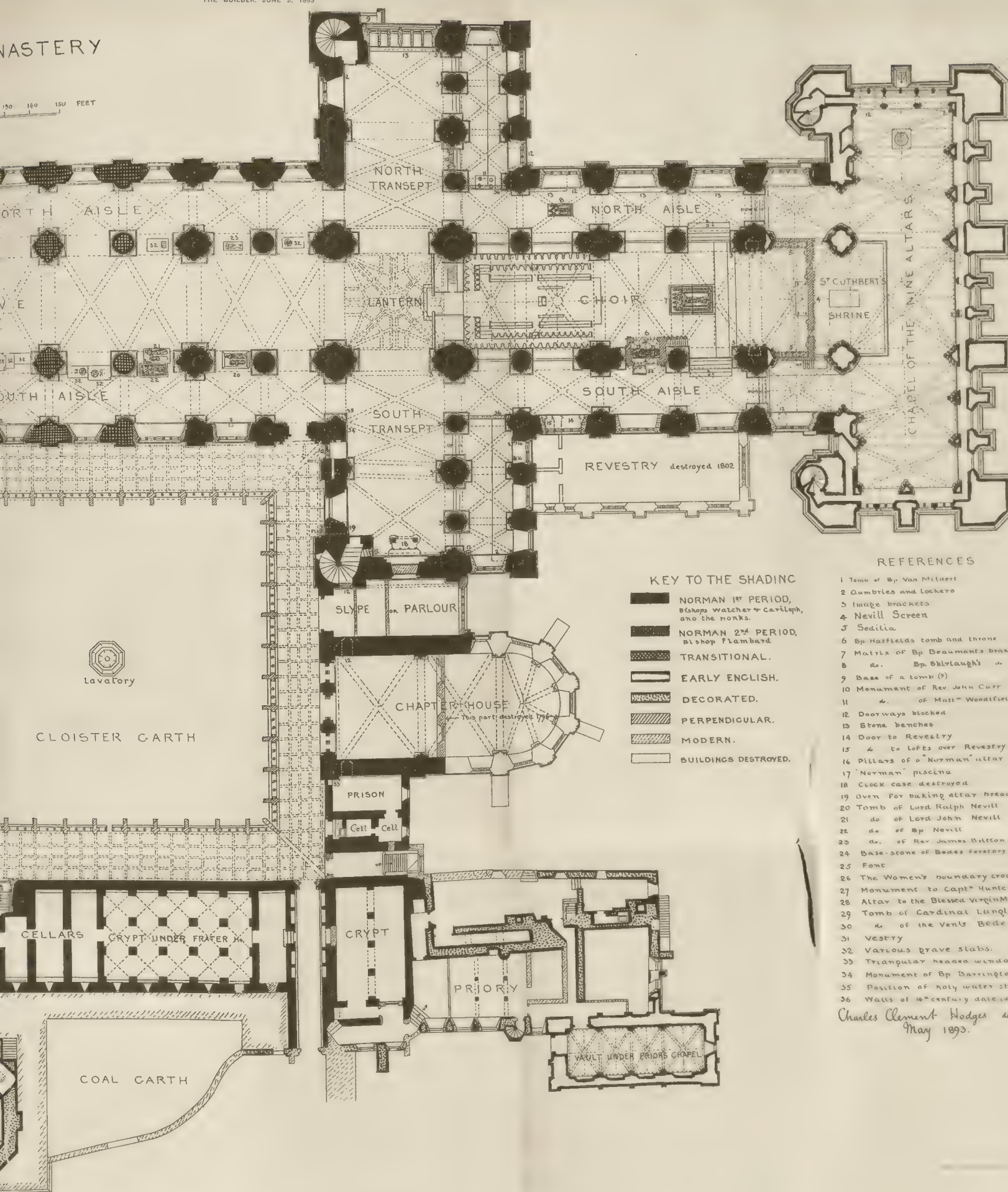
GROUND PLAN

SCALE
10 5 0 10 20 30 40 50 60 70 80 90 100 110 120



MASTERY

150 100 50 FEET



built on the high ground under the direction of JEDITH DEAN, although in 1875 one of the most distinguished architects of the the exterior of the building was rather flat, he be very hard, and appearing almost like cast

The interior, however, was a pleasing contrast to the exterior.

The meeting then terminated.

The Annual Dinner.

The annual dinner of the Association was held on Wednesday evening last at the "Criterion," Mr. H. O. Cresswell, the retiring President, in the chair.

After the toast of "The Queen and Royal Family" had been duly honoured,

The Chairman proposed "The Royal Academy," which, he said, although one of the best-abused bodies in this country, had nevertheless some claim to gratitude from architects for the work which it had carried on in its Architectural School. In saying that, he did not mean to convey the idea that that School was perfect in its methods; on the contrary, he thought that the feeling in the profession was very largely in favour of reform in the School, which it was felt ought to be brought more up to date. With the toast he had great pleasure in coupling the name of Professor Aitchison, A.R.A.

Professor Aitchison, in replying, referred to the early history of the academy, and said he thought that, in spite of its critics, it had done a great deal for art since it was founded. Genius only came when Nature sent it to us, and no academy could create it; but what an academy could do was to seek to maintain a high standard of excellence in anything that could be taught, and he thought that in that direction the academy had done good work. In painting, for instance, he thought there could be no question that the bulk of the work exhibited in the present day was very superior, in technical skill and knowledge, to the work exhibited fifty or sixty years ago. After an amusing reference to the disproportionate number of painters and sculptors in the Academy, compared with the few architects admitted within its ranks, Professor Aitchison concluded by alluding to the question of reform in the Architectural School of the Academy. The system now pursued there was very much what it had been from the commencement, and was based almost entirely on the old Renaissance traditions. Whether the Academy would ever establish professorships or classes in Statics would, he thought, largely depend upon the views expressed by the architectural profession itself as to whether construction was or was not an integral part of architecture.

The Chairman next proposed "The Royal Institute of British Architects," coupled with the name of Mr. J. Macvicar Anderson, the President of the Institute.

Mr. Macvicar Anderson, in replying, expressed his great gratification at the very cordial relations which exist between the Association and the Institute.

Professor Kerr next proposed "The Architectural Association," of whose efforts in the cause of architectural education for so many years past he spoke in terms of the warmest commendation. The members were, he thought, especially to be admired for their pluck, as a body of young men, in establishing two years ago what was no less than a College of Architecture.

The Chairman having replied, Mr. E. S. Gale proposed "The Instructors and Studio Visitors," coupled with the name of Mr. Cole A. Adams, who briefly replied.

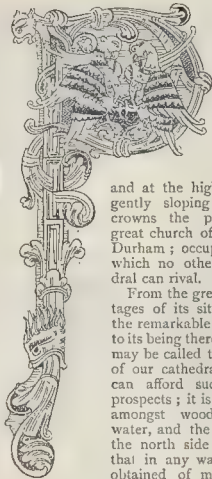
Mr. F. T. W. Goldsmith, in a lively speech, proposed "The Visitors," coupled with the name of Mr. Walter Crane.

Mr. Walter Crane made an interesting speech in replying. He said he felt the profoundest veneration for architecture, as he regarded it as the fundamental art—the greatest art of all—the art that was of more importance to the expression of national life than any other. But he feared we should not have good architecture again until there was greater unity and contentment amongst all classes of the people, and until all the workers on a building, from the workman to the architect, would work together with one consentaneousness to a noble end.

The other toasts were "The President Elect" (proposed by the Chairman), and replied to by Mr. E. W. Mountford, F.R.I.B.A., and "The Retiring President and Officers," proposed by Mr. E. W. Mountford, and responded to by Mr. Paul Waterhouse, M.A.

Illustrations.

DURHAM CATHEDRAL.*



ROUDLY seated on a rock, at the head of a small peninsula formed by the river Wear, winding and doubling on its course;

and at the highest point of the gently sloping plateau which crowns the peninsula, is the great church of St. Cuthbert, at Durham; occupying a position which no other English cathedral can rival.

From the great natural advantages of its situation, and from the remarkable events which led to its being there placed, Durham may be called the most romantic of our cathedrals. None other can afford such a variety of prospects; it is literally a church amongst woods, rocks, and water, and the view of it from the north side is the only one that in any way resembles that obtained of most of our great churches.

It is equally fortunate from a historical point of view, as the whole story of its rise and development has been recorded in a series of chronicles which have been preserved. Symeon and Reginald, in the twelfth century, Geoffrey of Gillingham, Robert de Graystones, and William de Chambre in later times, have given us complete accounts of what was done through the Middle Ages. These are supplemented by various account rolls of expenditure during the fifteenth and sixteenth centuries, while the list is closed with "The Rites of Durham," a work written by one who had known the Abbey before its dissolution, and which gives accounts, not only of the arrangements of the buildings, but also of the varied ritual and the services of the church, its stained glass and monuments, and also of the offices and domestic economy of the house.

The rise of Durham was brought about by the departure of the congregation of St. Cuthbert from the Island of Lindisfarne owing to the Scandinavian ravages of the ninth century, and the possession by the community of the incorruptible body of St. Cuthbert, which enabled them to survive those troublous times, and after various wanderings to establish themselves on the site of Durham which is so strongly defended by nature itself.

The settlement of the "congregation" at Durham occurred in the year 995 during the episcopate of Aldhune. A wooden church was erected at first, but this was soon replaced by a stone building, which, at the time of Aldhune's death, in 1018, was almost complete. Reginald gives some description of it. It was called the "White Church," and it seems to have had two stone towers, a western and a central one, both with spires of metal. Reginald's eulogistic words as to the beauty of this building leave us nothing on which to ground a supposition as to its size, but the two towers imply a church of upwards of 200 ft. in length. The present church occupies the same site, and there are no remains of its predecessor; it has entirely disappeared.

The existing cathedral was begun by the seventh Bishop of Durham, William of St. Carileph, in 1093. The foundation stone was laid on August 11, in that year, Aldhune's church having been previously destroyed. Thus the usual course of building, at any rate, a part of the new church, before removing the old one, was departed from. We are not told what the people used for a church between times, but the extreme rapidity with which

* This series of illustrations of the Cathedrals of England and Wales, which was begun in our issue of January 3, 1891, ends with this number. A list of those illustrated will be found on page 438. We intend to supplement this series with another, illustrative of the Cathedrals of Scotland, commencing in the number for July 1, particulars of which are given also on p. 438.

Billings says there "are some Norman arch and column mouldings of earlier date than the present church" in the floor of a passage in one of the western towers. These are now covered with cement. A curious capital which may have belonged to the early church was found in the "College" some few years ago. This has now disappeared.

the building was executed seems to confirm Symeon's account of the mode of procedure.

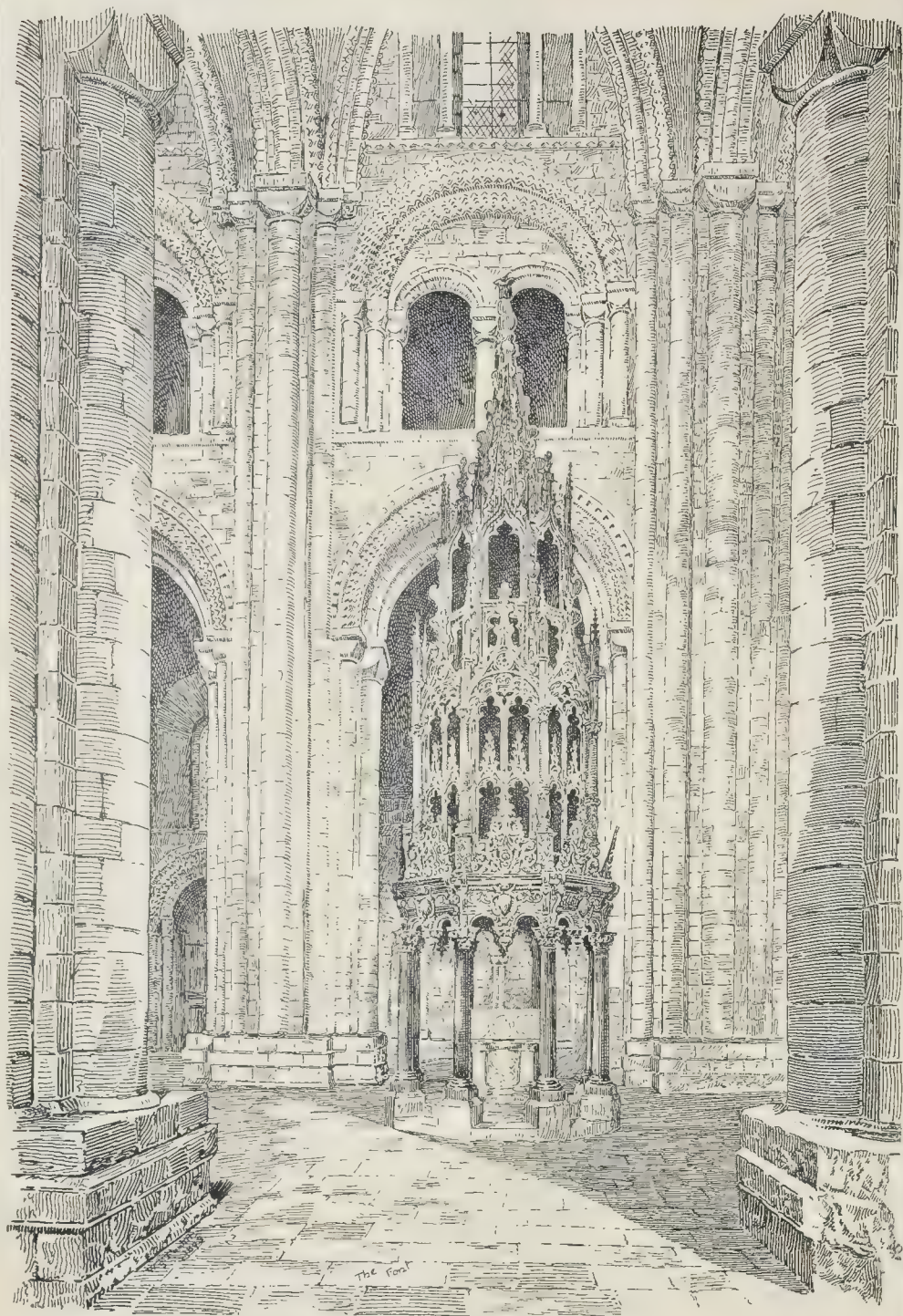
Carileph's plan comprised a choir of four bays, with an apsidal eastern termination; transepts of four bays to the north and the south, with an eastern aisle only; and a nave of eight bays, with two aisles and two western towers, which project somewhat beyond the line of the aisles. A central tower was also intended.

The foundations of all this work were laid in, the walls all round the church carried up as high as the top of the aisle wall arcade, the choir with its apse finished, the crossing piers and arches built, along with two bays of the nave in the ground story, one bay of the triforium on either side, and the greater part of both transepts, between 1093 and Carileph's death in 1096; and in the interval between his death and the election of his successor, Ralph Flambard in 1099, during which time the monks had carried on the work. Carileph's design was one of great ambition, and in advance of anything of his time either in England or Normandy. Owing to political differences with the king he had been an exile in Normandy for three years, and there can be no doubt that his design was inspired by what he had seen in progress in that country, even if he did not bring over with him a Norman architect, which is not unlikely. It is clear that his church was intended to be vaulted throughout, in single bays in the aisles, and coupled bays over the main area. The choir aisle vaults along with those to the transept aisles were executed with the other work, and afford one of the earliest, if not the earliest, example of a completely designed Norman vault to be found anywhere, i.e., one in which each member of the supporting pier or shaft carries a corresponding member or rib in the vaulting system. In fact, Carileph's design carries out to the full the true Gothic principle, as it has been called, and shows that the arguments of those who say that this does not exist in England are fallacious. It is to be regretted that we are in ignorance as to the exact lines of the eastern termination of Carileph's choir. That it had an apse is certain, and there can be little doubt that it was surrounded with an ambulatory, as at Norwich and Gloucester, and not of the solid form as that of Peterborough. The foundations of this apse were seen in 1827, when S. Cuthbert's grave was reopened, and again when a burial took place in the Nine Altars in 1844. These were seen by the late Dr. Raine, who has recorded the facts, but unfortunately no measurements or plans were made at the time, and it is much to be desired that the Cathedral authorities would allow a slight excavation to be made beneath the floor of the Nine Altars in order that the very interesting question as to how St. Carileph's Church actually terminated towards the east could be set at rest.

The design of the choir is bold and massive in the extreme; all fine detail and redundant ornament is totally absent. The four bays are divided by two circular columns, having triple vaulting shafts attached to them on the aisle side; and a pier of extraordinary length carrying responds east and west, and triple vaulting shafts towards the choir and the aisle. That towards the choir rises clear from the base to the spring of the vault, thus carrying out the vaulting principle to its full extent. The columns are ornamented with spiral sinkings, have plain cushion capitals and still plainer bases. The arch mouldings are of a good section, but there is no projecting hood. The triforium wall-plane is set back one foot behind that of the wall below. Over the circular columns, or in other words to every alternate bay, is a triple vaulting shaft, which has its origin as the level of the triforium floor, and has no projection beyond the wall below it. These shafts carried the intermediate transverse ribs of the Norman vault. The triforium arcade has coupled arches under a containing arch, the arches are plainly moulded, and the tympana are solid. The clearestory is of ample height, has one window in each bay, but no wall passage. The aisles have a wall arcade with semi-circular intersecting arches of plain mouldings resting on coupled shafts with cushioned capitals. The aisle vault is carried on the wall or outer side, by triple vaulting shafts rising from the floor, and on the inner side by shafts of similar section attached to the piers and columns. The vault is quadripartite, with moulded ribs. The transverse ribs are semi-circular or slightly horseshoe in form, while the diagonals have a flattened irregular curve.

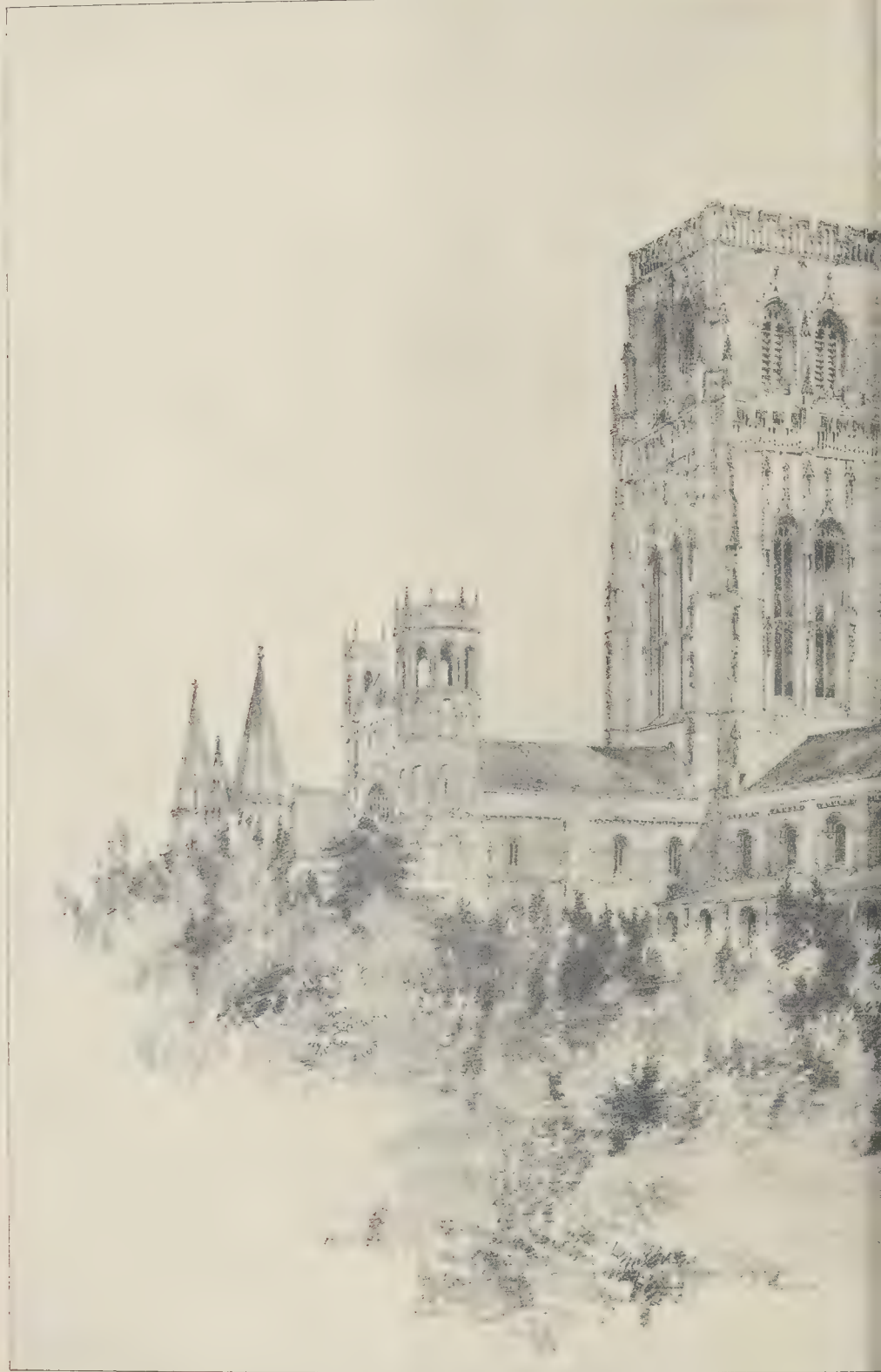
The crossing piers are of great size and solidity, and so well built that they have stood without buttressing or any subordinate supports, and they and the arches they carry show no signs of shrinking, though they bear aloft a tower

ERRATA.—The two foot-notes on pp. 405, 407 of our last number, referring to the Manchester Main Drainage Works and to the Ship Canal, should have mentioned the *Builder* for May 13, and not May 6.



Durham Cathedral. View across West End of Nave.





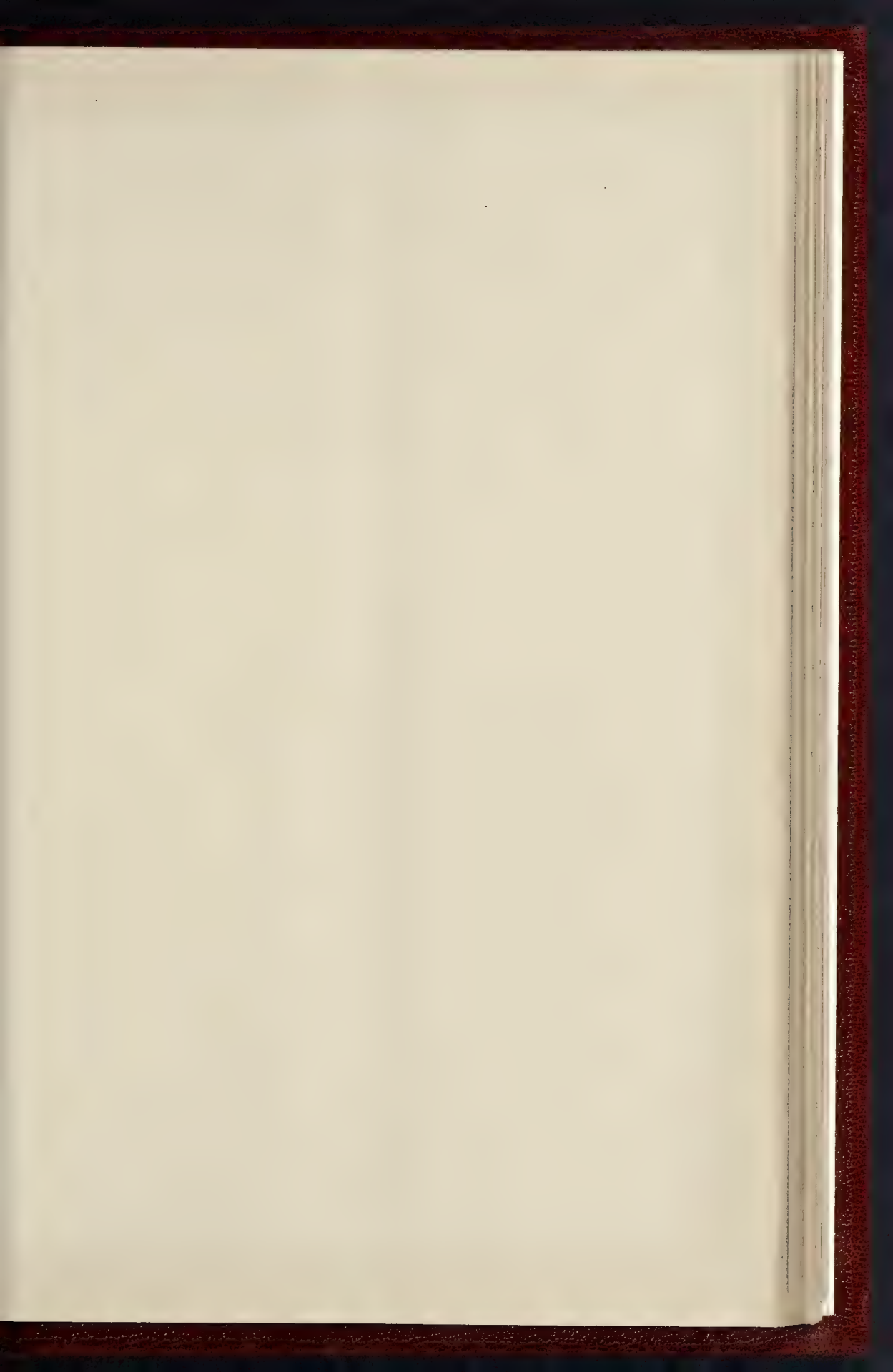
Cathedrals

No. 31 DURHAM FROM THE NORTH



and Wales.

OWN BY MR. ARNOLD MITCHELL, A.R.B.A.





DURHAM CATHEDRAL. VIEW IN SOUTH AISLE OF NAVE, LOOKING NORTHWEST.—DRAWN BY MR. H. W. BREWER.



DURHAM CATHEDRAL. BISHOP HATFIELD'S TOMB. DRAWN BY MR. J. G. BEDFORD, A.R.B.A.

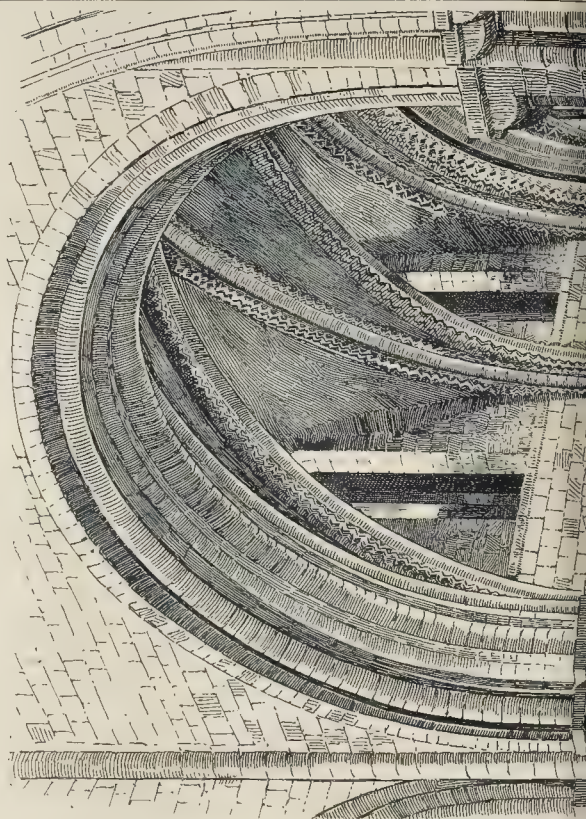
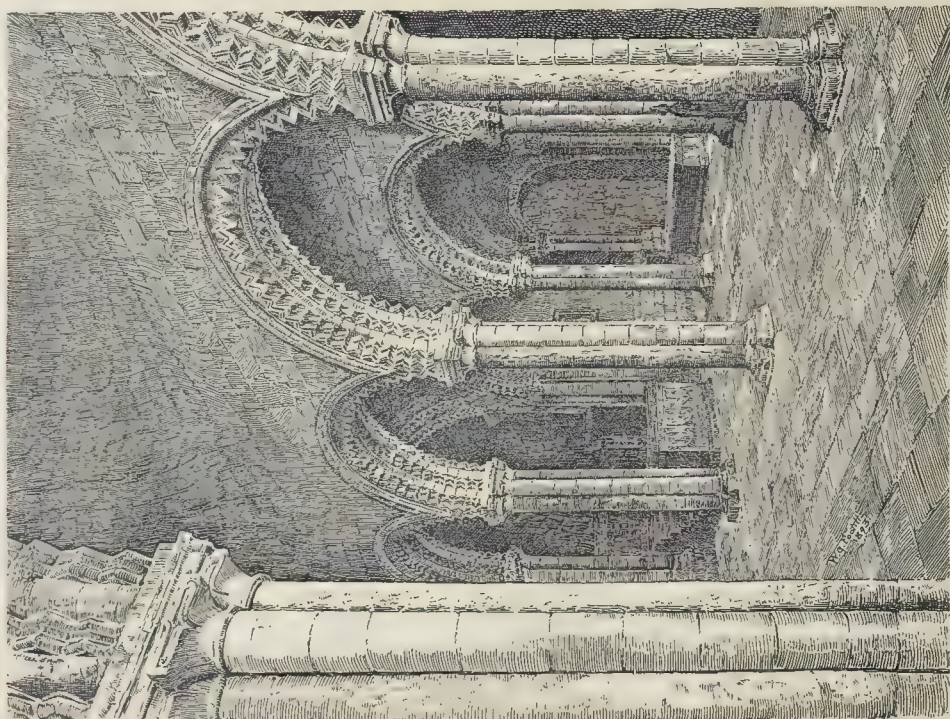


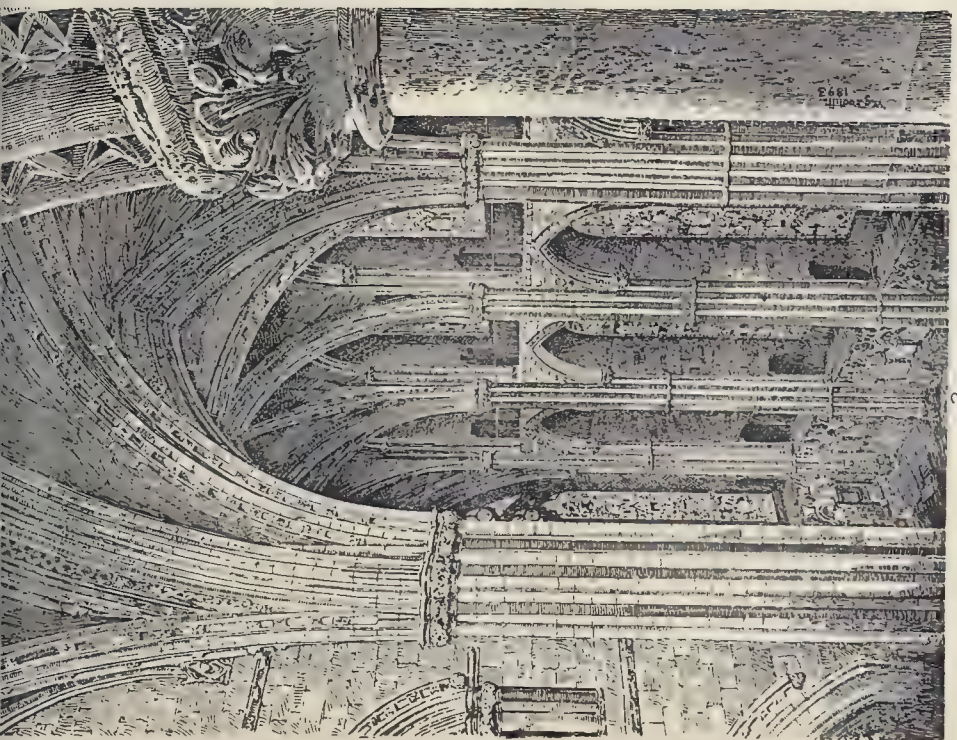
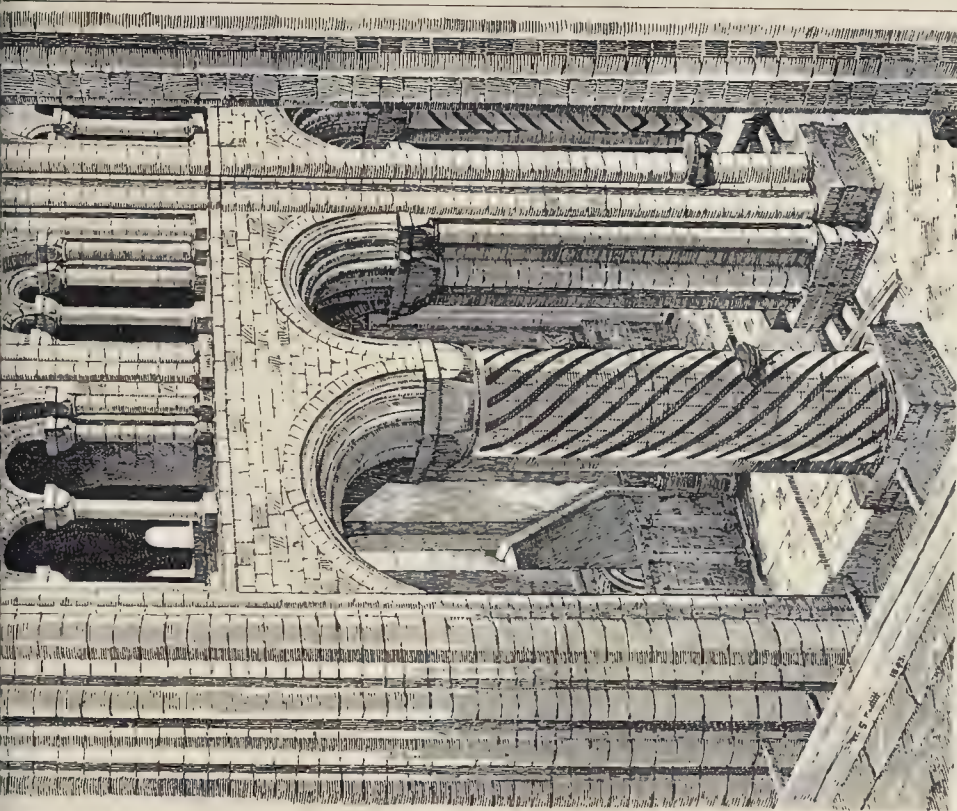
DURHAM CATHEDRAL.

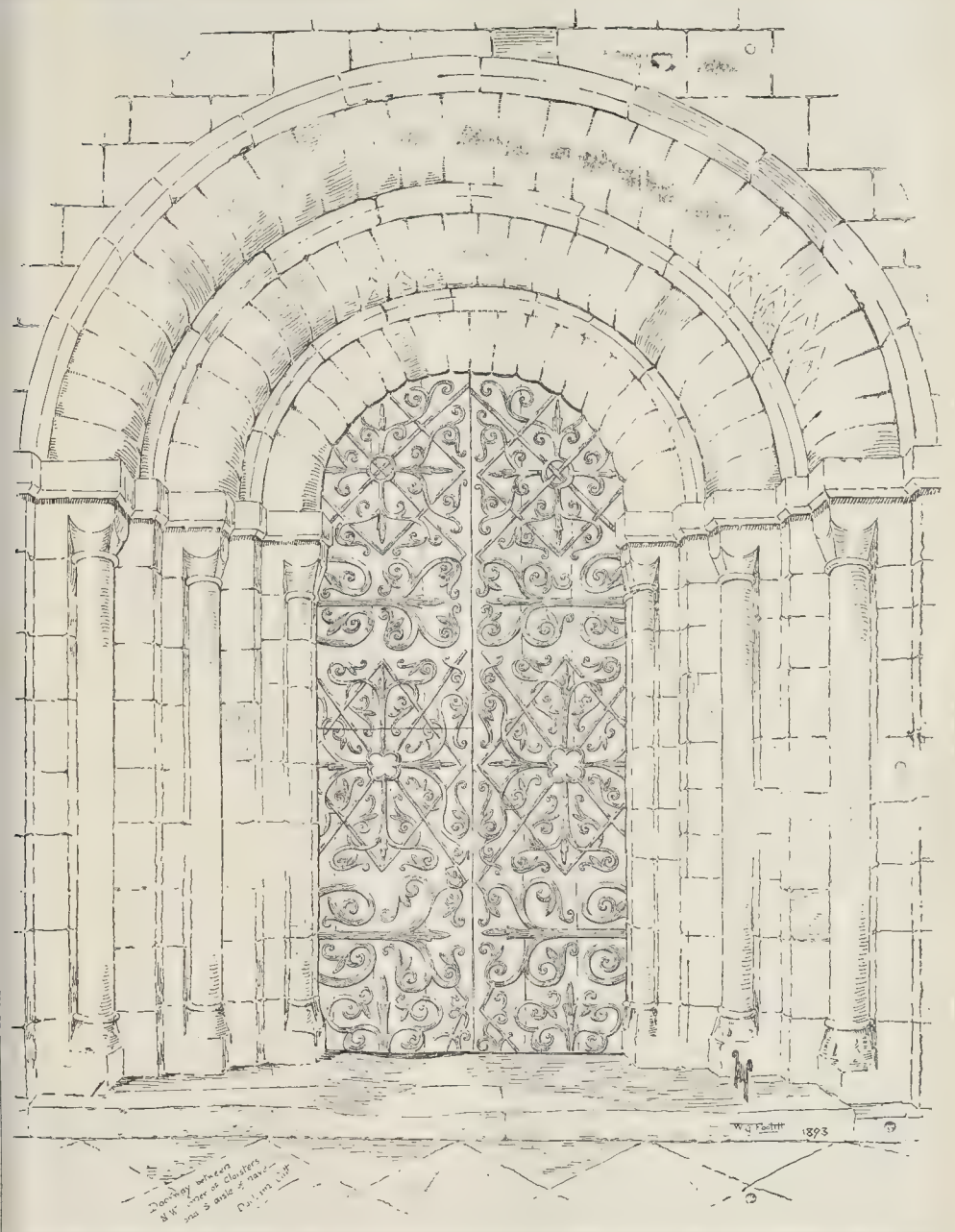
VARIOUS INTERIOR VIEWS, FROM DRAWINGS SUPPLIED

BY MR C. C. HODGES

- 1 THE GALILEE, FROM THE NORTH WEST ANGLE
- 2 THE NINE ALTARS, FROM THE TRIFORIUM OF THE CHOIR.
- 3 EAST SIDE OF SOUTH TRANSEPT, FROM THE TRIFORIUM OF THE NAVE







216 ft. 8 in. in height, the highest central tower in England, Lincoln only excepted.

The chief peculiarity in the plan of the transepts is the narrowing of the space between the columns as they recede from the crossing in either direction. The intercolumniation of the two extreme bays is reduced to half that of the bays nearest the crossing. The reason of this setting out was to give an exaggerated perspective effect to the view of the transepts from the crossing. Our readers will be aware that the arrangements of the choirs of the Norman churches were made so that the stalls were placed beneath the crossing. Those seated in them looked down the transepts, and it was to give the utmost effect to this view that the

arches were so spaced as to render the transepts of greater apparent length than they actually are. The same thing was sometimes done by making the walls of a church converge towards the east. Those tricks, however, were not commonly resorted to by Mediaeval architects. The general design of the transepts (see lithograph illustration) is identical with that of the choir, except in the clearstory. The triforium occurs only on the eastern side, and has to accommodate itself to the spacing of the arches below. In the two extreme bays the triforium consists of a single arch only. The triple vaulting shafts found in the choir have become couples, and in the extreme bays these rise to the vault surface,

which they seem to penetrate. As the two outer bays in each transept are spanned by a single quadripartite vault, the intermediate shafts are therefore useless, and were only inserted to preserve as far as possible the continuity of the design. The west side of the transept has arches opening into the nave aisles of the time of Carileph, a large window in each wing beyond the nave aisles, and above, at the triforium level, a wall passage, the openings to which are of various forms, and present some peculiarities.

The clearstory is of different designs in the two wings. On the north it has a triple arcade to each bay, the centre opening being opposite the windows. This arcade has single shafts with

rushion capitals and moulded bases. The form of this clearstory shows that when it was built a vault was intended, but whether the existing one is of contemporary date or a subsequent addition cannot now be definitely decided. It is of semicircular form, is divided into two sections, that towards the crossing being of double quadripartite form, while the outer bay has two diagonal ribs only. Each transept is spanned by a great transverse rib or arch, carried by the compound piers. These arches are not carried square across the transepts, but are placed somewhat obliquely. The clearstory of the south wing was so constructed as to show that a vault was not contemplated when it was first built, as though economy had to be observed in the carrying out of the work. It is of plain character, and had an arcade of plain square arches and piers between the wall passage and the church. The vault is of similar plan to that on the north, but the ribs are ornamented with zig-zag mouldings, being the earliest in the church. At the time the vault was added the side arches of the clearstory arcade in the bays next the tower were filled up as the vaulting passed over them. The clearstory passage was carried all round the transepts, but is now destroyed at the ends, owing to the insertion of the great north and south windows in later times.

The continuator of Symeon's chronicle says that Bishop Flambard, who held the see from 1099 to 1128, found the church advanced as far as the nave, and that he prosecuted the work somewhat intermittently, but before he died had carried up the walls of the nave as far as the roof. Any decision as to how much work was done at any particular period can only be arrived at by a careful examination of the building, and it is a most interesting study to trace the extent of Flambard's work, how he blended it with that of his predecessor, what changes he or his architect made in the general design and its details, and how they carried on their work so as to make it harmonise with that which had been done before, all using details to suit their own taste.

When Flambard's builders began their work on the nave, they found the aisle walls standing to the top of the arcade,* at any rate for the greater part of its length, and the two eastern bays of the main arcade with one bay of the triforium arcade on either side. This work had been done at the same time as the crossing, to serve as an abutment to the great arches. The clearstory was not begun. As all the pier bases had been set out, and some of them perhaps laid in, they were compelled to adhere to the arrangement of coupled bays, of which there are three in the nave, then an odd bay, and then the western tower bay. It may be here remarked that the great fault of the design of Durham is the shortness of its nave in comparison with the scale of the church. The proximity of the west end to the steep, rocky bank of the river prevented its being made any longer, and some local cause, now unknown, no doubt prevented the whole building being placed any further eastwards. Had the western tower bay been an addition to four coupled bays, instead of to three and a half, there would have been a completeness about the plan that is now lacking. The principal changes made in the design were the omission of the triple vaulting shafts from the columns, and the substitution of a half column on the aisle wall, opposite the single columns, for the triple vaulting shafts found in the choir and transepts. They abandoned the intention of vaulting the nave altogether, apparently intending to carry up the great vaulting shafts on the piers to support arches spanning the area upon which a wooden ceiling was to rest. The wall plane was to be carried up in the same line throughout, instead of being set back at the triforium string-course, as in the choir and transepts, the bay of the triforium which they found built was therefore faced above its arch, so as to bring the wall surface into one plane. The triforium vaulting shafts over the columns found in the choir and transepts were omitted, as with the modified design they were not required. The clearstory has a wall passage, and the external wall was made similar to that in the transepts, but internally large plain arches of 14 ft. span seem to have been formed as an arcade towards the church. Such was Flambard's design for the nave. It was a bold conception, but was a much more economical plan than that of his predecessor, who kept the requirements of

* This is proved by the different colour of the stone above and below the arcade, and by the weathering of the surface caused by the work standing exposed for a few years, as well as by certain chippings and injuries along what was the top course. Some of these could not have occurred if the wall had all gone up at one time.

the vault ever before his mind as the main thing to be considered, while Flambard did not hesitate to throw it over altogether. But before the work had reached the western limit of the church considerable modifications were made.* Flambard died in 1128, and after his death the see was vacant for nearly five years. "During that time the nave of the church was completed, the monks being devoted to the work."† It seems highly probable that the changes in the design of the nave were made at this time, and that its completion and its vault were carried out between 1128 and 1133, when Geoffrey Rufus assumed the see. These changes consisted in the abandonment of the wooden ceiling and the arches to carry it, and the substitution of the vault. The only provision for this which could be made available was the vaulting shafts at the main piers which had been carried up for the transverse arches, which, however, do not seem to have been erected, but the springers for their outer orders remain on the capitals projecting beyond the transverse ribs of the existing vault. Over the intermediate columns no vaulting shafts existed. Double corbel heads from which the diagonals spring were therefore inserted, by cutting into the walls. The clearstory string-course was also cut through to admit of the springers. Similar corbels were also inserted against the capitals on the main vaulting shafts. The transverse ribs are pointed, their centres being, according to Billings' measurements, about 3 ft. below the springing line. The diagonals are semi-circles, with their centres a little above the springing line. The adoption of the vault necessitated a change in the clearstory, and an internal triple arcade was inserted between the jambs of the larger arches. The arch opposite the windows is 6 ft. in width, while the two side ones are only 18 in. There are shafts with cushion capitals and moulded bases. The straight joints in the jambs and the extra wall thickness of the older arcade show that this change was made. The details of all the work in the nave later than Carileph's time are much more elaborate than in the earlier work. There is a profusion of zig-zag in arch-mouldings, string-courses and vaulting ribs. In the great arcade a good effect is gained by a ring of sunk squares on the extrados of the arches. The arch mouldings are, however, inferior in their sections to these of Carileph's time. The six single columns in the nave are ornamented with sinkings. The designs are three in number and the columns are treated in pairs. The eastern pair have a reticulated pattern formed by crossing spirals. There is a small square left at each intersection. The intermediate pair has a zig-zag grooving with a good moulding. The western pair has vertical flutings of hollows and beads. The Norman west front, had it been fully carried out and remained unaltered, would have been one of the grandest in England. The western towers were only carried up to the level of the wall-head of the nave in Norman times, and subsequent changes have robbed the façade of all its original character. The great west doorway had five orders of arch mouldings, all zig-zagged, and a hood moulding. The inner order was taken out and the jambs cut into when the Galilee was built. The ends of the transepts have been so changed, both in Mediaeval and modern times, that their original character has disappeared. The aisles of the nave had originally a series of gables between the buttresses. The marks of these on the south side were very perfect before the refacing was done in 1849. There are some traces of them on the north side still.

In the Middle Ages architecture was developing so rapidly that no great church ever remained long without some changes being made in it. The causes which brought about these changes at Durham were of a very curious nature, and resulted in the church assuming a plan which is quite unique. St. Cuthbert had, from some cause or another, a great dislike to the female sex, which he carried so far that he could not treat the Blessed Virgin with that honour which was usual in his time. The successors in his see seem, however, to have carried this craze still further on behalf of their Saint than he himself ever contemplated, and to have made a handle of it to provide their own schemes. In the time of Hugh Pudsey, one of Durham's most conspicuous bishops (1153-1195), there was a scheme on foot

to provide the church with a Lady Chapel. To effect this Carileph's apse was condemned to destruction, and by a mode of reasoning, which is common enough in our own time in similar cases, because they wanted to destroy it, they said it would fall if they did not do so. Preparations were made for erecting a Lady Chapel at the east end of the church in the Transitional style. This work had not gone far when it showed signs of weakness and dislocation, we can only assume from faulty construction, and the failure of some of the works of Pudsey's architect supports that view—he was an excellent designer but a poor engineer. What the contemplated design was like some little glimmering may be formed by an examination of some details found on the site and lying about the church. Some of these are portions of large columns with bold mouldings, running on their surface in raised patterns, which seem to have been intended for a crypt, as they resemble those in the crypt at York of contemporary date. Difficulties having arisen almost as soon as it was begun, and the work having failed, St. Cuthbert was said to have manifested impatience at a building dedicated to a woman having been begun near his grave. The Lady Chapel was therefore erected at the west end, between the west front and the river. The four arcades of four bays each are of excellent proportions; the arches rested originally on coupled marble monolithic shafts with voluted capitals. Two other shafts, built up in stone, were added to them in Cardinal Langley's time (1406-1437), when the "Transitional" capitals were curiously copied so exactly that many will not believe they are not twelfth-century work. None of the original windows remain in use. Those in the north and south walls were altered at the close of the thirteenth century, and those in the west end replaced with large Perpendicular ones in Cardinal Langley's time, while the original clearstory windows over the two outer arcades were built up when the present roof was added.

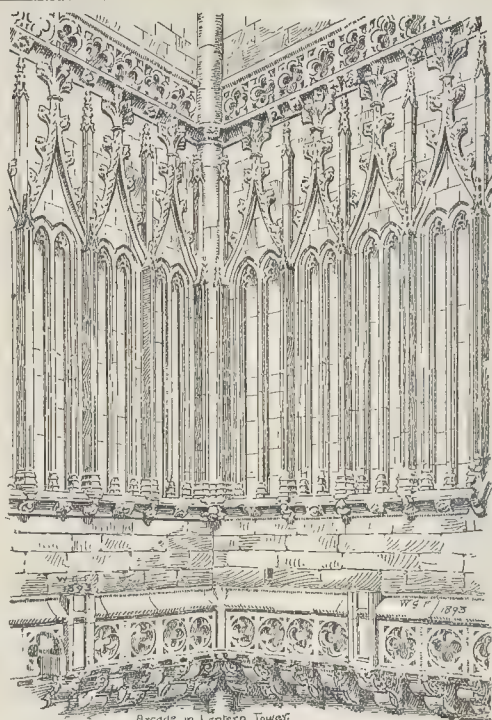
The transfer of the Lady Chapel to the west end allowed the apse to remain, but fashion was against it, and the time soon came for its removal. The concourse of worshippers about the shrine of any great saint rendered it necessary that the portion of the building containing it should not be straitened in its dimensions. A semicircular apse was an eminently inconvenient form for a building which had to accommodate large numbers. It was therefore decided to do at Durham what had been done at Fountains Abbey, viz., to form an eastern transept to the church by throwing out long wings to the north and south. The old excuse was made use of when begging money for the work, which was said to be necessary "on account of the fissures and fractures prominent at the eastern end of the church, threatening terrible ruin to all beholders." The time when the work was begun (1242) was a singularly auspicious one in an architectural sense. The Early English style was at its highest development, and the Geometrical was about to evolve from it. The convent also was wealthy, and St. Cuthbert's fame had not diminished by the passage of time. The architect employed was a master of his craft, and the result was that the thirteenth-century addition to the plan of Durham (see lithograph: Nine Altars) was



Capital: Nine Altars.

a masterpiece in all senses. Judges competent to give an opinion, both from knowledge and taste, have pronounced it to be the best specimen of Early English to be found. It is

* "Symeon's Continuator" says: "As to the works of the church he prosecuted them at one time with energy, at another time tardily; as money was plentiful or scarce with him; from the offerings at the altar or in the cemetery. From these sources he carried up the walls of the nave as far as the roof." Changes in the design were not an improbable result from such a mode of obtaining funds.
† "Symeon's Continuator."



Arcade in Lantern Tower

magnificently built. Though its walls rise straight from the ground, they have borne up its lofty vault for more than six centuries without the least sign of settlement or flaw, though unaided by arcades, aisles, or flying buttresses. The great thrust of the heavy ribs is taken by the enormous thickness of the walls, nearly 8 ft., and by the huge piers at the angles forming buttresses and carrying pinnacles. The details throughout are most carefully designed and beautifully wrought.



Archading: Nine Altars.

Arches, capitals, vaulting ribs and bosses are all liberally supplied with carving, all of it of the best class, yet so great is the scale of the building that there is no appearance of undue richness. A great point was made by lowering the floor to that of the level of the falling ground to the east, instead of by raising the building on a crypt. This has given an internal height of 80 ft., considerably exceeding that of the choir or nave.

Against the east wall nine altars were placed. There are doorways at either end, placed to the west of the steps to the altars. These doorways were no doubt used by pilgrims and others who would be accommodated in the main area of the building to view the shrine, which was placed on a platform on the level of the choir floor and projected into the Nine Altars.

It is extremely interesting to be able to say that both the names of both the architect and the master mason of the Nine Altars have come down to us. The name of the former occurs in a deed conveying land in the Bailey as "*Magister Ricardus de Parinham tunc architector nove fabricae Dunelm.*" That of the latter is cut on the north and east sides of the plinth of south great buttress on the east side of the Nine Altars and is here given.

The only subsequent extensions of the church, as far as the plan is concerned, were the north porch, added in the Early English period and destroyed in 1780, and the Vestry on the south side of the choir, a very considerable building with curious chambers at its western end. It was built about 1300 and destroyed in 1802 to make way for some heating apparatus which, however, proved a failure. Its windows were all filled with fine ancient glass which has perished with the other curiosities of that interesting building. The Sacrist's exchequer was added in the time of Prior Wessington (1416-1446), and stood in the angle of the north choir aisle and north transept. It was removed in time of Charles I.

The western towers were carried up in the early years of the thirteenth century. They were crowned by lofty octagonal timber spires covered with lead. These survived till the time of the great rebellion. The present battlements were added about 1780.

The central tower does not seem to have been built in Norman times. Had it been it would probably have survived as there has been no failure in the piers, such as has caused the destruction of so many Norman central towers in both ancient and modern times. An Early English tower existed, which had, no doubt a lofty leaden and timber spire for it was destroyed by fire after being struck by lightning in 1429.

The present fine tower was begun about 1464 and was unfinished in 1474. It was intended to carry a spire as there are massive squinches in the angles, and there can be no doubt that both piers and

tower would have successfully borne the extra load.

The changes made in the Norman church during the Middle Ages, beyond those enumerated, were the insertion of larger windows and the addition of furniture and tombs.

The great window at the north end of the Nine Altars is not an insertion but was erected with the work in which it is placed, though the original design was for a series of lancets as at the south end. The Nine Altars was begun in 1242 but was not finished till about 1280, and as the north end was the last portion executed the work extended into the Geometrical period.

In the time of Prior Fosser (1331-1374), the great west window and the north transept window were inserted. Prior Wessington (1416-1446), added the south transept window and the new rose window at the east end, destroyed in 1780. An Early English rose existed as is shown by the so-called arch of that date still remaining. The aisle windows of the choir were insertions of the fourteenth century. Those on the south side have been renewed according to the old designs, those on the north side were most stupidly destroyed and copies of others in Kent and Lincolnshire substituted. Carter's and Billings's plates show the former ones.

The magnificent open altar screen was erected in 1372. It was made in London and sent by sea in chests to Newcastle and from thence to Durham. Its erection occupied seven masons for a year. The splendid new shrine of St. Cuthbert put up at the same time has entirely gone.

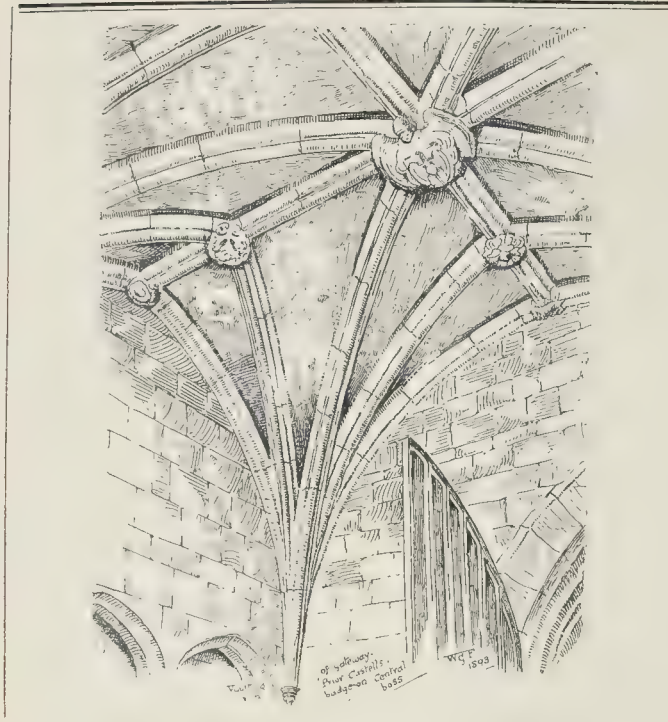
Bishop Hatfield's tomb (see lithograph) and the bishop's throne over it is still the chief ornament of the choir. Much of the painting and gilding upon it can be traced.

It is interesting, though tantalizing, to read in the "Rites" of the splendid furniture and ornaments which the cathedral once contained. Not a fragment of Medieval woodwork remains in the church; the cove of the Jesus altar is at Brancepeth, and some bits of the reredos of the altar of the Virgin in the Galilee are at Croxdale; everything else has perished. It is still more vexatious to think that the very fine Marian and Jacobean furniture and screens which replaced the older work has been to a great extent destroyed or removed quite recently—e.g., the beautiful screen of St. Cuthbert's shrine in 1844, and the clock-case, which contained a good deal of Medieval work of the time of Prior Castell in 1845. The font cover escaped by being put into a corner as inconvenient to remove, and has been reinstated. Of the three splendid brass chandeliers which served to light the choir, two were recovered by the action of Canon Greenwell, after having been thrown out as lumber and sold. The third, the large central one, was used at Ryton Church for a time, "then sold to a music-hall in Newcastle, and ultimately melted." The account of the havoc and destruction wrought at Durham since the blight of

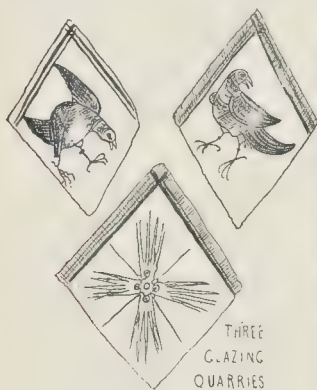


The Sanctuary Knecker.

"restoration" fell upon it would require a book to itself. Only a few things can be mentioned here. One of the most deplorable was the destruction of all the traceried windows in the nave and transepts, except the great end windows



and those which have fortunately escaped in the north transept, and the substitution of imitation Norman. In like manner the amount of ancient stained glass which has perished during the same period is almost incredible. In 1849, on the



destruction of the windows in the Nevill chapel, the stained glass in them, which many remember, perished too.

Our survey of the monastic buildings must be a brief one. Next the south transept is the slype, apparently contemporary with the transept. It has a good wall arcade of intersecting semicircular arches. The Chapter House was of two dates, and was not completed till about 1140. Its apsidal end had had traceried windows inserted in the fourteenth century. This portion was destroyed in 1796 along with the vault over the whole. The west walls remained, and the side walls in part. Carter's drawings preserved a record of it, and it is now being rebuilt more or less on the old lines. Beyond the Chapter House are some early walls of the time of Walcher, the first Norman bishop. Then an early crypt, with a double-barrel vault, carried by an arcade on square pillars. South of the cloister is a long Early Norman crypt, and various chambers connected with the domestic economy of the house. Above this was the Frater House, now the old library, which has been twice modernised. The west side is occupied by a long

vaulted crypt of Early English date, with later insertions and additions. A portion of Norman walling has survived on the west side of it. Above is the new dormitory, a magnificent room of the fifteenth century, with two tiers of windows and a grand open timber roof, which only escaped destruction in 1850 by the architect employed boldly refusing to do the evil work.

The kitchen is an octagon with a fine vault, and dates from 1368.

The cloister was rebuilt in the time of Bishop Skirlaugh (1388-1405), but all the windows were replaced by the existing ones about 1773. The basin of the old lavatory still lies in the centre of the garth.

The Priory is of various dates, and contains a good chapel of Early English, with a vaulted undercroft. The Chapel itself is turned into modern bedrooms. There is also an entrance hall of Prior Castell's time (1494-1510), with a traceried south window and good ancient panelling. One of the bedrooms has a fine ceiling of Medieval woodwork.

The Abbey gate, to the south-east of the Priory, is also of Castell's time, and has a good vault.

The curious buildings to the west of the new dormitory have recently been excavated and opened out under the direction of Canon Greenwell. They contained the latrines and the great prison. Their connexions with the dormitory and also the cellarer's exchequer were destroyed not many years ago. They may be understood by a reference to Carter's plan.

The plan is taken through the church at the level of the aisle windows, and through the other buildings at the ground level, but the Chapter House and kitchen are taken at a higher level to show some features which do not appear on existing plans. The Priory is drawn in as well as other buildings from special surveys previously unpublished. In the church the destroyed Medieval windows are shown in preference to the imitation Norman ones, and the stalls are drawn in from Billings's plan.

C. C. HODGES.

BUSINESS CHANGE.—Messrs. John H. Hackworth & Company, of 45, Queen Victoria-street, inform us that they have succeeded to the business of the Machinery and Hardware Company, Limited.

THE ACME WOOD FLOORING CO.—The secretary of this company asks us to mention that there is no connexion between it and the firm of Duffy & Son, which has recently gone into liquidation. The point of the announcement lies in the fact that the Acme flooring system is also known as "W. Duffy's Patent."

COMPETITIONS.

NEW COUNTY ASYLUM, CHEDDLETON, STAFFORDSHIRE.—On the 27th ult., Mr. C. H. Howell, the professional assessor appointed by the Staffordshire County Lunacy Committee to examine the competition designs sent in for a new county asylum at Cheddleton, made his report, and under his advice premiums were awarded by the Committee as follows:—First, Messrs. Giles & Gough, London; second, Mr. G. T. Hine, London; and third, Messrs. J. G. Izard and A. B. Cottam, London.

SCHOOL BUILDINGS, COLCHESTER.—At the monthly meeting of the Colchester School Board, held on the 26th ult., the Building and Sites Committee recommended that plan No. 16 sent in in competition for the North-street Schools be adopted by the Board, provided the cost of warming and ventilation as shown by the plan submitted therewith be included in the estimate of 5,260*l.* This having been agreed to, the Chairman opened the letter which accompanied the plan, when it was found that the architects were local practitioners, viz., Messrs. J. F. Goodey & Cressall. Thirty-one plans were sent in, the estimates for which ranged from 3,300*l.* to 14,244*l.*

Correspondence.

To the Editor of THE BUILDER.

BENI-HASAN.

SIR,—In connexion with your interesting article on the recent investigations at Beni-Hasan, may I call your attention to the paper by Mr. Flinders Petrie, printed in the enclosed issue of the *Journal of the Society of Arts*. The column shown in Fig. 8 is very remarkable, as showing distinct fluting, though why it is described as "octagonal" is not clear; from the illustration it might be 16-sided, or circular. Fig. 9, showing the probable "tent-pole" origin of the bell-topped column, raises, in my mind, the question whether the early arched ceilings at Beni-Hasan may not be derived from tents, and not from brick structures. The use of the arched representation of a booth, as the hieroglyph for a festival, shows the persistence of the form.

R. LANGTON COLE.

. The drawing of a column referred to by Mr. Cole is one of the 16-sided columns, wrongly described in the *Journal of the Society of Arts* as "an eight-sided column." The effect of the fluting is probably very much exaggerated in the shading, and a large-scale plan of the column would probably give a very different impression. In regard to the arched ceilings of Beni-Hasan being derived from tents, it should be remembered that the top of a tent would show a convex curve when viewed from the interior, not a concave one.—ED.

THE BELASYSE MONUMENT.

SIR,—In the *Builder* of September 9, 1892, appeared an interesting "Note" on that ardent Royalist soldier, Lord Belasyse, who died on September 20, 1685, and was buried in the Church of St. Giles's-in-the-Fields. The "Note" in question commenced with the following sentence:—"The Society for Preserving the Memorials of the Dead have, as we understand, undertaken to repair the Belasyse monument, against the east wall of St. Giles's-in-the-Fields Church."

A few days ago I went to have a look at the "repaired" monument, and found that a hoarding had been erected round it, and through the cracks in the boards I could see parts of the monument lying on the ground and the main portion of the structure shored up with props. I understood that it had been in this state for about twelve months, and during that time the interior of the hoarding appears to have formed a nice receptacle for various items of discarded rubbish.

In view of these facts, I for one should be very glad to know if the Society in question does really intend eventually to repair the monument. They have already done good work near the spot by repairing the monuments of Richard Penderell and George Chapman, and for many reasons it is much to be hoped that the monument of Lord Belasyse will not be forgotten until the ravages of time have rendered the idea of repair impossible.

ROYALIST.

A COUNTY COUNCILS' RIVER MAP.—A map, published by J. E. Cornish, Manchester, of the river basins of England and Wales, defines the natural jurisdiction of Joint Committees of County Councils for the prevention of pollution of rivers under section 14 (iii.) of the Local Government Act of 1888. The limits of each watershed are distinguished by red shaded boundary lines.

The Student's Column.

CHEMISTRY.—XXII.

COMPOUNDS OF LEAD (continued).

RED LEAD is a red oxide of lead, Pb_3O_4 , prepared by exposing litharge, a monoxide of lead, to a dull red heat in a current of air. It is usually regarded as a compound of monoxide and dioxide of lead, thus, $2PbO + PbO_2 = Pb_3O_4$. If red lead is acted upon by dilute nitric acid, the monoxide is dissolved, and forms lead nitrate, while the dioxide is left as a brown powder.

Red lead is used as a "drier," also for painting iron, and as a priming coat for wood. It is sometimes known as *minium*. Red lead is sometimes adulterated with red brick-dust, but this is readily detected by an analysis, which may be made in the same manner as the analysis of white lead (see experiments, group 12), with the exception that when dissolving the material in dilute HNO_3 , a lump of sugar or some other oxygen-extracting substance should be added in order to reduce the PbO_2 , which is insoluble in HNO_3 into PbO . A sample of red lead in the form of a dry powder yielded 131.2 per cent. $PbSO_4$, $131.2 \times 7534 = 98.84$ per cent. Pb_3O_4 . It is said that red lead is sometimes adulterated with red oxide of iron. This adulterant may be detected by the following process:—Boil some of the red lead with HCl , cool the solution and filter. In order not to have a very strongly acid solution, add ammonia, but be careful to keep the solution distinctly acid. Then pass H_2S gas through this acid solution until no further precipitation of black lead sulphide is produced. Finally, filter, and to the clear filtrate add excess of ammonia and ammonium sulphide. If any iron salt was present, a black precipitate of iron sulphide will now be produced.

Lead monoxide, massicot, or litharge, PbO , is obtained as a straw-coloured powder by heating metallic lead in air at a moderate heat, or as a reddish powder by employing a higher temperature. It is used for the manufacture of lead or flint glass, and for the preparation of red lead.

Lead dioxide, price oxide, or brown oxide, PbO_2 , is obtained by treating red lead with nitric acid.

Lead sulphide, PbS , is found native as galena. **Lead acetate, or sugar of lead**, $Pb(C_2H_3O_2)_2$, sometimes written PbA_2 , is prepared on a large scale by dissolving litharge in acetic acid. It is sold in a white crystalline form, and has a sweetish taste. Like all the soluble lead salts, it is very poisonous. It is largely used as "driers" for paint.

Lead chloride, $PbCl_2$, **lead sulphate**, $PbSO_4$, and the other lead salts, are not of much commercial importance. An insoluble lead chromate, $PbCrO_4$, is sometimes used as a pigment under the name of chrome yellow.

Symbol Ag. Silver. Atomic Weight 108.

Silver is sometimes found in the free state, but is obtained in largest quantities from its ores. The most important silver ores are the sulphide, known as silver glance, Ag_2S , and the chloride, known as horn silver, $AgCl$. A considerable portion of the silver of commerce is obtained from galena by the methods described under Lead (see Paper XXI.). Silver rapidly tarnishes in air containing small quantities of sulphuretted hydrogen on account of the formation of silver sulphide, Ag_2S , which is a black compound. Pure silver is too soft to resist ordinary wear-and-tear well, and is therefore alloyed with copper. Electro-plate is produced by depositing a thin coating of silver upon articles made of baser metals by electrolysis. Silver is very ductile and extremely malleable, and is one of the best conductors of heat and electricity. Silver readily dissolves in nitric acid to form nitrate of silver.

Silver nitrate, $AgNO_3$, is sometimes sold in the form of crystals, and sometimes is fused into sticks. It forms the *lunar caustic* of the surgeon. When exposed to light it stains organic substances to a black colour. It is used for making indelible marking ink, and for preparing silver chloride, silver iodide, and silver bromide, which are largely used in photography.

Symbol Hg. Mercury. Atomic Weight 200.

Mercury (Latin name, Hydrargyrum) is sometimes found in the free state, but is almost wholly obtained from cinnabar, a sulphide of mercury, HgS , which is found in Spain, California, China, &c.

The metal is easily obtained by simply roasting the ore in a current of air. The sulphur is con-

verted into gaseous sulphur dioxide, while the mercury which is left in an uncombined condition volatilises, and the vapour is condensed in brick chambers or clay tubes.

Mercury or "quicksilver" is the only metal which is liquid at ordinary atmospheric temperatures; it is not affected by hydrochloric acid, but dilute nitric acid dissolves it readily, and it is also attacked by strong hot sulphuric acid. Mercury is used for artificially preparing *Vermilion*, a sulphide of mercury, also for barometers and thermometers, and for "silvering" looking-glasses. All the common metals, except iron and platinum, readily form alloys with mercury, such alloys being termed *amalgams*. If a gold ring is brought into contact with mercury, it instantly assumes a silvery colour, and after a time becomes so brittle that it is easily broken.

Mercurous Chloride, or Calomel, Hg_2Cl_2 , is a whitish powder insoluble in water, which may be prepared by heating a mixture of corrosive sublimate and mercury.

Mercuric Chloride, or Corrosive Sublimate, is a very poisonous crystalline salt, which is soluble in water, and forms one of the most effective disinfectants. It is also much used for preserving the skins of birds and small animals. It is prepared by heating a mixture of mercuric sulphate and common salt with a little manganese dioxide. It distils over as a vapour, and is sublimed.

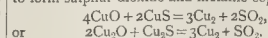
Mercuric Sulphide, HgS , is found native as cinnabar, but is also prepared artificially as a black precipitate by the action of sulphuretted hydrogen upon a solution of a mercuric salt. When this black sulphide is sublimed it changes to a red colour without altering its chemical composition, but is then known as *vermilion*. Vermilion is also sometimes prepared by a wet process, which consists in grinding sulphur and mercury together for several hours, and mixing the black sulphide thus formed with warm caustic potash solution. This latter process is said to produce a superior product.

Mercuric oxide, HgO , is a red, insoluble powder at ordinary atmospheric temperatures, but becomes black when subjected to a moderate heat. It regains its original colour upon cooling. When heated strongly, mercuric oxide is decomposed into oxygen and metallic mercury.

Symbol Cu. Copper. Atomic Weight 63.5.

Copper is found in the metallic state in many countries, being most abundant in Siberia and South America. The metal is, however, mostly obtained from its ores, the most important of which are the sulphides Cu_2S , CuS , and copper pyrites $CuFeS_2$. Among the less abundant ores are malachite, a carbonate of copper $CuCO_3 + CuH_2O$; red cuprous oxide, Cu_2O ; and black cupric oxide, CuO . In Britain, copper ores are found in largest quantity in Cornwall, but are mostly smelted at Swansea.

In order to extract copper from copper pyrites, the ore is first roasted for about twelve hours. The sulphur in the ore is thus expelled as sulphur dioxide gas, while the arsenic which is usually present as an impurity is driven off in white fumes of arsenious oxide, and the iron is converted into iron oxide. The ore is then transferred to a reverberatory furnace and smelted with silica or some silicious compound. By this treatment a large proportion of the iron is converted into a fusible slag of silicate of iron, which is removed, while the so-called "coarse metal," consisting of sulphide of copper with a small proportion of iron sulphide, remains behind. This coarse metal or "mat" while still liquid is run into cold water in order to granulate it. It is then again roasted, and again smelted with silicious matter to remove the iron. "Fine metal," consisting almost entirely of copper sulphide, is thus obtained. The copper sulphide is then partially oxidised by roasting it in a current of air, in order to obtain a mixture of copper oxide and sulphide. Air is now excluded from the furnace, and the oxide and sulphide then react upon one another to form sulphur dioxide and metallic copper.



The metal thus obtained is very impure, but is refined by roasting it for some time to drive off traces of arsenic and sulphur, and oxidise other impurities. The metal now contains a small quantity of suboxide of copper, and to remove this it is covered with finely-powdered carbon while in a molten condition to prevent oxidation, and well stirred with a pole of green wood. The gases escaping from the green wood reduce the copper suboxide to metallic copper.

Copper is very malleable, but is inferior in tenacity to wrought iron. The tensile strength of cast copper is about $8\frac{1}{2}$ tons per square inch,

while that of copper wire is about 16 tons on the square inch. Copper is an excellent conductor of heat and electricity. When exposed to the atmosphere, copper gradually becomes coated with oxide and carbonate of copper. The latter is of a green colour, and is often called *verdigris*, but true *verdigris* is a basic acetate of copper. All soluble copper salts are poisonous, and when food is boiled in a vessel coated with copper oxide or carbonate it is liable to produce fatal effects. So long as the copper vessels are kept scrupulously clean no harm can accrue from their use—unless, of course, they are brought into contact with vinegar or other acid. Copper is largely employed for the manufacture of brass, bronze, and gun-metal. Copper is scarcely affected by dilute hydrochloric acid, but is soluble in hot concentrated sulphuric acid, and dissolves readily in nitric acid.

Copper Sulphate, $CuSO_4 + 5H_2O$, also known as *blue vitriol*, is the most important salt of copper. It crystallises in large blue crystals. It is largely used in calico-printing, electrolysis, and for the manufacture of Scheele's green, Brunswick green, and other pigments.

Symbol Au. Gold. Atomic Weight 196.

Gold is always found in the metallic state, and is always found associated with silver. Although it is only found in small quantities, it is very widely distributed. It is found in small particles in the alluvial deposits or sand of certain rivers, and sometimes in the quartz veins of rocks. Occasionally "nuggets" of the impure metal are found.

Gold is collected from the sand in which it occurs by washing it in a "cradle." The sand and soil are washed away while the heavier grains of gold remain behind. From quartz, gold is extracted by crushing the rock and shaking it with mercury. The mercury forms an amalgam with the gold, which is left behind when the powdered rock is washed. When this amalgam is heated, the mercury distils off, is condensed, and again utilised, while the gold remains in the retort.

Gold is very ductile, and is the most malleable metal known. It can be beaten into sheets having a thickness of only $\frac{1}{100}$ of an inch. Gold is not attacked by any of the common acids singly, but dissolves when boiled in a mixture of hydrochloric and nitric acids termed "aqua regia." Aqua regia is made by mixing 2 parts concentrated HCl with 1 part concentrated HNO_3 . **Gold Chloride**, $AuCl_3$, is the most important gold compound. It is prepared by dissolving gold in aqua regia and evaporating the solution to dryness. It is much used for photographic purposes.

Purple of Cassius, which is used for painting on porcelain, and is also employed for imparting a beautiful red tint to glass while in a molten condition, is obtained when a solution of gold chloride is added to a mixture of stannous and stannic chloride solutions.

Symbol Pt. Platinum. Atomic Weight 194.5.

Platinum is a silver white metal which, like gold, is only found in the metallic state and in very small quantities. It is always found associated with other rare metals. Platinum is not dissolved by any common acid singly, but dissolves in aqua regia. It is very infusible, and may be repeatedly heated to redness without appreciably altering its weight or composition. Crucibles and other apparatus made of this metal are therefore much used in chemical laboratories. Platinum is also largely used for electrical purposes.

Lead, antimony, tin, zinc, and certain other metals readily form fusible alloys when heated with platinum. Heated platinum vessels should therefore never be brought into contact with such metals.

TRADE CATALOGUES.

MESSRS. RICHARD MORELAND & SON, of Old-street, send us a very useful illustrated catalogue of constructional work in steel, wrought-iron, and cast-iron. Girders, joists, stanchions, and columns are shown in various sections, and the dimensions and safe loads for varying spans and heights are given. Fireproof flooring and roof construction are also figured and described in the catalogue, which will undoubtedly be found very useful for reference.

Messrs. F. W. Reynolds & Co., of Acorn Works, Blackfriars-road, send us their new catalogue of wood-working machinery and builders' plant and appliances. It is well printed and illustrated, and the explanatory matter is clear and concise. The catalogue describes a great many hand and power machines which are models of compactness,

and machines, moreover, without which no builder's workshop of even moderate size can be said to be complete. As it is difficult to single out any for special mention, we advise builders to see the catalogue for themselves. They are sure to find in it something to suit them.

From Messrs. R. Waygood & Co., of Falmouth-road, S.E., we have received their new catalogue of hand-power lifts and hoisting machinery. The catalogue, which is well printed and illustrated, is very comprehensive and complete, and will enable the architect, the builder, or the building-owner to see at a glance the kind of lift suited to his requirements, whether a dinner-lift, a coal-lift, a carriage-lift, or a passenger-lift. The hospital and infirmity lifts shown on p. 10 of the catalogue appear to be very simple and efficient, and the invalid or passenger lift, shown on p. 11, worked by hand-power, is so arranged as to enable an invalid to be moved in his *chaise roulante* along corridors and from floor to floor without disturbing him. Warehouse and cellar lifts of all kinds, worked by gas, steam, or electricity, are illustrated in the catalogue.

Mr. George Wragge, of Chapel-street, Salford, Manchester, sends us his "Supplementary Catalogue of Metal Casements and Opening Gear," which together with his previously-issued catalogue, affords a very useful guide to the specialist for which he lays himself out. The sections shown in the new book are new, and special rolls have been obtained for their production. It is claimed by Mr. Wragge that the new sections will render such casements absolutely wind and water-tight. After experimenting for a long period, Mr. Wragge says he has decided to use iron in preference to steel. He has his sections rolled of the best Staffordshire iron, which, he says, rusts a great deal less quickly than mild steel. For hanging the casements, he has abandoned brass hinges for steel pivots, with satisfactory results.

Messrs. Melhuish, Sons, & Co., of 84, Fetter-lane, E.C., send us a large and comprehensive illustrated catalogue of tools and machines for wood-workers. In it, carpenters, joiners, cabinet-makers, and carvers will find enumerated a variety of tools suited to their use. The catalogue also includes tools for bricklayers, plasterers, mouldeers, and painters. The catalogue is worth perusal by the amateur as well as by the skilled craftsman.

The Critical Manufacturing Company, Ltd., Baintree, send us their No. 2 catalogue of metal casements, sashes, and doors. It is illustrated with sections and details showing how metal casements can be provided for in cutting the stone mullions, transoms, &c. The catalogue will be found very useful.

The Edison and Swan United Electric Light Company, Ltd., send us their illustrated catalogue and price list of installation fittings, including lamp-holders, adapters, plug terminals, switches, switchboards, cut-outs, fuse-boards, ceiling roses, and many other details. A great deal of information about such things may be gleaned from the catalogue.

GENERAL BUILDING NEWS.

TECHNICAL SCHOOLS, HALIFAX.—The foundation-stone of the new Technical School at Halifax was laid on the 24th ult. by Mr. William Hunter, Master of the Clothworkers' Company of London. The site of the new building, which covers an acre of ground, is situated on the west side of the People's-park, and has frontages to Hopwood-lane and a new street called Francis-street. The main building will be three stories in height, and in outline will be L-shaped; the interior of the square being filled in by a one-story building, 135 ft. by 120 ft., which will be shed-lighted, and divided into various compartments to be used as workshops. The main entrance, which will be surmounted by a gable, will be placed in the centre of the Hopwood-lane façade, and will lead on to a main corridor, running the full length of the building. There are to be two other entrances from Francis-street leading into this corridor, and a fourth entrance, from Hopwood-lane, giving access to the lower floor. The basement floor will contain five class-rooms, lavatories, &c., and a caretaker's house; and the ground floor class-rooms, each 15 ft. square, chemical, lecture, and preparation rooms, staircases, and offices; while the first floor will be devoted to the Art School rooms, facing into Hopwood-lane, mechanical engineering class-rooms, a large lecture theatre, 66 ft. by 45 ft., retiring rooms, &c. The architects are Messrs. Jackson & Fox, Halifax; the clerk of the works is Mr. Henry Wilson; and the various contractors are—mason work, A. Foster; joinery, J. Fleming; slating, &c., Rushworth & Firth; plumbing, John Naylor & Sons; ironwork, John Berry. The various contracts amounting to about 15,000l.

ENLARGEMENT OF HOTEL, CULLERCOATS, NORTHUMBERLAND.—The Huddleston Hotel, Cullercoats, henceforth to be known as the Cullercoats Bay Hotel, has just been enlarged and altered. The new portion comprises the main entrance and three shops in the basement, with sitting and bedrooms on the first and second floors. The hotel proper occupies the whole of the premises except the basement, which is fitted up with bars, smoke-rooms, &c. Entering by the new doorway, and passing through a vestibule, laid with mosaic tiles, an oak staircase leads to the hotel. The accommodation consists of a large smoking and reading room overlooking the bay, buffet, and numerous conversation rooms, all facing seawards. A second-class bar, with a separate entrance in Huddleston-street, also has a large sitting-room attached. The general plan of the hotel is in the shape of the letter E, the three branches going from front to back of the premises. On the first floor is a large coffee-room and six private sitting-rooms with bay windows. The two end wings contain sitting and bedrooms, and the centre wing comprises the administrative department, with a banqueting hall capable of seating 120 persons, at the rear, reached by a separate staircase. On the second floor there are more bedrooms, and isolated from them, in the centre of the block, is the culinary department, with a complete service of lifts. There is also a billiard room. On each floor there are lavatories and bathrooms. Behind the shops there is a room capable of seating 200 people, which it is proposed to utilise as a temperance refreshment department. The whole of the work has been designed by Messrs. Oliver & Leeson, architects, Newcastle. The contractor for the buildings was Mr. Joseph Elliot, J.P., of North Shields. The stoves and fireplaces were supplied by Messrs. Emley & Sons, Ltd., and Mr. H. Walker, of Newcastle, and the papering and decorations have been carried out by Mr. W. Taylor. The sanitary arrangements have been carried out under the supervision of Mr. J. McQueen, Sanitary Inspector to the Corporation of Tynemouth. Electric bells and speaking tubes are fitted throughout the building.

NEW STATIONERS' SCHOOL AT STROUD GREEN.—According to the *City Press*, plans for the new buildings have been accepted by the governing body of the school, but they await the decision of the Charity Commissioners. It is proposed to provide in the building accommodation for 150 scholars. Mr. G. Gordon Stanham, of Queen's Victoria-street, is the architect. His design is for a Gothic building of red brick, with stone dressings, and it comprehends an assembly hall, 65 ft. long by 30 wide; ten or twelve class-rooms, a dining-hall, and a covered playground, with other necessary offices, the whole covering an area of about two acres.

POTTERY BUILDINGS, WOODVILLE.—Further extensions (being Contract No. 2) are to be made in connexion with Messrs. Outram & Co.'s new works, at a cost of about 3,000l., consisting of a large block of buildings, two stories high, divided into workshops, greenhouses, kilns, and warehouses, from the plans and under the direction of Mr. R. E. Carpenter, architect, Burton-on-Trent. The tenders of Mr. John Varlow, of Burton-on-Trent, has been accepted for the works.

NEW FREE CHURCH, MORNINGSID, EDINBURGH.—The foundation stone of the new Free Church, at Morningside, Edinburgh, was laid on the 27th ult., by Dr. Walter Smith. The frontage of the new building is towards Morningside-road. In plan, says the *Scotsman*, the church is of rectangular outline, without transeptal or other projections. Entering a lobby, staircases at each side give access to two cloak-rooms and two class-rooms, and also conduct to the galleries. At the opposite end is the pulpit platform, recessed, and connected with it accommodation for the organ. The church will accommodate about 650 in the area. Two narrow galleries of one seat in depth, projected on cantilevers along the side walls, supply accommodation for about 200 more. There are no pillars or other obstructions supporting these side galleries. The lighting will be by large windows in the upper part of the building, assisted by a range of lunette lights in the cove of the ceiling. There are no windows under the galleries. To the church a range of hall and office buildings is attached at the back of the site. The main hall will accommodate about 250, and, in addition, there are children's class-room to accommodate 60, and a further class-room for advanced pupils. There are also vestry, session-room, heating chamber, and caretaker's dwelling. The main façade towards the roadway represents a rusticated ground floor story, in the centre of which are three doorways. The upper story is relieved with slightly projecting pilasters carrying an entablature with a pedimented centre. On the north side is a winged projection, subordinate to the main structure, whilst on the south side a projecting wing, of larger proportions, is carried up as a tower of plain masonry to a height of about 120 ft., above which the design is relieved with a belfry stage, surmounted by a pyramidal roof. The upper part of the tower is not proposed to be proceeded with under the first contract. The other elevations are treated more simply. In the interior the ceiling rises in elliptical form from the main, entablature, carried round the building at the level of the wall head, the

surface of the ceiling being relieved with slightly recessed panelling. The architect is Mr. Hippolyte J. Blanc, A.R.S.A., and the cost will be between 8,000l. and 9,000l.

SCHOOL BUILDINGS, BELFAST.—On the 27th ult. the memorial and keystones were laid of the National Schools now in course of erection in Hurst-street, Sandy-row, Belfast. The building now in course of erection will provide accommodation for 400 pupils, and will cost about 1,800l. It is a two-story building, the large room on the ground floor being 40 ft. by 30 ft., and in a room adjoining there is an infants' gallery. There are two porches, with cloakrooms—one for boys and the other for girls—and there are separate staircases leading to the upper room, which is of the same dimensions as the lower one, the only difference being that the infants' gallery is separated from it by screens, instead of being in a separate room. The height of the ceiling in the rooms on the ground floor is 12 ft., and in the upper rooms 20 ft. Robin tube ventilators are used on each floor. The buildings are constructed of Belfast perforated brick, and are being erected by Mr. Isaac Hewitt, Mr. J. L. Phillips, of Belfast, is the architect. It is proposed to build exactly similar schools in Tierney-street, Blackstaff road. The total cost of the erection of the two schools will be about 4,000l.

WESLEYAN CHAPEL AT NEWHAVEN, SUSSEX.—On the 24th ult. the foundation stones were laid at Newhaven of a new Wesleyan Chapel. Provision is being made for the accommodation of 300 people, at an estimated cost of 600l., and the style adopted will permit of the erection of an end and side galleries if subsequently required. The elevation will contain a circular traceried window over the central entrance, and will be surmounted with stone gables, while the other windows will be glazed with cathedral tinted glass. Internally, pitch-pine will be principally used, and in the rear will be two vestries, kitchen, and a heating chamber, the heat to be distributed by hot air pipes. Mr. Morling, of Seaford, is the builder, and Mr. Charles Bell, of London, the architect.

PROPOSED CORPORATION LODGING-HOUSE FOR LEITH.—The Improvement Scheme Committee of the Leith Town Council have approved of plans for a common lodging-house to be erected on the Corporation in Parliament-street. The plans show a building four stories in height, with a basement floor. The building will be 90 ft. in length, and 43 ft. in breadth, with a pack wing of one story. On the basement floor there will be a dining-room, kitchen, wash-house, &c. On the same level, at the back, there will be wash-houses for the lodgers. On the ground-floor there will be a reading and recreation room, board-room, caretaker's room and house. The upper floors will consist of dormitories containing in all 168 beds. The estimated cost, including furnishings, is about 4,000l. *S. Toman*

NEW CHAPEL, SWANSEA.—On the 25th ult. four memorial stones of the new English Calvinistic Methodist Chapel, Terrace-road, Swansea, were unveiled. The new building will be 25 ft. long, 40 ft. high, and 40 ft. broad, and will be capable of accommodating some 300 people. The work of building is entrusted to Messrs. Benfett Brothers, the architect being Mr. J. M. Thomas, Swansea, and the cost of the structure, which is of a Gothic style and built of polished stone with Bath stone facings, will be about 1,100l.

CHURCH OF NORTON, MALTON, YORKSHIRE.—Further progress is about to be made in the construction of the new church of St. Peter, Norton, Malton. The foundation-stone was laid by the late Archbishop Thomson, on October 16, 1889, the original plan being to complete the church in three efforts—first, the eastern portion, comprising chancel, south chapel, organ chamber, &c.; secondly, the nave and aisles; and, lastly, the massive western tower and porch. This scheme was estimated to cost 8,000l., and the first portion was completed some time ago, at a cost of 3,500l.; but the commencement of the second part of the work was delayed for want of funds. Now, however, the contract has been let, and the work will proceed forthwith. Mr. Burton, of Newcastle-on-Tyne, had the first contract. The tender of Mr. Anthony Lyons, builder, of Norton, has been accepted for the nave and aisles; and the erection of the tower, &c., will be left for awhile. Mr. Hodgson Fowler, of Durham, is the architect of the church, which, when completed, will afford accommodation for over 700 worshippers. The chancel and nave will be of Levensham stone, with string, dressing, &c., of Barnard Castle stone, and arches of Roche Abbey stone. The tower will be 85 ft. long, and will comprise six bays, with north and south aisles. Grundy's patent hot-air apparatus will be inserted. Mr. T. Whitwell, of Norton, will execute the joiner's work; Mr. G. M. Robson, painting and decorating; and Mr. Halliday, of Malton, the plumbing and gas fitting.

SANITARY AND ENGINEERING NEWS.

NEW PIER, DOVER.—On the 22nd ult. the new Promenade Pier at Dover, which has been in course of construction for the last eighteen months, was opened by Lady Dickson, the wife of Sir Richard Dickson, Chairman of the Company. The pier is approached from the Marine Parade, and runs out

as nearly as possible in the centre of the bay. It is 900 ft. in length and 30 ft. wide from the entrance gates to the commencement of the pierhead, some 50 ft. in length, and it opens out to a width of 100 ft. There are two embayments on each side of the narrower portion of the pier, in which are placed ornamental kiosks. There are seats at intervals the whole length of the pier, whilst at each corner of the head circular covered wind screens are erected, and wind screens are also placed at other points. The principal architectural feature of the pier will be the pavilion, which has not yet been carried out. The concert-room in the pavilion will be capable of seating 1,000 people, with a stage 38 ft. long by 30 ft. wide, green-room, &c. There will also be a dining-room, refreshment-room, lavatory accommodation, together with four octagonal rooms, to be placed at each corner of the pavilion. A landing stage is also in course of construction. The engineer was Mr. J. J. Webster, Mr. A. Thorne being the contractor. —NEW BRIDGE, NEWBURN, NORTHUMBERLAND.—A new steel bridge, spanning the Tyne at Newburn, has just been opened by the Newburn Bridge Company, Limited. The new bridge consists of spans of steel lattice girders, the river piers being of concrete, with Whitburn limestone string courses and capstones. They are founded upon a platform supported by pitch pine piles, at a depth of 15 ft. below high water level. In consequence of the contemplated widening and deepening of the river by the Tyne Improvement Commissioners, the new bridge had to be made more than 100 ft. wider than the abutment, and the present width of the river at Newburn, and a clear height of 21 ft. at high water had to be provided for. The engineers were Messrs. J. Watt Sandeman & Moncrieff, C.E., Newcastle, and the contractors were Messrs. Head, Wrightson, & Co., Limited, of Stockton. The engineers were represented on the works by Mr. J. Barker, and the contractors by Messrs. Irwin and Bignmore.

FOREIGN AND COLONIAL.

FRANCE.—The Conseil-Général of the Seine has commissioned M. Edmond Debon, painter, to decorate the Salle des Mariages of the Mairie of Maison Alfort, near Paris.—A competition will be shortly opened for the pictorial decoration of the Salle des Mariages of the Mairie of Bagnelet. The cost of the intended decoration is estimated at 43,000 francs.—The Minister of Public Works has authorised the Orleans Railway Company to arrange for the opening of a new branch from Bourg-la-Reine to Sceaux-Robinson, in the outskirts of Paris.—In order to inform themselves as to the existing artistic riches of France, the Ministry of Public Instruction have addressed a circular to all the directors of museums in the country, containing a detailed series of questions, and requiring a report from them to the administration in regard to the contents of their museums.—The town of Toul (Meurthe-et-Moselle) has opened a competition for the design and construction of a monument to the memory of the late Emperor.—The Société des Architectes d'Aisne has organised a committee, with M. Daumet as honorary president, for the erection at Ribemont, near St. Quentin, of a monument to the memory of François Blondel, architect of the Arc de Triomphe of Porte St. Denis, and the first director of the Royal Academy of Architecture in France.—The Jury of the International Competition opened at Bucharest of a railway terminus and administration buildings has decreed the first prize to MM. L. Blanc and Marcell. The last-named is a Paris architect. The second premium has also been awarded to a Paris architect, M. L. Fargue.—The railway company "de l'Est" is about to establish a direct and express service between Nancy and Lyons, which will have an important influence both commercially and strategically.—The Municipality of Lyons is to submit to the Government shortly a project which has been drawn up by M. Perrignon, engineer, and which consists in establishing over the Rhone a one-arch bridge of steel, composed of length and twelve in width, and between the Boulevard de la Croix Rousse and the Boulevard de Rosel. There is also some talk of a bridge over the Rhone at Avignon, in order to establish a railway line connecting the line from Lyons to Marseilles with that from Lyons to Nîmes.

MISCELLANEOUS.

TECHNICAL EDUCATION AND THE PAINTING TRADE.—The first of a course of lectures to painters and decorators was given on Tuesday evening last by Mr. Wm. Fourniss at the Westminster Technical Institute, Mr. Richards (of the firm of Messrs. Richards, & Co., Motcomb-street, and Manager of the Trade Classes at the Institute) in the chair. The lecture was much appreciated, and a hearty vote of thanks to the lecturer was given. These lectures are the outcome of the Conference held at the Painter-Stainers' Hall in the early part

of the year. The endeavour to raise the quality of workmanship of the operative painter, and to find better means for the proper education of London apprentices has been informed, caught the attention of the entire trade. We are very glad to hear it. There are five more lectures announced, and tickets may be obtained at the door.

THE RESTORATION OF KIRKSTALL ABBEY.—According to a local journal, the members of that section of the Corporate Property Committee of the Leeds County Council which has charge of Kirkstall Abbey, and of the excavations and other improvements in progress there, visited the place last week and had an interview with Mr. Micklethwaite, the architect under whose superintendence the alterations are proceeding. In the course of a tour of inspection over the Abbey and the grounds, Mr. Micklethwaite described what had been accomplished, and what he thought would be the best course to adopt in extending the excavations, and executing further restorative work. He indicated to the committee certain newly unearthed parts of the old fabric, which he suggested were too interesting to be further disturbed, and the committee being favourably inclined towards this idea, talked over the advisability of protecting the work alluded to by an iron fence. All the interesting relics dug up are being preserved, and the monument of their eventual being placed on view in some part of the Abbey. Satisfactory progress is being made with the laying out of the Abbey grounds.

THE CONDITION OF THE THAMES.—The recent drought has had its effect upon the River Thames, for it has been reported for some weeks that the river from Teddington Lock to Kew Bridge has been remarkably shallow at low water, and that the bed of the river has been exposed in many places. This has led to the accumulation of mud and putrid matter on the foreshore, notably at Chiswick, where the Local Board have recently resolved to send to the Conservators a copy of a memorial which has been received from the inhabitants of the district calling attention to this fact. In the memorial it is alleged that the accumulation of offensive material is so great at low water as to cause a noxious smell to emanate which is in all probability injurious to health, and if this be so it is the immediate duty of the Conservators to see to it without delay. Their attention might also be drawn to the probable causes of this nuisance. Now that no sewage is allowed to be discharged into the river until it has been treated, and as in view of the drought it cannot possibly be due to surface drainage, the cause would appear to be a local one. Of local causes, there are the discharge of domestic refuse from the houses situated on the banks of the river and the indiscriminate discharge also of sewage and slops from the house-boats in spite of the prohibitory regulations of the Conservancy.—*The Lancet*.

"SWIFT'S PATENT" WALL TILES.—This is a patent for shaping tiles intended for wall covering so as to afford a better key than that supplied by the usual ribbed surface. A core in the form of a cross is inserted at the back of the tile material before it is pressed in the box, the core having bevelled edges which produce an undercut bevel, or dovetail section, in the impression left on the back of the tile. In the kiln the core burns away, leaving the cross-shaped sinking with overhanging edges on the back of the tile, into which the cement is pressed when fixing the tile. It will be readily seen that such a tile must have a much firmer hold than one with merely a ribbed back. The patentee is Mr. Geo. Swift, of Liverpool.

THE SOCIETY OF ENGINEERS.—On Wednesday last a visit was paid by the Society of Engineers to the Water Works, Gas Works, and new "Front" and Harbour improvement works at Ramsgate. The party were conveyed to Ramsgate in a special train, and were received by the Mayor and members and officials of the Corporation, and were entertained at luncheon at the Water Tower. Ramsgate Water Tower was erected in 1878 and 1879 to afford a constant supply of water to the town. Up to that date the supply was intermittent, the inhabitants in the upper part of the town not being able to obtain water until the cisterns in the lower levels had been filled. It is built entirely of brickwork, 50 ft. by 80 ft. on plan, and 60 ft. high, being surmounted by one of the largest elevated cast-iron tanks in the country, which is 10 ft. deep, and holds 250,000 gallons. The weight of the tank is thrown entirely on the cross walls. The whole of the brickwork is composed of common stocks, except the facing of the outside walls, which is of Mid-Kent wire cut red bricks. The pumping main is 15 in. diameter, and the distributing main 18 in. The water is raised from Whitehall, a distance of about two miles, and pumped into the bottom of the tank, the overflow being in direct communication with the low level reservoir holding 750,000 gallons. This arrangement obviates the necessity of making any alteration in the valves during pumping hours. The difference in level between the bottom of the well and the top of the tower is 220 ft. The Gas Works, next visited, were purchased by the town in 1878. Immediately after the transfer it was found necessary to entirely reconstruct the works. The present capacity is about 200,000 cubic feet per annum. The retort-house consists of fourteen beds of six retorts each, and five beds of eight retorts each. Gaseous firing is used throughout, and West's manual

machinery is used for charging and drawing. The gasholders, of which there are two, have a capacity of 650,000 cubic feet. This in the course of another year will be supplemented by another holder containing about one million cubic feet. With regard to the "front" and harbour improvement works, for the last fifty years the necessity for better communication between the cliffs and the sands had been felt, and various schemes to attain that object had been brought forward at different times, but none, strange to say, until the present one (which was also the first to get the consent of the burgesses), proposed to interfere with the Inner Basin. The water along the north or military wall of the Inner Basin was so shallow as to be of little use for berthing vessels, &c. The work now being carried out was commenced in January, 1892, and consists of a new basin wall cut off the shallow part, a rising road from York-street to the West Cliff, on the site of the old Military-road, a rising road to the East Cliff, and the pulling down of the Custom House and Harbour Master's house (which will be rebuilt in another position), and the warehouses in the Pier Yard, so as to widen the approach to the L. C. & D. Ry. and sands from the present 15 ft. to 30 ft. The sea-wall is built of concrete and faced with Portland stone, and coped with granite 18 in. deep. The wall is 30 ft. high, 5 ft. 6 in. thick at the bottom, and 4 ft. at the top, with 4 ft. counterforts at intervals of 30 ft. The rising road to the West Cliff is carried on semi-circular arches 30 ft. centres. A party walls are of concrete, the lower ones being 2 ft. 6 in. thick at the springing, and the more lofty ones 3 ft. The arches are built of picked stones, the thickness being 18 in. The front arches are built in red Pluckley bricks with a moulded cornice and terra-cotta balustrade. The road will have an inclination of 1 in 25. The carriage-way will be macadamised, and 30 ft. wide. The footway will be of asphalt, 15 ft. wide. The approach to the East Cliff, to make room for which the Albion Hotel is to be removed, will follow the natural conformation of the ground, and will have an incline of 1 in 14. The approach to the sands will be paved with wood in place of the present cobble. The Customs House will be rebuilt on the opposite side of the road, and the Harbour Master's House will be rebuilt on the West Cliff. The works are being carried out by Messrs. W. & T. Denne, contractors, from the designs and under the superintendence of Mr. W. A. McIntosh Valon, J.P., Borough Engineer, and President of the Society.

THE ENGLISH IRON TRADE.—Matters continue quiet in the English iron market. Pig iron generally is steady, with but little life in the demand. Finished iron remains in a depressed condition. The tinplate branch maintains its recent movement. The steel trade, on the whole, shows further signs of amelioration. Shipbuilders and engineers are quiet. The coal trade is not very brisk.—*Iron*.

"CREMATION ABROAD."—Mr. T. G. Dee writes to say that in our report (pp. 390-391 ante) of his paper on this subject (read before the Sanitary Inspectors' Association), we made him state that the cremated remains placed in the urn at the cemetery of Père la Chaise are sealed with wax. As a matter of fact, he says, he did not mention the material; but it is sheet lead that is used for the impression.

MEETINGS.

SATURDAY, JUNE 3.

Architectural Association.—Visit to the old church and chapel, the Old Manor House, &c., at Chertsey, Bucks. Incorporated Association of Municipal and County Engineers.—Yorkshire District Meeting, to be held at Harrogate.

Edinburgh Architectural Association.—Annual Excursion, to Cupar and district.

St. Paul's Ecclesiastical Society.—Visit to the Temple Church, under the guidance of Mr. G. H. Birch, F.S.A. 3.30 p.m.

MONDAY, JUNE 5.

Royal Institute of British Architects.—(1) Special General Meeting to consider a Proposal by the Council to modify By-law 25 (a) General Business Meeting for the Election of Officers, &c. 8 p.m.

Society of Engineers.—Mr. Robert Carey on "Economic Hydraulic Lifts." 7.30 p.m.

TUESDAY, JUNE 6.

Society of Biblical Archaeology.—8 p.m.

WEDNESDAY, JUNE 7.

Carpenters' Company, Carpenters' Hall (Lectures on Carpentry and Joinery).—Professor Benjamin Fletcher on "Timber; English, Foreign and Colonial: its decay, preservation, and use." 8 p.m.

British Archaeological Association.—(1) Mr. Edgar Barclay on "Stonehenge." (2) Mr. J. H. Macmahon on "The Evil Eye and the Solar Myth." (3) Dr. A. C. Fryer on "The Mounds of the Kings, Upsala." 8 p.m.

THURSDAY, JUNE 8.

Society of Antiquaries.—8.30 p.m.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

10,705.—WATER-CLOSING: *J. G. Underhay*.—This invention relates to what are known as "water-closers," in which the time of closing the valve supplying water to the pan is regulated by the descent of a weighted piston or bellows, which forces air out of the cylinder. Contrary to the usual method, the handle only acts on the valve whilst being pulled upon, so that the closing of the valve commences directly the motion of the handle ceases. In

PROVISIONAL SPECIFICATIONS ACCEPTED.

5,269, W. Pates, Water-cloth Traps.—5,359, H. Ward.
Pedestal Water-cloth with Seat attached.—5,687, J. Fallas.
Grooved Picture-frame Moulding.—7,030, J. Glendinning.
7,031, J. Glendinning.
Walls, &c.—7,894, C. Haigh, Material for Use in the Construction of Pavements, Floors, Walls, Stair-treads, &c.—7,975, A. Fitterer, Seats for Water-closets.—8,247, D. W. Smith.
8,248, A. Fitterer, G. Gibson and A. C. S. Blydenburgh, Flush-ing Cisterns for Water-closets, &c.—8,643, W. Sykes, Iron Cisterns for Sewers or Drains.—8,751, T. Brown, Windows and Doors.—8,802, L. E. Leitch, Windows and Doors.—Sandiford.—8,842, J. Hacking, Chimney Chooes and Ventilators.—8,843, J. Douglas, Heating and Ventiling Buildings.—8,844, J. Douglas.
Ovens—8,855, R. Kilns for Firing of Bricks, Tiles, &c.—8,959, J. Easthope and G. Neddmer, Weather Excluders for Doors and Windows.—9,003, K. Allen, Clamping Apparatus for Closing Doors.

NEW SOUTHGATE.—For the erection of a terrace of six houses and one shop in Crownwell-road, New Southgate, N., for Mr. A. Hales. Plans and specification prepared by Mr. W. D. Bullis, surveyor, 22, Finsbury-pavement, E.C. 2.

Smith £1,375	J. Hill £1,750
Seabrook 2,155	Simpson 1,680

NORTHAMPTON.—For the erection of shoe factory, Oliver-street, Kingsley Park for Messrs. Singlehurst & Galloway, Mr. C. T. W. Wingo. Plans and specification prepared by Mr. W. D. Bullis, surveyor, 22, Finsbury-pavement, E.C. 2.

J. T. Wingo £2,658	W. Walls £2,573
Green Bros. 2,645	H. Martin 2,515
A. P. Hawen 2,615	R. Hickman 2,514
Woodford & Son 2,657	W. Head 2,475
D. Sharman 2,595	[All of Northampton.]

POOLE.—For the construction of a quay-wall and dredging in connexion therewith, for the Harbour Trustees. Messrs. Kningle & Jaffey, engineers, 3, Victoria-street, Westminster, London, S.W.

Frank Beris £14,486	0	J. J. Cochrane & Sons,
H. J. Sanders 13,100	0	W. Victoria-street,
J. H. Lawton & Co. 10,765	4	S.W. £10,000
John Hand 10,670	13	0

* Accepted.

POOLE.—For the erection of offices for Mr. J. J. Norton. Messrs. Lawson & Donkin, architects, Yelverton-chambers, Burnmouth, Quantin by architects.

F. Moore & Sons £2,241	E. Bath & Co. £2,057
G. B. Jones 2,111	George & Harding 2,024
Judd & Foot 2,100	Crane 1,968
T. W. Lucas 2,100	Ryder 1,920
Entwistle & Cox 2,097	J. Eaton, Poole* 1,748

* Accepted.

READING.—For alterations and additions to the Borough Police Station, for the Corporation. Mr. Arthur E. Collins, Borough Engineer, Town Hall, Reading.

F. Newberry £776	0	G. H. Tucker £591	0
T. Pignatelli 772	0	W. Hawkins 527	18
R. Webster 772	0	G. Seal* 527	12
A. Simonds 569	0	G. Simonds 519	0

[All of Reading.]

* Recommended for acceptance.

RUSHDEN (Northants).—For metalting, channelling, and paving various streets on the Rock estate, for the Local Board. Mr. W. Pare, Surveyor, High-street, Rushden.

Robt. Marriott £2,036	0	W. T. Hall £1,850
C. Trueman 1,837	4	F. Barlow, Rothwell,
W. Wilmett 1,866	0	Kettering (accepted) 1,900

SOUTHWINDON-SEA.—For the erection of a detached residence on the West Cliff Parade, Southwindon-Sea, in accordance with plans and specification prepared by Mr. W. D. Bullis, surveyor, 22, Finsbury-pavement, E.C. 2.

Lawrence & Son £1,123	Dyke & Son £999
F. Dupont 1,089	F. England 875

STACKSTEAD (Lancs).—Accepted for the extension of club premises, New Church-road, for the Trustees and Committee of Stacksteads Workmen's Club. Mr. Jas. Wilson, Borough Surveyor.

Jas. Hargreaves, Bacup £600	0
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STOCK-ON-TRENT.—For the erection of the Heron Cross School, built in for the Stock-on-Trent School Board. Messrs. R. Schwenker & Sons, architects, Hanley, Staffs.

Minks £6,824	0	Yoxall £5,855	0
Fells 6,470	0	T. Kington 5,797	0
Cook 6,384	0	Betteley 5,797	0
Colewell 6,147	0	Inskip, Longton* 5,740	0
Embery 5,696	0	Goodwin 5,590	0

* Accepted.

WEST HAM.—For elevating the inside and painting the outside of the Hospital and Dispensary at West Ham, for the Committee of Management.

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Newman 357	10	Powder Bros. 175	0
Reed 360	17	Buckridge Bros. 150	0
Hands 195	10	Co-operative Painters* 125	0
Holland 189	0		

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TO CORRESPONDENTS.

R.M.D.L.—R. W. (the matter is a medical one, and out of our province).—H. F. H. (received).—W. G. S. (amounts should be sent).—R. and H. (ditto).—F. E. (ditto).—S. W. (ditto).—W. J. J. (ditto).—C. E. B. (we cannot find space for tenders for horse-hire).—H. F. (too late).—A. E. G. (ditto).—R. W. (ditto).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses. NOTE.—The responsibility of signed articles, and papers read at public meetings, rests of course with the authors. We cannot undertake to return rejected communications. Letters or communications beyond mere news-items which have been duplicated for other journals, are NOT DESIRED. All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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ILLUSTRATIONS.

Interior of the New French Protestant Church, Soho-square.—Mr. Aston Webb, F.R.I.B.A., Architect	Double-Page Photo-Litho.
St. Olave's Grammar School, Southwark.—Mr. E. W. Mountford, F.R.I.B.A., Architect	Double-Page Ink-Photo.
House, "The Belfry," Uckfield.—Messrs. Lainson & Son, Architects	Single-Page Photo-Litho.
Mortuary Chapel, Hebrew Cemetery, Brighton.—Messrs. Lainson & Son, Architects	Single-Page Photo-Litho.
"Circus"—By Mr. Alfred Drury	Single-Page Ink-Photo.
Sculpture at the Royal Academy: "Applause."—By Mr. E. Onslow Ford, A.R.A.	Single-Page Ink-Photo.

Blocks in Text.

Plan of House at Uckfield	PAGE 448	Diagram Illustrating Article on Chemistry ("Students Column"),	PAGE 458
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The Monuments of the Borgias.



HE names of Cæsar and Lucrezia Borgia are associated in modern ears chiefly with the idea of abnormal wickedness, though we believe historians have been whitewashing Lucrezia a good deal lately, and it must be remembered that Cæsar Borgia, to whom we fear the same process cannot be applied, was not by any means regarded by his contemporaries as a monster of wickedness; on the contrary, he was obviously looked upon by them as a man of remarkable gifts and sagacity, who only employed against his enemies, somewhat more thoroughly and unscrupulously than others, the methods of injuring or overcoming them which were the common custom of an age when measures of violence or of cunning were only judged by the standard of success in attaining their end.* With the moral character of the Borgias, however, we have nothing to do here; there is no question, at all events, that Cæsar Borgia was a most accomplished man with a most refined taste in Art, and a liberal patron and employer of the artists of his day; and the study of the works executed for him has afforded that accomplished French historian and critic of art, M. Charles Yriarte, material for a volume of great interest.†

The book is divided into the consideration of the Borgia apartments at the Vatican, of the portraits of the Borgias, and of the sword of Cæsar Borgia. Of the portraits we need not say much, as the interest attaching to them is rather historical than artistic, the chief question gone into by M. Yriarte being as

to which of them are to be accepted as probably genuine likenesses. We may observe that in regard to the Borghese portrait popularly believed to be that of Cæsar Borgia by Raphael, M. Yriarte confirms the judgment of some previous critics that there is absolutely no evidence for considering it as that of Borgia except a vague tradition, the origin of which cannot be traced, and he very much questions the attribution of the picture to Raphael. The summary given of all the existing portraits, with engravings of a good many of them, is very interesting, and the conclusion of the author is that three are worth serious attention as certainly contemporary, and more probably trustworthy than others. Of these he gives a chromo-lithograph of the one belonging to Comte Codronchi as probably the nearest to a genuine portrait. It is a profile, and as far as it can be compared with the Borghese portrait, which is a full-face, or nearly so, is a far less agreeable and attractive head, and perhaps even on that account more likely to be a faithful likeness, while the Borghese portrait may be an ideal or flattering portrait made for effect, and possibly only a picturesque creation, at a later date, founded on the type of face of some of the contemporary portraits. M. Yriarte goes through the Lucrezia portraits in the same manner. These also differ in type of face exceedingly, much more in fact than the Cæsar portraits, but M. Yriarte gives us good reason for selecting two of these, which confirm each other remarkably, as most worthy of credit. They do not conform to the popular idea as to the beauty of Lucrezia; the type of face is somewhat heavy, though dignified.

The first and to us the most important portion of the work is that on "Les Appartements Borgia." In the *Builder* of January 1, 1887, we published a long article on a portion of the decorations of these rooms, by Mr. Woodhouse, accompanied by some carefully drawn illustrations in line, by the author of the article, of the painted decorations, which are attributed to Pinturicchio. The value of Mr. Woodhouse's article is recognised by M. Yriarte, who makes special reference to it. He has set himself the task of con-

sidering and describing, with numerous illustrations, the whole series of these apartments. They form a series of six contiguous rooms looking on one end of the Cour du Belvedere of the Vatican. In reference to the origin of these rooms and their decoration, M. Yriarte writes:—

"In the fifteenth century, a Pope who was a lover of art, Nicholas V., had conceived the project of grouping together all the Papal quarters around the Sixtine and St. Peter's, and with this end had summoned to his aid Bernardo Rossellino and Leon Battista Alberti; his death interrupted the scheme; Innocent VIII. endeavoured to continue the work, which in his turn he left unfinished, and his successor, Alexander VI. (Borgia), in place of continuing the work of the artists of the early Renaissance, interrupted it, and appropriating the completed portion, resolved to connect it with the basilica by a splendid portion of variously-coloured marbles, from which the Pontiffs, looking over the leonine city, could give their benediction on feast-days. The "Tour Borgia" and the "Appartements Borgia" are only an episode of the scheme, which was realised, but of which but a fragment remains at the present day. Paul V. (Borghese) ruthlessly destroyed the portico to give a new façade to St. Peter's, and it is only by the examination of the original plans and designs of the architects, preserved in the Vatican library, that we can now realise the work of Alexander VI."

This latter Pope commissioned Pinturicchio to decorate the walls of the apartments, which have thus become a repertory of some of the best art of that day, little known and seldom visited until recently. Julius II. ordered the apartments to be closed, in his hatred against the memory of the Borgias; others made them merely a place of storage; the present Pope has opened them more or less to inspection. Vasari had never seen them, as he gives entirely inaccurate descriptions of some of the principal paintings. M. Yriarte devotes some space to the consideration whether these rooms were really the daily residence of Alexander VI., and concludes in the affirmative, from the fact that they possess large and serviceable fireplaces, and from the unquestioned relation of the death of Alexander VI. from the fall of a chimney which came through the roof of one of the rooms, the "Salle des Pontifes."

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* Machiavelli, for instance, says that he could not recommend to a young prince a better model than Cæsar Borgia.

† Autour des Borgias; les Monuments; les Portraits; Alexandre VI.; Cæsar; Lucrece; l'Épée de Cæsar; L'Œuvre d'Hercule de Fideli; les Appartements Borgia au Vatican. Etudes d'Histoire et d'Art. Par Charles Yriarte. Rothschild, Paris.

The character of the principal decorations of these rooms is that of pictures painted on the various spaces, with entire freedom of pictorial composition and without any attempts at filling the spaces in a decorative manner, but dominated and brought into unity by the strongly marked decorative emphasis given to the mouldings and vaulting-ribs which separate and define the compartments. This is especially noticeable in the illustration giving of the ceiling in the "Salle des Saintes," where the four principal pictures are entirely independent and entirely different in their general lines and arrangement, except that they all appear to have the same conventional diaper background; but the emphatic treatment of the rib-lines reduces the whole work to one design, and enables the eye to overlook the variety of line and composition in the paintings. This is the case also, though not in quite so decisive a manner, in the much larger and more elaborate ceiling design of the Salle des Pontifes, where the panel spaces and their contents are entirely subordinate to the main architectural lines of the ceiling. Thus Pinturicchio, who, as M. Yriarte remarks, appears to have been left a perfectly free hand in these works and to have done just as he pleased, was enabled to indulge his fancy in the details of the paintings, while preserving at the same time, in the whole design, a complete harmony with the architectural lines of the rooms.

The third portion of M. Yriarte's book is devoted to the subject of the sword of Caesar Borgia, now in the possession of the Duc de Sermoneta at Rome, and to the consideration of this remarkable example of art applied to arms he devotes more than fifty pages. He regards it even, in the character and style of its decorations, as an important document from which we may gather something of the character of the prince for whom it was made. Unfortunately the sword is separated from its almost equally remarkable sheath, which latter is in the South Kensington Museum. The sword is truly a gem of art; the lines simple and fine, the hilt richly decorated but yet perfectly practicable and serviceable in form; the blade is one mass of engraved pictorial subjects and decorations. The blade being a straight one, for thrusting and fencing but not for cutting, the decoration did not of necessity interfere with its practical use. The blade is bevelled at the edges, and the surface marked by two parallel hollows or flutings, leaving a ridge down the middle. The author devotes some space also to the artist who made the sword, Hercule de Fidele, and to illustrations of one or two other of his known works in the same kind. In these, as in the Borgia sword, the blade decoration contains whole pictures and scenes, mostly of an allegorical nature. According to M. Yriarte, thirty to thirty-five arms are known to exist which may be attributed to this artist, which are full of the spirit of antique art, and worthy to be considered as among the greatest decorative work of the Renaissance.

We must content ourselves with giving a mere outline of the contents of this learned treatise on a subject of great interest, which, like all the works of its author, is worth a place in the libraries of all who are interested in art and art-history.

ARCHITECTURAL ASSOCIATION LYRIC CLUB.—The eighth and last concert of the fifth season of this Club was held at the Freemasons' Tavern, on Monday, May 29. The President, Mr. E. A. Rintz, was in the chair, and an excellent programme, which included several of the "A. A. Soirée" songs, was successfully carried out. The occasion was taken to present Mr. C. D. Imhof with a cheque beyond his fees as an acknowledgment of the Club's indebtedness for his services as accompanist during the last four years. A silver-mounted briar pipe was also presented to him by the Committee. Votes of thanks, with musical honours, were accorded to the retiring President and Hon. Sec., Mr. E. A. Rintz and Mr. J. Douglas Scott. The Club is, we are informed, in a most prosperous condition, numbering over 130 members, and having a substantial balance at its bankers.

THE COMPETITION FOR THE NEW STAFFORDSHIRE COUNTY ASYLUM AT CHEDDLETON.

THE Staffordshire County Council has again attracted the attention of the architectural professional by organising another open competition on a larger scale even than that held last year which decided who was to design the Council Offices in Stafford. The erection of a lunatic asylum for the county of Stafford, which has been decided upon by the County Council, involves the expenditure of a sum not less than 100,000*l.*, and more likely to amount to 150,000*l.*, and it is not to be wondered at that no less than thirty-one complete sets of designs were submitted to the scrutiny of the assessor. The Council had secured the services of Mr. C. H. Howell as assessor, and he has again placed the plans of Messrs. Giles & Gough and Hine in the first two places, thus further illustrating the remarks made in a "Note" on another page of this issue, as to the results of the repeated employment of the same assessor leading to the repeated selection of the same architects, whose method and treatment accord with the ideas of the assessor. In this case it is Messrs. Giles & Gough who come first and Mr. Hine second, but as long as Mr. Howell is engaged as assessor in asylum competitions it appears to be merely a duet between these two firms, and other competitors may as well in future save themselves the trouble and expense of competing. We do not for the moment say that the decision has not been made with perfect fairness, but Mr. Howell obviously has an *ide fixe* about asylums, and these two architects coincide with it. The premiums are 200*l.*, 150*l.*, and 100*l.*; the latter, the third premium, has been awarded to Messrs. Izard & Cottam. There were 31 competitors, the majority of them provincial architects.

The designs have been exhibited in the Shire Hall, Stafford, on Monday, Tuesday, and Wednesday of this week. The site for the new building is at Cheddleton, and is some distance from Stafford; it is 174 acres in extent, and bounded to a great extent by the River Churnet, it also has the line of the North Staffordshire Railway within its boundary, and within a short distance are the Caldon and Leek branches of the Trent and Mersey Canal. Cheddleton Junction to the north-east of the site is the nearest accessible station. The site appears to vary from 515 ft. to 560 ft. above the sea level, and the Ladderedge Reservoirs, with a water level of about 720 ft., will supply the establishment with water. The spot indicated as the selected position for the proposed building plateau is rectangular in shape, with its long sides facing almost due north-east and south-west.

The instructions issued to competitors required provision to be made for the accommodation of 300 male and 300 female patients, with administrative offices in the first instance of sufficient size for 800 patients. The designs were also required to afford facilities for future additions. The architectural character of the building, to be simple and without superfluous ornament, and the grouping of the parts in plan, were left to the decision of the competing architects. The committee drew attention specially, as points upon which they would insist, to soundness and economy of construction, simplicity of design, economy in working, supervision and future extension, and a convenient arrangement of internal communications with regard to levels, and last, but not least, strict conformity to the printed instructions and suggestions for the construction of asylums issued by the Commissioners in Lunacy. The buildings required may be briefly referred to as main buildings and offices, with superintendent's house, large recreation and dining hall with stage, two lodges, laundry, farm buildings, workshops, infectious hospital, mortuary, and airing courts. A detached chapel, to seat 450 patients, approached by covered

ways from the asylum, was also required, together with small detached houses of suitable size for steward, clerk, storekeeper, engineer, and gardener, and 10 cottages for married attendants.

Messrs. Giles & Gough in their design have accepted the instructions as to the accommodation, and have planned administrative blocks for the full number of 800 patients with separate blocks for the 600 patients now to be provided for, leaving the additional 100 male and 100 female to be provided for by the erection of a separate ward on either side at some future time without disturbing in any way the previously erected portion. Messrs. Giles & Gough have omitted the chronic ward blocks, but they point out in their report that ample accommodation can be made for these patients in the other departments until the further extensions are made. A modification of the *echelon* system on the block principle has been adopted, with the main front facing south-west. This is claimed to be most suitable for a sloping site, and to save unnecessary excavation. The official block, with principal entrance, has been placed in the centre of the south-west frontage. Two main corridors run east and west; the one which is behind the official block is made to branch off in a northerly direction on each side until it joins the other, and from this corridor the ward blocks project *en échelon* so as to give good aspects to the day-rooms of each. The Administrative block is rightly placed in the very centre of the site, and on each side are two administration corridors at right-angles to those already referred to. On the left side is the female block, and on the right the male. The position occupied by the laundry and establishment workshops to the north of the female and male blocks respectively is a good one, and gives opportunity for placing the wards for working patients conveniently near to these establishments. The female working patients' wards are contiguous to the matron's rooms, so that sewing can be done for the establishment under proper control. The chapel is placed immediately behind the administration block, but on the opposite side of the road which bounds the building. This position is good, and is equally accessible from both male and female sides of the building without crossing; covered ways to the chapel give shelter if required. The Medical Superintendent's house has been placed at the east of the asylum, and occupies a good position at the parting of two roads, one of which leads to the front and the other to the back of the building. Opposite it, but at some little distance, is the infectious ward, well away from other buildings. The best position has been evidently selected for the official block and entrances at which all patients and visitors will arrive. It is equally accessible and near to all the wards on either side or to the administration block which is immediately behind it. This block has on the ground floor the committee and officers' rooms; on the first and second floors above are the assistant medical officers', housekeeper's, and servants' rooms. On the cross corridor at the back on either side are male and female visitor's rooms, the dispensary, chaplain's room, and library. The main feature of the administration block in its central position is necessarily the kitchen and its surrounding facilities for edible stores and the service of meals. The dining and recreation hall has its long axis east and west, and a service lobby in the centre of its north side divides it from the kitchen. This service department has areas on either side of it, and additional lobbies at the sides of the kitchen are provided for the service of meals to the male or female wards. The arrangement of top-lighted rooms around an internal area is a convenient one. The whole of the stores will be delivered from the north ward, and a separate delivery yard and store-house, also the engine and dynamo-rooms, all occupy a good central position, and the separation of the entrances for stores and patients is complete and convenient.

A convenient mortuary has been placed between the north road and the chapel, and ranged on the same side of this road are eight dwellings for offices. The laundry arrangements are complete, and provide for the entirely separate treatment of the male and female washing in its reception and distribution. Ample drying-grounds are also provided. The large internal courtyard, which occupies the centre of each side, gives good light to the main corridors, from which the ward blocks lead off.

The disposition of the patients' ward is as follows:—On each side of the official block are the blocks for the sick and infirm in two stories. At the angle formed by the corridors the reception wards are placed to accommodate twenty-eight patients who will be kept under special observation until they are drafted off into suitable wards. Then, in the centre of the west and east corridors, come the acute wards to accommodate seventy-six patients each, twenty-four on the ground floor and fifty-two on the first floor; the additional space on the upper floors being obtained by carrying the ward over the reception wards. At the rear of the acute blocks at the end of the corridors are the epileptic blocks. The future extension of the asylum will take the shape of wards for quiet and chronic patients, for 100 patients of each sex, and will occupy a position to the north of the epileptic blocks. The position of the ward-blocks, *en echelon*, give facility for arranging a good south-west aspect to all day-rooms on each side, and each ward has a large airing court in front of it, with separate exits thereto. Facilities for escape from fire have been provided in the shape of double fireproof staircases from the upper dormitories in every ward.

The arrangement of the rooms of the separate wards correspond, with slight exceptions. A branch corridor, lighted on one side, and with single rooms for patients, and rooms for boots, slop-sink, attendants, &c., leads into the day-rooms. Behind the day-rooms single rooms are ranged, and the lavatories and water-closets occupy a separate block, cut off from the wards by cross-ventilated lobbies. Cross-ventilation is provided for each ward.

It is only natural that a building of this description should have to depend for its appearance upon the proportion of its parts and the disposition of its masses, as its materials are necessarily of the plainest description compatible with soundness of construction. Messrs. Giles & Gough have done the best they could with the opportunities at their disposal, and their elevations contrast pleasantly with the mean aspect of some which compete. It must be acknowledged, however, that a simple and convenient plan is the most essential point for a building of this description, and this undoubtedly is the point upon which the successful competitors have shown their pre-eminence.

It is proposed to install the electric light for use on the building, and the system of ventilation will be simple in its arrangements. The question of cost is an interesting one, and this Messrs. Giles & Gough estimate at 121,957*l.* for 600 patients, which would entail a cost of about 200*l.* per patient. The complete building is estimated at 137,000*l.*, or about 170*l.* per bed.

Mr. Hine's designs, which secure the second premium, deserve much credit for the careful way in which the parts of the design have been thought out. There are, however, several departments which could have occupied a better and more convenient place.

The grouping of the wards on each side and the position of the administrative block, also the disposition of the main corridors is nearly the same as that adopted by Messrs. Giles & Gough, but the position allotted to the official block on the north side, and the chapel on the south leads to all manner of complications entirely undesirable. Had the official block been placed in the centre of the south front the improvement would have

been marked at once, as by this means the delivery of stores and the arrival of patients and visitors would have been kept entirely separate, and the official block and its inmates would have been in closer contact with the wards on either side. The locality of the stores department is too confined, and the delivery yard is separated from it by one of the main corridors of the administrative block, an arrangement which would be highly inconvenient. The engine and boiler and dynamo rooms in the position allowed to them would be too distant from the centre of the buildings where economy of working could best be obtained. The position of the recreation hall with the kitchen and conveniences varies but slightly from that adopted by Messrs. Giles & Gough. The main corridors from which the main wards lead are branched away in a northerly direction at an angle of about 45 degs., and this gives an agreeable aspect to the day-rooms of the wards. The medical superintendent's house is placed at the north-west angle of the site, it has a good south-west aspect and is evidently a conveniently planned dwelling. The disposition of the remaining portions of the buildings, such as the wards and the extension wards, differ only slightly in detail from those adopted by Messrs. Giles & Gough, and therefore need not be referred to at great length. Mr. Hine's estimate of cost is singularly near Messrs. Giles & Gough in amount, being 126,749*l.* for the 600 patients, and 142,493*l.* for a complete asylum of 800 patients.

Under motto "Efficiency," Messrs. J. G. Izard & A. B. Cottam submit their design, which has secured the third premium, and has many carefully thought-out points in its favour. There is a great similarity, in the leading lines of this design, to the two previously mentioned. In this design the entrance and the official block have been placed in the centre of the south front, and the delivery of stores has been kept to the opposite side of the building. The stores department on the north has its delivery yard and store-house conveniently planned, equally accessible from the north road and the administration department. The position of the laundry, the boiler and engine houses are conveniently arranged to the north of the female side, in connexion with the laundry provision is made for working female patients, but it is not particularly accessible to control from the matron's quarters. The main corridors, which principally follow the lines adopted by other competitors already referred to, are to the east and west branched at an angle of about 30 degs.

The extreme north-west and north-east angles are occupied respectively by the chapel and medical superintendent's entrance. This remote position for the chapel is inconvenient, and would necessitate the traversing of part of the corridors of the female portion by the male patients when bad weather necessitated the use of a covered approach. The wards are two stories in height, and are divided on each floor into a day-room, gallery, and two dormitories; these are so arranged that it is possible for attendants or medical officers to go through the whole ward without passing through a dormitory and so disturbing the patients. The provision of four dormitories permits of more complete classification and separation of the various cases which come under the head of sick and infirm or recent and acute. Messrs. Izard & Cottam estimate the cost of their design at about 113,500*l.* for 600 patients, and 128,000*l.* as the cost of a complete asylum for 800 patients.

Want of space prevents us referring in detail to the remaining designs. Several of the designs show that great attention has been paid to the design of the exterior of the buildings, but intricacy of plan has, in most instances, been against the attainment of greater success. The competition may be considered to have been, on the whole, a satisfactory one.

NOTES.



ON Tuesday the question of the treatment of the spire of St. Mary's, Oxford, came before Convocation. The consideration lay between restoring conjecturally one of the former aspects of the pinnacles (fourteenth century or sixteenth century), rebuilding the last arrangement of Buckler, which is the one familiar to the eyes of the present generation, or simply aiming at a design which would produce the best architectural effect at the present moment. It is needless to say that the latter is the course which every true architect would recommend, and that it is the one recommended by Mr. Jackson. The "history" is gone now, and attempts to reproduce it can only be conjectural and therefore of no historical value. Mr. Case, the Waynflete Professor, has produced a volume of formidable size on the history of the spire, which is valuable as containing a great deal of curious information, and shows how great is the interest felt in the spire at Oxford, but the conclusions of which we cannot adopt. Mr. Jackson's design is shown in our lithograph from his drawing, published in the *Builder* of May 6, along with a drawing of the pinnacles as Buckler left them in 1848. There can be no doubt that Buckler's pinnacles are too high, and out of proportion to the spire, and that Mr. Jackson's design, which does away with Buckler's additional and needless story in the pinnacle, is far superior in effect. Mr. Jackson, however, had made a compromise design in which he retained a part of Buckler's upper stage, only cutting it shorter, and this, as he said at the Convocation meeting, he "incautiously" showed to Mr. Bodley, who preferred and recommended it, thus introducing another complication. The Vice-Chancellor summed up in favour of this last design, because (he said) it would satisfy architects and at the same time would not make a perceptible difference to the eyes of the laity. The meeting voted in favour of Mr. Jackson's own proposal by a large majority, but unfortunately, on his design being submitted as the substantive proposal the meeting seemed to have lacked resolution to confirm its own decision, and the proceedings terminated with a vote to refer the whole matter afresh to a "delegacy" of six. This will involve more delay, after the scaffold has been standing for a year. It is a great pity Mr. Jackson's design was not at once confirmed and proceeded with.

IT seems that the practice of inviting an architect to act as assessor and adviser in the decision of competitions, which has been forced on the public by the action of the architectural profession, and which in the main has undoubtedly led to better and wiser decisions in many cases than would otherwise have been made, has in practice some drawbacks which had hardly been foreseen, though they are not inseparable from the system. A correspondent draws our attention to the increasing tendency to select one special architect as the assessor for certain classes of buildings, with the natural result that his special view of what is best in that class becomes the standard, and those who represent his views get selected over and over again. No doubt such decisions are made with entire good faith, but it seems hardly desirable that the selection of the designs in a series of competitions should come practically into the hands of one man. As an example of the results of this system our correspondent draws our attention to the following results in asylum competitions:—

With Mr. C. H. Fowler as assessor in each case—
Dorset: G. T. Hine, 1st. Giles & Gough, 2nd.
Sunderland: G. T. Hine, 1st. Giles & Gough, 3rd.
Somerset: Giles & Gough, 1st. G. T. Hine, 2nd.
Isle of Wight: G. T. Hine, 1st. Giles & Gough, 2nd.
Stafford: Giles & Gough, 1st. G. T. Hine, and

On the other hand, in three competitions in

which the architects above named also competed, but in which there were three different assessors, we have the result—

With Professor Haytor Lewis as assessor—
 Execut: R. Stark Wilkinson, 1st. Kershaw, 2nd
 With Mr. Goddard as assessor—
 Derby: B. S. Jacobs, 1st. J. Barradaile, 2nd
 With Mr. Savon Snell as assessor—
 Maidstone: Stephens, 1st.

It seems highly probable that if there had been distinct assessors in each of the first five competitions, the results would have varied in a corresponding degree. It seems hardly desirable, either in the interests of the public or of the architectural profession, that one assessor, however impartial and competent, should have the decision of so many competitions practically left in his single hands; and we should recommend competition committees, in selecting an assessor, not to go on the principle of inviting an architect to act merely because he has acted in the same capacity in other similar competitions, but rather to endeavour to vary the choice of an assessor, in order to bring a fresh mind to bear on the subject.

IT is not often that the London Fire Brigade has to cope almost simultaneously with three such dangerous fires as those of the 2nd inst. at the Kennington timber yards, the Blackfriars saw-mills, and the South Eastern Fever Hospital. Any unfortunate coincidence—as, for instance, a gale of wind on the night in question—might have proved disastrous for more than one London district, and what with, we understand, a ridiculously small number of men and only six horses left at the fire stations to cover the whole Metropolitan area at one time of the night, an otherwise ordinary risk to human life at a minor fire would no doubt have proved fatal. For all that, it would be wrong to use last week's experience as a handle to urge an increase in the strength of our undermanned Fire Brigade. Even the best organised and most fully manned fire brigade at home and abroad will always have an occasion now and then when they find themselves too weak for a simultaneous outbreak of several large fires. It is for such occasions, however, that several Continental cities look to the aid of reserve firemen specially trained for service, or even to the volunteer fire brigades whose amateur efforts at other times give plentiful occasion for ridicule. Referring to the timber yard fire, we would point out that most Continental cities have regulations as to the way of stacking wood. Generally the timber yards have to be surrounded by high brick walls, and a passage of 15 ft. width is left between the outside stacks and these barricades.

THE somewhat fatuous manner in which the business of the London County Council is conducted was illustrated by an occurrence on Tuesday before the Parliamentary Committee, which is considering the Bill in which questions as to compensation for taking property for the Tower Bridge approaches arise. Mr. Moulton admitted that the Council desired to make an owner pay for the "betterment" of his property, it was not intended to compensate him for "worsement." When it was pointed out that it would be wholly inequitable to make a man pay the Council for the "betterment" of one portion, and not in return to pay him for the "worsement" of another portion, the advocates of the Council agreed to amend the Bill by giving a man compensation under such circumstances. But obviously the matter cannot rest here. There is no reason why, when property in the possession of one owner is both improved and depreciated, compensation for the latter should be given, and not when property depreciated belongs to one owner and that which is bettered to another. But if the principles of "betterment" and "worsement" are to be applied it is doubtful if the Council will obtain more money, because the one

counterbalances the other. Moreover a much larger liability for compensation is created than exists under the present law, when compensation is only paid where land is actually taken. It is conceivable that improvement may cause only "worsement" to adjoining properties and no "betterment." In such a case the new system of the County Council would land the ratepayers in greater expense than the old system.

THE case of Robson v. Edwards reported in the current number of the "Law Reports" is a decision which, while it should not pass unnoticed, is chiefly remarkable for an ingenious attempt by the defendant's legal advisers to defeat the plain meaning of the Prescription Act in regard to the right to light. But the attempt, though ingenious, was obviously hopeless. The plaintiff had during his tenure of certain premises under a lease acquired a prescriptive right to the light of certain windows, or, to speak more accurately, a right had become attached to the building. At the expiration of the lease, an agreement for a new lease was made, but the actual lease was not drawn up, the occupation being continued under the agreement. It was urged on behalf of the defendant that the easement ceased with the lease, and that the prescriptive period must be recalculated and begin to run again from the time at which the new agreement was made. Such a contention would have defeated the operation of the Prescription Act, and was decisively overruled by the judge. A right to light once gained during a leasehold tenure cannot be lost by the termination of the lease.

THE correspondence in the *Standard* on the subject of jerry-built houses will hardly bear much practical fruit unless it is followed up by some organised and systematic movement to obtain the stricter enforcement of the Building Acts, and the more complete adoption of a system of supervision by local authorities of new houses all over the country. It is obvious that only by a sound system of Building Act carefully applied can jerry-building be prevented. Unfortunately, however, good building cannot be done cheaply, and the jerry-built houses of the present day are, in truth, the article which supplies a particular demand. There is no class in the community which more largely inhabits jerry-built houses than what may be called the class of clerks; these persons wish to live respectably and on a higher standard than the artisan, and for them the jerry-built villa has to a great extent been constructed, because the clerk cannot afford a more substantial structure. The increase in local rates and the demands of the local authorities are not likely to enable rates to be lowered and more money to be paid in rent, hence the demand for low-rented houses must continue. To some extent the evil of jerry-built villas would be cured if the Englishman would more largely adopt the system of flats which at present may be said to have no hold at all upon those who chiefly inhabit badly-constructed houses. If flats became more general then those who lived in them would have more substantial dwellings, and the builders of villas, by reason of competition, might be induced to erect more substantial houses. But we confess we are not hopeful of seeing much improvement in this direction.

IN *Le Génie Civil* an interesting block-setting crane at Ponta-Delgada, Azores, is described. This crane is being used in the construction of a mole of concrete blocks on a rubble foundation. The heaviest blocks weigh 30 tons, and can be set at a distance of 98.4 ft. from the axis of rotation of the crane. Blocks of 15 tons can be set at a radius of 147.6 ft., and blocks of 12 tons at 164 ft. The blocks are lifted by chains passed round them, two grooves being left in each block for the purpose. The turning

part of the crane very much resembles a triangulated girder swing-bridge, as commonly used for dock entrances. The depth of the girders is 19.7 ft. over the supports, and diminishes to 11.1 ft. at the outer end. The tail end is 91.9 ft. long, and carries a counterweight of 113 tons of masonry. The girders have vertical posts and diagonal tension-bars, and are spaced at a distance apart of 7.2 ft. The carriage travels on ways near to the lower flanges of the girders, so as to admit of transverse bracing between the girders throughout. These ways are at a distance apart of 4.6 ft. The crane can turn through a complete circle, and turns on a live ring of rollers of 26.2 ft. diameter. The live ring rests on the head of a square-framed iron pier, the sides of the square being 26.2 ft., and the height from rails to the under side of girders 39.4 ft. All the movements are derived from a steam-engine of about 65 h-p.

THE *Transactions* of the American Society of Civil Engineers contain a paper upon the "Jetty Harbours of the Pacific Coast," in which the author shows, that while the tides along the Pacific Coast of the United States are of a complicated character and the coast itself generally high and rocky, his experience leads him to prefer converging to parallel jetties. He considers the parallel system to be more liable to undermining from racing currents, and argues very truly that the improvement of harbours is best attained by a study of the actions and tendencies of the currents, as they are determined by the constructions which are made to control those actions, which can seldom be fully understood in advance. Furthermore, the author maintains that, while in regard to exposure, a high tide jetty is more liable to injury and beating down by heavy seas than one built only to low tide level, yet this liability is reduced from the protection given to the jetties, similar to those upon the Pacific coast, by the outlying sands, upon which the strong seas break before reaching the jetty. The same publication also contains a discussion upon a paper dealing with the subject of "Flood Waves in Sewers," a subject in which our exact knowledge is very limited. Gaugings of sewers show that if a storm continues long enough to allow storm water from the remotest portion of a district to reach the outlet before that rate of rainfall ceases which may be characterised as a storm, then, practically, the same proportion of this rainfall flows off at the maximum flow as would flow from the smaller district with the same rate of rainfall. The real rate of the rainfall causing the maximum discharge from a given district will be the rate which may be expected for a time equal to that necessary for the storm water from the remotest part of the drainage area to flow to and through the sewer to the point under consideration.

WE have received an illustrated pamphlet descriptive of a high-level roadway bridge, proposed across the River Mersey, for connecting St. George's-crescent, Liverpool, and Hamilton-square, Birkenhead, designed by Messrs. John J. Webster and John T. Wood, M.M.Inst.C.E. While the Mersey railway tunnel in the immediate vicinity of the suggested bridge provides for goods and passengers conveyed by rail, the proposed bridge is in a suitable position to prove of service for vehicular traffic between the docks of Liverpool and Birkenhead, and to prove of recognised utility should be a free bridge, although its projectors argue that it would pay as a toll bridge. As a high-level means of crossing, its only interference with ordinary river traffic would be in the space occupied by two intermediate piers. The suggestion to cross the Mersey by a bridge is not novel. In 1860 the late Mr. Jesse Hartley proposed a bridge across the river, at the extremity of the Sloyne; in

1863 Mr. Ellacott also proposed a bridge across the river from James-street, upon the Liverpool side, to Hamilton-square, in Birkenhead, in spans of 400 ft. and 250 ft., with shipways of 140 ft., and having a clear headway of 45 ft. above high water spring tides; but such low-level constructions would interfere too much with the river traffic, while that now proposed will have a clear headway of 150 ft. at the centre of the bridge, approached by viaduct roadways 60 ft. wide, with a maximum gradient of 1 in 35. The proposed bridge is of the arched suspension type, very suitable for wide openings, and somewhat similar to that suggested by Sir Joseph Bazalgette for crossing the river Thames at the Tower, but of greater span. The approaches to Southwark Bridge, London are, upon both sides of the river, steeper than 1 in 35; and while it would be desirable not to introduce a steeper approach than 1 in 40, the advantages secured by the increased headway to the river compensate for the steeper approach across the river by the bridge. The danger of crossing in fogs by ferries becomes obviated. Three spans are suggested, of 1,100 ft. each, or the central one may be increased and the side spans reduced. The main ribs are proposed to consist of eight octagonal steel tubes braced together, and to be hinged both at the springing and at the crown. The total estimated cost of the bridge and approaches, including a sufficient sum for the purchase of property and compensation to owners, is 1,730,000*l.*—a large order for a joint municipal enterprise between Liverpool and Birkenhead if constructed in this way, and hopeless as a commercial scheme in private hands.

OWING to a large number of accidents having happened at Berlin through the faulty construction or mismanagement of lifts, and the spread of fire up lift shafts, the Government has now issued a set of strict regulations on the employment of lifts and similar apparatus. The new rules, after treating of the position of the shafts and their isolation, refer to the construction, brakes and safety gear, as well as the speed at which the lifts are allowed to run, the weights to be carried, and the tests they are to regularly undergo at the hands of certain officials of the Board of Works. Although strict, the regulations are only rational, and by no means extreme if the risks be considered. On one point there may be some cause of complaint—viz., the limit of speed, which is fixed at one and a-half metres per second, which will be found a drawback when "through lifts" to upper stories and the most modern American elevators are introduced to the Prussian capital.

THE paper contributed by Mr. George Hodson at a meeting in Derbyshire of the Incorporated Association of Municipal and County Engineers upon "Underground Water Supplies," as reported in our issue dated May 27 (pages 404 to 406), shows the importance of preliminary investigations prior to undertaking expensive works, and that while the Geological Survey maps are useful as helps in giving suggestions as to the general geological character of a district, they are not sufficiently reliable for application in detail. The writer of the paper quotes a case, in the printed pamphlet which we have since received, in regard to which he says:—

"When engaged upon investigating an area of Lower Greensand which the published Survey showed as occupying an area of about 8½ square miles, of which the outflow lay to the south-west, a careful examination proved that a main anticlinal existed which brought up an underground ridge of imperious Weald clay, which although not apparent on the surface, effectively divided the underground sheet of water, and diverted to an outflow on the south-east the water absorbed on 3½ miles of the watershed, leaving only ½ mile as possibly available. In addition to this, the evidence afforded by the springs conclusively showed that other smaller anticlinals

existed, which held up the water as in a series of troughs, which made it very doubtful whether more than one square mile could be commanded by any particular well; whilst to complete the uncertainty, notwithstanding the most persistent efforts, it was impossible to discover all the Lower Greensand area given by the map, and a large district clearly marked as Upper Greensand was just as clearly Gault, and was in fact being actively worked by a company for the manufacture of Portland cement."

Such remarks may help to convince the Ordnance Survey Department of the importance of a periodical revision of their publications.

SOME interesting experiments upon cement mortars have been recently carried out at the Boulogne laboratory of the Administration des Ponts et Chaussées, and have been published by M. Teret in the *Annales des Ponts et Chaussées*. The influence of variations of quality and quantity as regards the sand used, and the proportion of water, was especially investigated. The quality of the cement itself did not form a subject of investigation. The term sand was applied to all particles passing through a sieve of a mesh of 0.157 in.; coarser material is termed gravel. In making mortar with sand and cement, the sand is usually measured and the cement weighed, but the author points out that various causes may produce considerable variation in the results in measuring sand; moisture, for instance, diminishes the quantity of sand in a given space to such an extent that in a case quoted the proportion of sand moistened with 2 per cent. of water was 20 per cent. less in a cubic metre than when the same sand was measured dry; but the presence of a large quantity of water causes the sand to pack almost as well as when quite dry. This is especially the case with fine-grained varieties. The variations in the weight of a given bulk of sand also depend to a great extent on the size of the grains. In mixing the mortar, both cement and sand should first be mixed dry, and afterwards wet in a mortar mill; by these means the greatest density is obtained. The proportion of water to be added in the preparation of a mortar necessarily varies with the size of grain of the sand and the percentage of cement. The best proportion is that which gives the most plastic mortar. The quantity of water diminishes in proportion as the water becomes poorer in cement. It appears that in the densest mortar interstices always remain, amounting to at least 3 per cent. of the apparent volume of the mortar. As regards the proportion of water, M. Teret found that mortar rather drier than the normal consistency was the most dense; but this is only the case when the gauging is very perfect, and on a large scale it is recommended to make the mortar sufficiently plastic for convenient use.

WE have received from the National Boiler Insurance Company, Manchester, their Chief Engineer's annual report, which is very interesting reading. The insurance of steam boilers undoubtedly tends to reduce the number of explosions and disasters. Under the Boiler Explosions Acts, 1882-90, the Board of Trade have power to investigate all circumstances connected with explosions, and if they can trace negligence or undue risk, they inflict heavy penalties, which have to be borne in addition to the cost of repairs and compensation for personal injuries—if any. The insurance of a boiler obviates these liabilities as far as possible, owing to the fact that, for their own benefit, the company make thorough examinations, keep a staff of qualified skilled inspectors, and give good advice whenever required. This report shows that the explosions for 1892 number twenty-seven, involving the loss of eleven lives and injuries to twenty-six others. This is the lowest record both in explosions and fatalities since 1873; in fact the record has been steadily decreasing since that year; and if any proportion of the decrease is due to the search-

ing examinations of insurance companies, it says much in their favour, for we have to remember that the number of boilers in use is steadily increasing every year. The report also touches upon the explosion of kitchen range and similar boilers used for domestic hot-water supply. It states that in almost every case the disaster is due to frost-bitten pipes, and recommends the invariable use of a safety-valve to these boilers as a preventive measure; the advice we have already given. The use of a safety-valve on a closed (known as high-pressure) kitchen range boiler should be considered imperative. The object of this report is doubtless to induce all steam-users to adopt some system of insurance, but it is not written in an alarmist or exaggerated way, and we should recommend everyone interested in such matters to get a copy. There is much to be learned, and it has some instructive illustrations.

IT is stated that the 24th inst. has been fixed for the re-opening of St. Helen's Church, Bishopsgate, upon completion of the restoration, under the direction of Mr. J. L. Pearson, R.A., to which we lately adverted.* The Merchant Tailors', Grocers', Skinners', Drapers', and other City companies, together with certain private persons who are connected with the past history of the fabric, contribute liberally to the reparation fund. We understand that the first named company, who are patrons of the living, gave 3,500*l.* to the general fund, and that an appeal to individual members of that livery has already resulted in subscriptions amounting to 500*l.* towards providing a reredos designed by Mr. Pearson. The Skinners give a screen in honour of Sir Andrew Judd, founder of the school at Tonbridge, whereof some past pupils add a "Judd" standard in the chancel. Other screens are presented by the Grocers and Clothworkers, in memory of Sir John Crosby and Sir John Spencer, whose monuments are in the church. But in the case of Francis Bancroft's tomb the Drapers, whom he entrusted with the maintenance thereof, have consented to its removal from the aisle floor (into the crypt, we believe) and to the placing of a commemorative stone in its stead. The *City Press* says that the Drapers have added a gift of 350*l.* for the erection of a screen to separate the nave and chancel; the Leather-sellers undertake to defray the charges, about 200*l.*, of reflooring the chancel; the Mercers have provided for new sedilia in memory of the interment in St. Helen's of Sir Thomas Gresham; and Sir Reginald Hanson contributes a brass lectern.

THE exhibition of Mr. Sambourne's drawings at the Fine Art Society's rooms is the exhibition of a wonderful amount of clear and painstaking workmanship expended in the production of drawings which are as remarkable for their satiric humour as for their quality of decorative design. They cannot claim equality of interest with the drawings of Keene, which were not long since exhibited in the same room, either in the social or the artistic sense. Keene drew life as he saw it; Mr. Sambourne translates it into grotesque and caricature, but caricature of a very high order, and in which the humour is nearly always subordinate to decorative effect. The style is somewhat hard and precise, but the work is always complete and finished on its own lines, and the method of it is admirably adapted to reproduction. As Mr. Spielmann remarks in the preface to the catalogue, the shading is always done in parallel lines, and cross-hatching is avoided. This gives a somewhat mechanical appearance to the drawings, but it is a method exactly suited to their purpose, and it is surprising to see in how finished a manner it is carried out, considering the short time in which it is said that many of these drawings were produced. The manner of

* See our "Notes" of August 15, 1891, and February 27, 1892.

designing which Mr. Sambourne has adopted for the kind of subject which he has made his own is entirely original, and in its way as effective as it is original. In one sense his perfect adaptation of method of drawing to reproduction as engraving takes away a little from the special interest of the exhibition: the drawings are so like the engravings. In the case of Keene we found how much there was in the drawings which the engraving had failed to render. In Mr. Sambourne's drawings we seem only to see the *Punch* engravings on a rather larger scale. Some of the very best of the *Punch* designs we miss, among them that admirable one in which the development of Darwin's earthworm was traced through the monkey into the modern dandy making his bow to the philosopher; one of the cleverest drawings, both in humour and design, that has ever appeared in *Punch*. The collection of designs for the "Water Babies" is one of the best portions of the exhibition.

WE cannot profess to feel much interest in the collection of works by M. Sinet exhibited at the Goupil Gallery. There is no doubt a good deal of ability displayed in them, but it is not of the right sort, and they seem to us for the most part to possess all the shortcomings of the Impressionist school without anything of the power of its best men.

ARCHITECTURE AT THE ROYAL ACADEMY.—VI.

1610: "Bank Premises at Daventry"; Messrs. Kidner & Berry. A pretty watercolour drawing, showing a very simple and unpretending country lank in Gothic style, built mainly in brick. By the same architects is

1,611: "House at Bisham-on-Thames"; an effective small pen-drawing of a house which is certainly picturesque, but looks a little too much as if it struggled to be picturesque, gables and chimneys being tumbled about in an accidental kind of manner. The verandah on small columns carried round the angle makes an agreeable feature.

1,612: "Music Room, Highlands, Putney Heath"; Mr. W. D. Caroe. This was published in the *Builder* of May 21, 1892. It shows an interior of a large room with a music-gallery on one side, and a large segmental stone arch at the further end, forming a wide angle-nook. The ceiling is treated with a geometrical design, but in what material this is executed can not be very well made out from the drawing. The room looks a very agreeable and suitable one for its purpose. By the same architect is

1,613: "The Hall, South Lytchett Manor, near Poole," also published previously in the *Builder* (September 24, 1892), a much better drawing than No. 1,612, which suffers from being overworked, while this is a clear bright drawing, with plenty of unworked space to give contrast and value to the shadows. It shows a hall lighted by flat skylights placed in a flat timber ceiling, and with a railed gallery round the upper portion of it: the piers in the gallery, which correspond with the closed portions of the ceiling, are well treated, with a couple of niches corresponding with the panels of the ceiling, and each containing a great vase. The whole forms a very agreeable and rather original interior.

1,614: "New Church, Huxton"; same architect as the foregoing; a very solid looking church in Early English style, but almost sternly plain, the gables to the buttresses being not even moulded: there is a plain spire with a visible entasis and diversified only by one set of lucarnes at the base. The drawing (in pen-line) is a bold and effective one, but why are the roofs left entirely white, as if they had snow on them?

1,615: "Seamen's Almshouses, Cowes; elevation of centre gable"; Messrs. James Clarke and J. T. Michellwaite. A rather large coloured elevation of a small bit of work; a brick central block with a gable over it, and a white stone panel with an arched window and a small figure on each side forming a band across; the whole looks like a reproduction of the style of some almshouse entrance gables of the last century. The side portion shows the commencement, on each side, of a timber arcade or loggia behind which we presume the residences are placed. No plan.

1,616: "Conflict"; panel of a frieze illustrating

the story of a man's life's; Mr. E. W. Davies. At first sight this rather reminds one of Bon Gaultier's ballad:—

"Never wears this warrior armour, in a knot himself he ties;"

for the effort to group figures on a large scale and to keep them within the proportions of a low frieze has led to a curious and almost inextricable mixing up of the limbs of figures placed horizontally. The knight appears to be endeavouring to get "into chancery" the head of a dragon which we may presume has been the means of the death of the other prostrate and apparently lifeless bodies on the left. Seriously, the design is very clever, but we doubt if any one could look at it without feeling a sense of the ludicrous at this arrangement of figures. The colour effect is a little dark and heavy, but not unpleasant.

1,617: "Irish Village at the World's Fair, Chicago"; Mr. Laurence A. M'Donnell. A bird's-eye view of a quadrangle of low high-roofed cottages, some of them with large buttresses, and presided over by a large square tower at the head of the quadrangle. Are Irish villages built in a quadrangle? We should say not; and in that case this representation is not realistic, but only a conventional one for the purposes of an exhibition. This seems a mistake; realism is the principal value of work of this kind.

1,621: "Design for Steward's House at Margam, South Wales"; Messrs. Cheston & Perkins. A half-timber house with the unusual and picturesque arrangement of a portion of the house isolated from the rest and reached by a two-story open-arched bridge. A plan would have shown the reason for this, or whether there is a sufficient reason; as it is it may be only a whim.

1,622: "House, Woodside, Stanmore"; Mr. Arnold Mitchell. A small house, perhaps with a little too much the air of studied simplicity about it, shown in two small views most artistically sketched in brown tint. A plan is given, which shows a very pleasing drawing-room plan, indeed the sitting rooms altogether make a very good suite, but we cannot reconcile ourselves to the position of the dining-room fireplace, which is too much in a corner and too near the window, both for appearance and comfort. With this we may class No. 1,628 "Grove Hill Cottage, Harrow - on - the - Hill," by the same architect, in which two sketches of the house, a plan and some decorative detail are shown on one sheet, which was published in the *Builder* of May 27. The house is a small and unpretending one, of which we like the garden front the best, the other seems a little needlessly irregular and cut up. The plan is a good one for a small house, except that the door of the ground floor w.c. is much too close to the scullery; the door should have been outside and the apartment turned the other way about; we have had to notice this kind of practical mistake in one or two other plans in this year's collection. The ornamental details are very nice, especially the modelled ceiling of the drawing-room, and the whole makes a very attractive sheet of drawings.

1,623: "Design for the Library, Welbeck Abbey"; Mr. H. Wilson. One of the most remarkable drawings in the room, for originality of design and ability of execution. It is an admirably executed water-colour, showing an interior in which coloured marble appears to be largely used. We look through a kind of centre compartment with large elliptical arches, the archivolt mouldings of which are cut through by raised voussours at intervals, and which has an apartment or recess opening out of it on the right through a lower arch; this apartment however is only half shut off by low screen walls and coupled shafts on them. Beyond is a longer apartment in which is seen an organ, in a gallery carved on yellow marble columns. In the foreground portion we see painted or inlaid decoration of figures and accessory ornament applied in a very characteristic and original manner. The mass of untreated wall, of rather a dingy colour, over the nearest arch, seems rather to crush the lower detail; but in the main this is a very fine and remarkable bit of interior design. By the same architect is

1,624: "Design for New Cathedral, British Columbia." This was a competition design, and not successful, but if the people in British Columbia have secured a better cathedral design than this they have been exceptionally fortunate among the projectors of modern cathedrals. The west front is a very unusual and picturesque composition. Two low square towers stand at the extremities of the façade, with semi-octagon turrets projecting on their faces, between

which is a low segmental arch giving shadow to the porch, and above this a large west window which is connected architecturally with a large sculptured panel of the crucifixion above it, the two main mullions of the window being enlarged so as to cut through the arch mould and connect with the panel above. Behind the gable over this sculpture panel rises a small centre tower or lantern with a thin spirelet rising from the centre of it. The whole composition is most picturesque, and quite unusual in effect. The buttresses at the side are deep and massive, and enclose between them at the ground story level, recesses for monuments, with a large sloping set-off as a roof. The transept seems rather unnecessarily plain in contrast with the rest of the design. The east end cannot be seen in the drawing, but the west end is one of the most original and picturesque things in the room.

1,625: "Ingle Nook in New Billiard Room, Bungay"; Mr. Bernard Smith. Published in the *Builder* of May 20. A fine clean pen-line drawing (drawn by the architect and not by "an hireling"), showing an ingle nook of somewhat monumental scale and treatment, with a large modillion cornice over the opening, and a rich over-mantel executed with colonnettes and niches and panels between them, carried on brackets under the mantelshelf. The design of the ingle-nook is well connected architecturally with the rest of the wall design, and the seats on each side are treated with a solidity and massiveness suited to the situation. A plaster strap-work frieze runs along the room over the ingle-nook cornice. There is little that is original in most of the details, but the whole is well and consistently designed and makes a good composition.

1,626: "New Homœopathic Hospital, Great Ormond-street"; Mr. W. Pitt. A small coloured elevation showing a sensible treatment for such a building, with red and buff-tinted bricks, the red applied in wide bands and also in emphasising some portions of the front, as the upper part of the circular angle turret. The bridges of communication between different portions with spaces open to the sky between, give a special effect to the elevation. This is just the sort of drawing we like to see, provided it were accompanied by a plan, but it is absurd to send a hospital design without a plan, and doubly so when the drawing is a geometrical elevation and not a perspective view.

1,629: "Blawith, Grange - over - Sands"; Messrs. Willink & Thicknesse. A pen drawing of a house in domestic Gothic style—the domestic Gothic of the more solid order, with stone mullions—which rather requires grouping or pulling together so as to give it a more decisive character and composition; it is too much in and out at present. The plain mass of low tower with battlements would have been efficacious for this purpose had it been more massive; as it is, it does not dominate the rest; everything seems too much the same size. The chimneys are treated in an unusual and characteristic manner, as large plain slightly conical cylinders on a square base with a battering surface. No plan.

1,630: "Gatton Park; New Staircase"; Mr. Sextus Dyball. A carefully executed pen-line interior of a staircase hall on the Italian model; an arched and balustraded gallery on the first-floor level, with a pilaster order between the arches and a boldly coved ceiling with a skylight in the centre; all very good and correct, but all very like many other staircases. It appears to us that the stairs themselves, and their balustrading, are too light to be in scale with the massive treatment of the first-floor gallery. We like to see the stair in a hall of this kind form part of the architecture; this looks rather as if put in—what landlords call "a fixture."

1,631: "Local Offices and Fire Station, Harrow"; Mr. C. Forster Hayward. The plan shows an irregular piece of ground, which has been made the most of for its practical purpose. The front is an unquestionable fire-station front, with its large doors on the ground floor, and a feature is made of the alarm bell hung in a large wrought-iron frame carried on a corbelled-out block of masonry adjoining the chimney. Might not a simpler metal-work design have been better in keeping? The projecting bay window of the board-room, over the engine-house, forms a break in the front.

1,632: "Proposed Business Premises, Exeter"; Mr. Sidney K. Greenslade. A small delicately tinted elevation, with plans of each story, which is worth attention. The ground floor is treated with a large segmental arched shop window and a carved cornice, this portion being in a delicately tinted grey stone; the upper stories are in brick in two tints, the second floor being treated in a

very original manner, with the front wall recessed back and a loggia formed with short thick built-up columns in brickwork in bands of two tints; the third floor is treated with brick-built colonnettes with circular windows in the spaces between, treated with radiating stone quoins. This, though a simple and inexpensive design, is a very good example of the effective treatment of a street front.

1,633: "County Council House, Stafford"; Mr. W. Pite. When a design has not been accepted but only submitted in competition, it seems to us it would be better taste to send it in as "Competition Design for," &c., &c. A good many exhibitors overlook this little point, and we do not mean the remark to apply specially to this case more than others, but the recurrence of the want induces us to mention it here. The drawing is a geometrical elevation with a small plan, which latter shows the council room in theatre shape, and connected with the other buildings by a circular vestibule which gets over the break of angle between the two blocks; we should have looked, however, to see some recognition of this vestibule in the exterior design, in which it is not traceable. In elevation it seems as if the lines of the building and roofs would be rather cut up and irregular.

THE ROYAL SOCIETY'S CONVERSAZIONE.

ON Wednesday evening last, the 7th inst., the Fellows of the Royal Society, following out the programme of previous years, held another *conversazione*—the second of the season—in the apartments at Burlington House. As is usually the case, many of the objects shown at the first soirée were again placed on view, but it is noteworthy that the places of others were occupied by exhibits of a more novel and scientific character than on the first occasion, so that the meeting was much more interesting.

Amongst the new exhibits we noted a carefully executed series of drawings shown on behalf of the Egypt Exploration Fund by Mr. Percy E. Newberry, representing a portion of the work of the Archaeological Survey during the past season—1892-3. These comprise sketches of various sites visited by the officers of the Survey, including views of Tel el Amarna, Sheikh Said, and Dér el Gebrawi, as well as specimens of *fascimile* drawings of wall paintings from ancient tombs in the provinces of Minich and Assiut (VI. and XII. Dynasties, B.C. 3,800 and B.C. 2,500). The latter were mainly natural history objects, some of which must have taxed the ingenuity of the officers to designate correctly. A number of water-colour drawings illustrating the scenery of the Karakoram Mountains in Cashmere, by Mr. A. D. McCormick, was exhibited by the Mountain Survey Expedition. These drawings were made at altitudes of from 15,000 ft. to 20,000 ft.

The recent eclipse expeditions to Senegal and Brazil were extensively represented, as might have been anticipated. Professor Thorpe had some autotype enlargements from photographs taken by himself on the African Expedition; whilst the Joint Eclipse Committee showed photographs from both points of observation. A lantern demonstration on the same subject, given by Professor Norman Lockyer, would have been of higher interest had the lecturer said more respecting the phenomena observed during the eclipse, and less concerning the superstitions of the inhabitants of the districts where the eclipse parties were stationed. Photographs of groups of the natives are very interesting in their way, but they are decidedly out of place in a scientific demonstration—especially in the apartments of the Royal Society.

Turning to the new electrical exhibits, we may notice the hydrophone of Captain McEvoy, a very remarkable apparatus. This, in connexion with a new instrument called a kinesiophone, is intended to be used at night-time, or in foggy weather, to give warning of the approach of vessels, which may be some miles away, by ringing bells, &c.; the signals in every case being verified by telephones in the circuit. It will, no doubt, prove useful in times of war, and also as a protection to vessels coming too near the shore in foggy weather. Messrs. W. A. Shenstone and M. Priest exhibited an apparatus used for studying the action of the electric discharge on oxygen. Mr. W. H. Preece showed some examples of submarine borers and specimens of submarine cables damaged by them in different parts of the world; which brings to light the fact that whilst twenty years ago some of these depredators were

practically unknown in English seas, they have now gradually spread all around our coasts, and cables have to be served with brass tape to be protected from their attacks. Specimens of electrolytic copper, deposited bright, were exhibited by Mr. J. W. Swan. This production is much harder and more elastic than ordinary electrolytic copper.

There were also a number of minor exhibits—mainly in the domain of natural history.

THE CONGRESS OF FRENCH ARCHITECTS.

The following is the programme of proceedings of the Congress of French Architects this year, extracted from *L'Architecture* of June 3:—
"SOCIÉTÉ CENTRALE DES ARCHITECTES FRANÇAIS.
Congrès des Architectes Français de 1893.
Programme des Séances et Visites.

Lundi 19 juin.

A 2 heures (à l'hémicycle de l'École des beaux-arts).—Ouverture du Congrès.—Constitution du Bureau et ordre des travaux du Congrès.—Nomination des Commissions sur les questions suivantes: Enseignement de l'architecture en province, Hygiène, Honoraires, Économie sociale, Concours publics.—Reprise des questions étudiées au Congrès de 1892. Compte rendu des Congrès de Milan et Anvers, par M. Ch. Lucas.

Mardi 20 juin.

A 9 heures 3/4.—Visite de l'hôtel des Téléphones, rue du Louvre, sous la conduite de M. Bousard.
A 2 heures (amphithéâtre de l'École des beaux-arts).—Conférence par M. Fournereau: Exploration artistique à travers l'Indo-Chine, avec projections à la lumière oxyhydrique.
A 3 heures. Conférence de M. Langlois, ingénieur, sur un nouveau type de charpente métallique à bases encastrées.

Mercredi 21 juin.

A 9 heures 3/4.—Visite à la manufacture des Gobelins, sous la conduite de M. Redon, architecte.
A 2 heures (à l'École des beaux-arts).—Conférence de M. Ritter, de Neuchâtel, sur l'Adduction à Paris des eaux du lac de Neuchâtel.
L'enseignement de l'architecture en province. Du repos hebdomadaire.

Jeudi 22 juin.

Excursion à Amiens (Somme). Départ de Paris, gare du Nord, train de 8 h. 22; retour à Paris à 10 h. 5.

Vendredi 23 juin.

Matinée réservée à la Caisse de défense mutuelle.
A 2 heures.—Notice nécrologique sur M. Edmond de Joly, par M. Lucien Etienne.
Des concours publics.

Samedi 24 juin.

A 10 heures (à l'École des beaux-arts).—Questions à l'ordre du jour.—Communications.—Propositions des diverses Commissions.
A 2 heures (à l'hémicycle de l'École des beaux-arts).—Distribution solennelle des récompenses décernées par la Société centrale des architectes français (M. P. Sédille et M. F. Roux, secrétaire principal, rapporteurs).
A 3 heures 3/4.—Assemblée générale de la Société centrale. (Voir l'ordre du jour dans *L'Architecture* du 17 juin.)
A 7 heures.—Banquet confraternel à l'hôtel Continental.
(Prière instante de se faire inscrire à l'avance pour l'excursion et pour le banquet.)

INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS: MEETING AT HARROGATE.

A YORKSHIRE District meeting in connexion with the Incorporated Association of Municipal and County Engineers was held in the Council Chamber, Harrogate, on Saturday, the 3rd inst. The natural beauties of Harrogate, and the fame of its medicinal springs, were sufficiently attractive to induce a large attendance of members. Amongst those present were the President of the Association (Mr. J. Cartwright, Bury), Messrs. J. Allison (Manchester), C. C. Smith (Dalton-in-Furness), J. Hall (Cheltenham), W. G. Laws (Newcastle-on-Tyne), G. Gregson (Durham), J. Howcroft (District Hon. Secretary, Redcar), M. Hall (South Shields), J. M. Burn (West Hartlepool), H. Crumack (Hartlepool), R. Griess (Hexham), S. S. Platt (Rochdale), E. Kothwell (Rochdale), T. W. Stainthorpe (Eston, Middlesbrough), C. Bowndridge (Birkenhead), J. Mitchell (Hyde), H. J. Marks (Dewsbury), F. Massie (Wakefield), J. Cook (Lancaster), F. S. Britton (Burnley), H. T. Hopper (Ormesby), A. M. Fowler (Manchester), E. R. S. Escott (Ilialfax), E. W. Dixon (Harrogate), F. Cartwright (Bury), A. Creer (York), J. H. Cox (Bradford), A. E. Nichols (Leeds), H. Dearden

(Batley), W. Spinks (Leeds), T. Mallinson, (Selby), G. F. Carter (Leeds), T. Thorburn (Birkenhead), T. Kidd (Ripon), C. F. Wike (Sheffield), and a large number of visitors. The members having assembled in the Council Chamber,

The Mayor (Mr. J. Simpson) said it afforded him great pleasure to welcome the members of the Association, and to express the gratification of the Corporation that they had chosen Harrogate for their District meeting. He might mention that Sir Robert Rawlinson last summer visited their sewage farm, when he complimented them on their sewerage disposal and the way in which their Engineer managed the farm.

The President, having taken the chair, thanked the Mayor and Corporation for the manner in which they had received the members of the Association. From what they had heard and seen of Harrogate, he was assured the visit would be of interest and profit to them.

Mr. W. G. Laws (Newcastle-on-Tyne), proposed the election of Mr. T. W. Stainthorpe, of Eston, Middlesbrough, as hon. sec. for the Yorkshire district. He said he knew the abilities of Mr. Stainthorpe, and was assured the duties would be carried out to the satisfaction of the Association.

Mr. J. Howcroft, Redcar, the retiring secretary, seconded the nomination, which was agreed to.

Mr. Stainthorpe thanked the members for the compliment they had paid to him, and promised to do his best for the Association.

Municipal Work in Harrogate.

Mr. R. Stead, Borough Engineer of Harrogate, then read a paper on "Municipal Work in Harrogate." We quote the following portions of it:—

The town of Harrogate is situated in the West Riding of the County of York, about midway between London and Edinburgh, and is distant 21 miles from York, 15 from Leeds, and 11 from Ripon. It stands on an elevated plateau about 400 ft. above sea-level, and as it is midway between the Irish Channel and the North Sea its climate is eminently of a bracing and invigorating character. It is about three hundred years since the first discovery was made of the medicinal springs, and since that time fresh springs have been brought to light from time to time, until there are now no less than eighty of various kinds, the whole of them, with one exception, being vested in the Corporation. So important have these springs become that more than a century ago, namely, in the year 1778, an Act of Parliament was passed for dividing and enclosing certain portions of the ancient forest of Knaresborough, and expressly enacting that 200 acres of the forest should be set apart for ever, for the use and benefit of the persons taking the waters, and for all persons whomsoever, without any payment whatever. This open common, or stray, as it is called, has aptly been termed the lungs of Harrogate, and there is no doubt that to its existence the town owes a great amount of its popularity, not only as a health resort, but as a visiting town, and a place of residence for merchants and others having business in the large manufacturing towns adjoining. The area of the Municipal Borough is 1,287 acres, and the resident population about 15,000, this number being probably doubled during the summer months. The rateable value is about 92,000*l.* The General District Rate is 3*s.* 2*d.*, the Borough Rate 2*d.*, and Poor Rate 1*s.* 4*d.* in the *£*. The management of the town was in the hands of Improvement Commissioners from the year 1841 to the incorporation of the borough, which took place in 1884.

The sewerage of the town was carried out between the years 1868 and 1874, under the control of Mr. John Richardson, the Surveyor to the Improvement Commissioners. The bulk of the sewage is delivered by gravitation on to the irrigation farm of 310 acres, situated just outside the borough boundary, by means of two outfall sewers, one of 20 in. diameter from Low Harrogate which crosses the valley, in an inverted cast iron syphon pipe, and another of 12 in. diameter passing down the Shipton road from High Harrogate. The area of land under irrigation is about 210 acres. About 40 acres of land are usually devoted to the cultivation of turnips and corn, the remainder being grass, and the sewage is distributed on to the land by means of earthenware pipe carriers and grips cut in the soil, which are afterwards filled in when a sufficient quantity of sewage has been allowed to run on to the land. The land is somewhat heavy with a clay sub-soil, and it is underdrained with earthenware pipes laid at a depth, generally speaking, of about 5 ft. When the farm was originally laid out the sewage was passed through a number of

settling tanks in a building erected for the purpose, but this I am informed was found not to work well, and the sewage now passes in its crude state, without treatment of any kind, on to the land. The effluent is at all times very good and perfectly clear, and although occasionally there have been complaints of pollution in the stream into which the effluent water is discharged, it has invariably been found, when enquiries have been made, that the offence has not arisen from the sewage farm. The annual loss upon the working of the farm may be put at about 150*l.*, and 1,350*l.* for sinking fund and interest upon capital, or a total of 1,500*l.* The ordinary dry weather flow of sewage is about 320,000 gallons per day, and no difficulty is experienced in dealing with this volume on the land; but in times of very heavy rains and floods the large amount of surface water becomes troublesome, and the Corporation have for many years past been endeavouring to get rid of this storm-water into the natural streams and water courses wherever practicable. This has been effected by laying down separate drains for surface water in all streets where an outlet could be obtained into a water course, and also by forming storm-water overflows at suitable points on the lines of the main sewers.

The whole of the public streets within the borough are macadamised, as the traffic is principally of a light character, and the Corporation are at great expense in keeping them in a good state of repair. The total length of public roads and streets is twenty miles, of which about four miles are main roads under the control of the West Riding County Council. The main roads are usually repaired with granite from the Mountsorrel quarries in Leicestershire, and the remainder of the public roads with limestone from the Corporation quarry at Pateley Bridge. One of Green's 10-ton steam-rollers is employed for rolling the roads. Owing to the large amount of scavenging and watering necessitated by the use of the limestone, and frequent complaints of the dust and dirt arising therefrom, the Council have decided to extend the use of the tar macadam referred to in another portion of this paper, and also to coat some portion of the roads other than main roads with Mountsorrel granite.

No doubt most of the members present will have noticed the tar macadam roads in the town, and as this kind of roadway appears to be coming more into favour, judging from the numerous enquiries I have had respecting it, I thought it might be of interest if I gave a short description of the manner in which the materials are prepared and put upon the roads. The stone which is used for this tar macadam is limestone, obtained from a quarry at Pateley Bridge, held on lease by the Corporation from Mr. T. E. Yorke, and the tar is purchased from the Harrogate Gas Company. The ashes for firing the rough or foundation material are from the ordinary domestic ashpits in the borough, and are well screened before being used. The rough or foundation material is prepared in the following manner, viz., the limestone, broken to a 2½ in. gauge, is spread upon the ground in a heap, about 6 ft. wide, 15 in. to 18 in. high, and any convenient length. A fire is then lit on the top with wood and ashes, and the stones gradually turned over and mixed until all are at the same temperature. The stone is afterwards spread on an iron plate while warm, and thoroughly mixed with gas tar, after which it is stacked in a heap ready for use. The materials are much improved by stacking for a few months before being put upon the roads. The surface-material is prepared as follows, viz.: a bed of clean furnace ashes 9 in. deep, 6 ft. wide, and 12 to 15 ft. long, is formed on the ground and covered with a similar depth of ¾-in. screened stone. A fire is then kindled on the stone and entirely covered with ashes, which should be allowed to burn for at least three days, or longer, if the weather be unfavourable. The material is then thoroughly mixed while warm and passed through a ¾-in. screen. A pan is afterwards formed (as in slacking lime) with 6 in. of material on the ground and the tar poured on and mixed until the whole becomes thoroughly incorporated. The material then remains in a heap for about twelve hours and is afterwards well mixed, and allowed to stand for two days or more, when it is stacked ready for use. In forming the roadway a layer of the rough or foundation material, about 3 in. thick, is first put down and well rolled. This is followed by a sufficient quantity of ¾-in. chippings (prepared in a similar manner to the foundation material) to fill up the interstices and just cover the rough stone. It is again well rolled and covered with a thin coating of the surface material formed of ¾-in.

chippings and ashes, and well rolled. The surface is finally sprinkled over with fine limestone chippings and again rolled. The edges next the channel are trimmed and beaten with an iron beater, and after standing for a day or two the road is ready for use. A 10-ton steam-roller is used for rolling these roads, and the total cost is about 2s. per square yard laid complete. The footpaths are laid in the following manner, viz.: upon a prepared foundation of broken stone a layer is put down 2 in. thick, formed of 1½-in. limestone prepared in the same manner as for the foundations of roadways, and well rolled with a hand-roller. This is covered with a layer ½ in. thick of the fine material, rolled again, and finished with a sprinkling of Derbyshire spar, and finally rolled, the edges being well beaten with an iron beater.

In a town like Harrogate, the by-laws and regulations as to streets and buildings naturally play a very prominent part, and the most important of them are of such a character as to render the property when built healthy and in accordance with modern sanitary requirements. The streets laid out are required to be of three widths, viz., 12, 15, and 20 yards, this being dependent upon their length and the character of the property to be erected, and in addition to the street proper a building line, varying from 2 to 20 yards, is usually laid down. Villa residences are built detached or semi-detached, in which case the drainage is usually into the front street, but when houses are built in terraces a back road is laid out at the rear 7 yards in width, and a sewer is generally laid in it, while in the front street there is only a shallow drain for surface-water and roof-water. The regulation as to yard space at the rear of all houses requires the distance across to be not less than 15 ft. in the case of a two-story building, and 20 ft. for one of three stories. Every house has a separate yard, and the drainage from each house is kept within its own yard, and is connected direct to the sewer, a Duchan trap being placed on the house drain just inside the private property. Water-closets are required in all cases, and on no account is a privy or cesspool allowed. For several years there has been a great demand for houses, and, as a consequence, the building trades have been very brisk. The average number of houses erected during the four and a half years, in which I have been the surveyor, has been about 200 per year: a considerable number of them being of a superior class, and of large size. The town is noted for its excellent hotels, and recently several large hydropathic establishments have been erected, and one of the oldest has been considerably enlarged.

The supply of gas is in the hands of a private company, from whom the Corporation purchase the gas for the public street lamps; the price paid being at the rate of about 2s. 8d. per 1,000 cubic feet. The present number of public lamps is 564, made up as follows, viz., 473 consuming 5 cubic feet per hour; 85 consuming 10 ft., and 6 consuming 30 ft. per hour.

Along with most other Corporations the Harrogate Town Council has had the subject of electric lighting under consideration at various times during the last few years, and in 1891 a Provisional Order was obtained enabling the Corporation to lay down the necessary plant and supply electricity within the whole of the Municipal borough. During the time which has elapsed since the order was granted, the Electric Lighting Committee have made careful inquiries, and have visited towns where installations have been laid down, and they have also had the advice of an expert in the matter. At the present time, advertisements are being issued inviting persons or companies to send in offers for the transference of the Corporation's powers, duties, and responsibilities, upon terms to be mutually agreed.

The water supply is in the hands of a private company, whose engineer, Mr. Dixon, is present to-day, and will read to you a paper on the works belonging to the company.

One of the most important features of the town is the bathing establishments, which are the property of the Corporation. The Victoria Baths, which also contain the Municipal offices, were erected in the year 1871 by the Board of Improvement Commissioners, at a cost, including the estate adjoining, of about 30,000*l.* Numerous additions have been made from time to time to this establishment in order to meet the demands of the public for new and improved forms of baths and bathing appliances, and these have been much appreciated by the visitors. This establishment was originally erected for immersion baths chiefly, and these have been and still are extensively patronised by persons from all parts of the

globe, who come for the benefit of the sulphur water, for which the town is noted; but as medical science advanced and new systems of bathing, massage, douching, &c., were introduced it was felt that in order to keep Harrogate in the front rank some great efforts must be made, and increased facilities afforded for these special forms of baths. After thoroughly ventilating the subject in the Town Council, and discussing the pros and cons. with the medical faculty, it was decided in the year 1887 that the Borough Engineer, Mr. E. Wareham Harry (who is now the Borough Engineer of Cambridge), should visit some of the principal watering places on the Continent with a view to formulating some scheme of future development. Mr. Harry visited, along with the Mayor and two medical practitioners, Aix-le-Bains, Baden-Baden, Homburg, Wiesbaden, Aix-la-Chapelle, Spa, and Marlioz, and upon his return home presented a report to the Council embodying the information gathered during the visit. In accordance with the recommendations contained in the above report, plans were prepared for altering and enlarging the Victoria Baths so as to provide suites of baths on the line of those visited on the Continent. These plans were completed and tenders obtained for carrying out the work, when the Montpelier Estate, which was then owned by the late Alderman George Dawson, came into the market, and after considerable negotiations it was purchased by the Corporation for the sum of 29,500*l.* This estate contained a number of valuable springs, together with a suite of baths, which were found to be not quite up to the standard of modern requirements, and it was therefore decided, after very careful consideration, to pull them down, and in their place to erect an establishment which should contain all the most modern forms of baths and bathing appliances, together with a promenade or winter garden for the accommodation of bathers and visitors during inclement weather. In connexion with this scheme I made a careful survey and prepared lithographed plans of the site, giving the levels and other requisite information, and advertisements were issued, inviting architects to send in competition designs, the result being that Messrs. Baggallay & Bristowe, of London, were appointed architects for carrying out the work. The plans of this establishment (which is expected to cost from 40,000*l.* to 50,000*l.*), have been kindly placed at my disposal by the architects, for the inspection of the members present.* Like most other big schemes, especially those promoted by Corporations, this one has not progressed so rapidly as could be desired, and delays have arisen from a variety of causes. At the present time, however, there seems every probability of the contracts being let and the work commenced before the summer is over, and I am firmly convinced that the buildings when erected will reflect the greatest credit upon the Corporation and the town to which they belong.†

MAGAZINES AND REVIEWS.‡

THE *Art Journal* commences with an article on the "Royal Academy in the Present Century," by Mr. J. E. Hodgson and Mr. F. A. Eaton, a continuation of their previous one on the Royal Academy in the last century. The present article is mainly devoted to Turner, and we observe that the authors have the courage to say that there was something wrong either with Turner's theory or practice as an oil painter, and that the one hundred and ninety-five oil paintings by him in the National Gallery show a larger proportion of ill-digested and obscure work than should have been for a man of his genius. The authors admit that his water-colour works are nearly always equal to his reputation. The whole article is a very able and discriminating criticism on Turner, with some sidelights on Ruskin. An article by Mr. J. S. Little is devoted to Mr. La Thangue and his works. In a paper on some British Industries at Chicago, by Mr. Lewis F. Day, there are some good illustrations given of wall-paper and other designs, including some for costly trimmings by Messrs. Muddiman & Co., concerning which Mr. Day observes that not enough money has been spent on the designing; that if West-end drapers want their customers to

* We published views, plans, and sections of Messrs. Baggallay & Bristowe's design in the *Builder* for August 2, 1890.

† For want of space we are obliged to hold over the remainder of our report until next week.

‡ The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that is within our province to comment upon.

spend two or three pounds a yard on a trimming, they should begin by spending two or three pounds a yard on the design. No doubt they would if the customers demanded design worth that—but unfortunately they do not. To most of them one design is as good as another, in an artistic sense.

The *Magazine of Art* gives an article on the Royal Academy Exhibition; Mr. Wedmore continues his article on English etching, giving great but well-deserved praise to the etchings of Mr. F. Short, and Mr. Spielmann contributes an article on the National Gallery of British Art (the building, not the pictures), in the course of which he shows at all events that he is not an architectural critic. It seems to be supposed that anyone who is a critic on pictures can criticise architecture. That the plan of the gallery is a good one we admit, but Mr. Spielmann is evidently not in the least aware how commonplace the design is. Mr. Britten's page design, "June," with her sunshade in her hand, goes oddly with Mr. Swinburne's totally idealising verses. Those who admire the Meissonier exhibition will find some reminiscences of it in an illustrated article by Mr. Claude Phillips.

In *Harper* the article on "An Artist's Summer Vacation," by Mr. J. G. Speed, gives a very pleasant account of the manner in which Mr. W. M. Chase, the President of the Society of American Artists, spends his vacation in teaching and overlooking the amateurs during his summer abode and forming a kind of class among them. The second part of the Evolution of New York, by Mr. T. A. Janvier, is as interesting as one would expect any careful history of the growth of such a city to be. "Wyoming—another Pennsylvania," by Mr. Julian Ralph, is another historic article, but not so interesting as that on the great city.

Scribner concludes the papers under the title "An Artist in Japan," by Mr. Blum, accompanied by some very spirited and occasionally very pretty illustrations of Japanese personalities and scenery, and one entitled "Architecture of Ikao," a sketch of a street. A short article on "A Notable Hotel," viz., the St. Denis in New York, concludes the number, with some illustrations of the interiors. There is nothing else of specially artistic interest in the number, except a frontispiece showing the "Fall of a Giant Redwood," which gives a good idea of the scale of an American forest.

The *Century* contains an article by Mr. A. F. Jancani upon the last act of art-criticism, *Vierge*, with a number of illustrations, one of which is "Bashibazouks returning from a Raiding Expedition," a night effect, is a revival of the old manner of wood-engraving by white lines out of the dark, instead of dark ones left between the cuts. Some of the scenes in Parisian life that are reproduced are admirably delicate bits of work. The literary portion of the article seems rather too exuberant. A short poem in the same number on "Art," signed Florence Earle Coates, contains a thought well expressed. The frontispiece is a fine reproduction of the head of the "Juno" of Argos, discovered in 1892 by the American School of Athens.

The *English Illustrated* commences with an article on the Red Cross Hall in Southwark, in which the "Heroic Deeds of the Poor" have been illustrated by Mr. Walter Crane in fresco paintings amid decorative panelling and borders; illustrations of two of the pictures are given. We are quite unable to see why there should be special illustrations of the heroic deeds "of the poor," as if they were specially praiseworthy, or where the line is to be drawn between poor and rich; but the idea of decorating a hall with frescoes of heroic deeds of anybody's, poor or rich, is a happy combination of moral and artistic influence. The first of a series of papers on "The Romance of Modern London" deals with railway stations, which we quite agree have much romance about them, and are in an artistic point of view "a much neglected institution," but the article does not make much of the subject.

The *Studio* commences with a paper by Mr. Walter Crane, "Notes on Gesso Work," with illustrations; which we need not say is of value. Mr. D. S. MacColl's article on "Exhibition" puts very well the best objection of the outsiders to the Royal Academy system, that so many men acquire a right to exhibit, independently of the quality of their work; or, as Mr. Walter Crane said at the Architectural Association dinner, they are "taken for granted." A paper on "A New Treatment of Bas-Reliefs in Coloured Plaster" does not give the colour, but gives us some good designs in this work by Mr. R. Anning Bell. An article on "The Collecting of Posters" (pictorial

wall-placards) is chiefly interesting for the piquant illustrations connected with it, some of which seem to have got on the wrong page. They are all French, but there have been some faint signs of improvement in this sort of work in England. The short articles on "Drawing for Reproduction," by various contributors (apparently experts), have a decided practical value. The *Studio* is a paper to be looked at by lovers of art; they may not agree with all its ideas, but there is a freshness and originality in its contributions.

The *New Review* contains an article on "Public Slaughter Houses," by Dr. Richardson, which should be studied by corporations and their architects who have to build abattoirs. Mr. George Moore contributes under the title of the "Academics and their Associates" one of those "slashing" pieces of art-criticism which are the fashion of the day; but vulgar and insolent in style as it is, there is more truth in it than we sometimes find in criticism of this stamp; e.g., in the remarks as to the folly of life-size genre pictures. The article by Mr. H. Arthur Jones on "Middlemen and Parasites" contains some refreshing remarks, apropos of the "Eight Hours Movement," as to the superior importance of the question what kind of work we are going to do in the eight hours. "It is so easy to vote for an Eight Hours Bill. It is so hard to do honest work."

The *Newbury House Magazine* contains an article by Canon Venables on "Lincoln Minster," with some sketches; of more interest to the general reader (for whom it is intended) than the architectural student.

The *Pall Mall Magazine* includes an illustrated article by Mr. Charles E. Fripp (whose Japanese subjects many of our readers will remember on the walls of the Society of Water-Colourists), "In a Shinto Temple," and the commencement of a series on "Strange Cities of the Far East"; the first one, by the Hon. G. Curzon, describing and illustrating Soul in Korea. One of Mr. Beardsley's remarkable illustrations (we have no doubt it is his though there is no name to it) forms a weird and fantastic page in connexion with a paper on "The Black Art"; "the black and white art," this may be called.

In *Macmillan*, an article on "Ste. Anne des Deux Mondes" gives a picturesque description and history of the old church at Auray in Brittany, and its associations. A good many of our readers are interested in music, and we may recommend to their notice an admirable little article on descriptive music (or rather against descriptive music), signed "W. H. T.," in which the writer brings out forcibly the radical mistake of treating music as a means of describing external facts, instead of as a separate art with its own ideal.

Blackwood contains a short article by "Mary R. L. Bryce" on the art and influence of Mr. Burne-Jones. With the feeling and intent of the article we sympathise, but we doubt whether this chapter in art (as we may call Mr. Burne-Jones's work) has quite the kind of significance which the writer finds in it. The painter's rare gift in design the writer fully recognises, but is hardly conscious of his limitations. The article however, is not a commonplace one.

The *National Review* contains an article on "The Art of the Year" by Mr. William Sharp, which is far better worth reading than art-critical articles generally are, though we think he does injustice to the Royal Academy, not in his remarks on the pictures which he criticises adversely, for in these we are entirely in accord with him, but in leaving out of notice some really good pictures. Mr. Sharp has the courage, in mentioning the winter loan exhibition, to speak the truth about the sad collection of abortions by Blake which were exhibited, and tells a characteristic story of a critic who in conversation abused them as abominations, but in print spoke of them with admiration, and gave as a reason that "he did not care to incur the scornful contempt of the pseudo-Blake-lovers, who are legion." To such a position of insincerity and claptrap has art-criticism (?) arrived in these days. Mr. Mallock's thoughtful and we think sound paper on "Wealth, Labour, and Ability" is worth attention.

To the *Nineteenth Century* Mr. Gustav F. Stephen contributes a carefully-prepared paper on "Six Hundred Years of English Poverty," a sketch for a history of the Wages system, its fluctuations and their causes. The author regards it as only a brief suggestion of the historical treatment which may be brought to bear on this subject in much greater detail; a subject on which, as he says, ordinary history has hitherto been mostly silent, but which is of the highest im-

portance in determining the causes which affect the real prosperity and wealth of a nation.

In the *Idler* Mr. F. Miller gives a lively description, which we fear is only too true, of "the trials and troubles of an artist" in the prosecution of open-air studies in this Philistine country. One or two of the anecdotes are capital, but we will not spoil the market by quoting them. We doubt however if the English population are a bit worse in this respect than the people of some other countries. Ask artists who have painted out of doors in Holland, for instance.

In the *Gentleman's Magazine* the Rev. M. G. Watkins has a well-written paper on "Kalypso," partly with the view of suggesting to artists a subject in Greek legend which has been little treated. The articles "At a Kneipp Spa" by Mr. H. W. Wolff, and "Around Konstanz and Eterhof," give the local colour of some places not too much known to Englishmen.

The *Antiquary* publishes a short article on "The Year's Pictures," by "M. F. B.," which is disappointing, as it is merely one of the ordinary picture notices of a general kind. An "antiquary" might have given us some very valuable criticism on the subject of the correctness of costumes and other details in pictures representing scenes of past times. The "Notes of the Month," English and foreign, contain a variety of interesting information. The editor contributes a long article on Mr. Jackson's "History of Wadham College."

The *Atlantic Monthly* sets out with an important paper by Signor Lanciani "New Facts Concerning the Pantheon." The main facts are those given by us in the *Builder* of Nov. 19, 1892, and led up to by the observations of M. Chedanne, but there are some new details given and suggestions made. Signor Lanciani considers that the columns and capitals of the portico may be original, but that Hadrian rearranged them; and this supposition would get over the difficulty of imagining that a circular building should be built on to a rectangular portion, when the contrary seems so much the more natural course. Mr. J. Irving Manatt contributes to the same number "Some Reminiscences of Dr. Schliemann," which are very characteristic and interesting.

The *Fortnightly* contains two art-criticism articles, one on "The New Salons," by Mrs. Pennell, and one on "The Royal Academy," by Mr. D. S. MacColl. Both of them are written in the contemptuous and carping tone which is the "note" of contemporary art-criticism, the main object of which seems to be to show that everything and everybody is wrong and stupid, except Whistler and Monet. One gets weary of reading all this captiousness. In one sentiment of Mr. MacColl's article, however we can heartily agree, that in which he advises the clearing of the Academy from its superfluous oil paintings and the proper recognition of art in other forms than painting. That there is an enormous proportion of superfluous and commonplace oil paintings we quite agree; but the mischief of the contemporary art-critic is that he weakens his own case by foolish exaggeration and by making out that everything in contemporary painting is weak and commonplace which does not accord with a certain somewhat narrow standard.

THE GENERAL ELECTRIC CATALOGUE.—The General Electric Company sends us under this title, their very full and useful catalogue of electric plant and furniture and fittings, which they claim to be the most complete catalogue referring to the Electrical industries which has yet been issued. It includes prices and descriptions of everything in connexion with electric lighting and electric communication (motors appear to be relegated to another catalogue), and will be found a useful practical *résumé* of what is wanted in connexion with electric lighting and communication. The designs for standards and brackets are of course neither better nor worse than those that we are accustomed to in trade catalogues. As an instance of the refinement of convenience to which electric lighting arrangements are being carried, we notice there is an automatic switch for attachment to the door of a room, which turns on the light on opening the door, but leaves it turned on when the door is closed, turning it off again when the door is opened a second time, and leaving it off at the closing. The third opening of the door turns it on again, and the same cycle is repeated: the light thus being automatically turned on as the occupant enters a bedroom (for instance) and automatically turned off on leaving it.

FIRE AT LIMEBURY YARD IN KENNINGTON ROAD.—Mr. T. Forman wishes us to state that, although the stock was totally destroyed at Kennington, all orders are being promptly executed from stocks held at the Docks and saw-mills.

Illustrations.

"ÉGLISE PROTESTANTE FRANÇAISE DE LONDRES."

THE site of this church is a parallelogram, 48 ft. by 106 ft., on the north side of Soho-square, and is enclosed by buildings on three sides; the frontage of 48 ft., facing south, being the only one from which light could be obtained. The parsonage and library had therefore to be placed there, with the church in the rear, the central entrance being the only portion visible externally. The space left for the church was 80 ft. by 40 ft., surrounded with walls 20 ft. high, within which and a line drawn at an angle of 45 deg. from the coping the church had to be built.

This gave a nave 46 ft. to the ridge, and 20 ft. wide, aisles 19 ft. high and 12 ft. wide. These latter are groined and top-lighted, finished with asphalt flat roofs to give as lofty a clearstory as possible, on which the church largely depends for its light.

The church is finished with an apse, on the chord of which the table stands with a row of stalls behind, following the line of the apse, and a Presbyter's seat in the centre. The choir sit in these seats with the pastor in the centre, and for the simple ritual, which is Lutheran or Presbyterian, the arrangement answers well.

The organ occupies the wall of the apse immediately above the stalls, with a central terra-cotta panel with a cross, angels, and the Ten Commandments and the Lord's Prayer.

The church seats about 400 people. It is faced internally with buff terra-cotta by Messrs. Doulton & Co. The roof timbers and seating are in sequoia, the colour of which goes well with the terra-cotta.

The heating, by Messrs. Ashwell & Nesbit, is by hot water radiators, entirely, all floor gratings being thus avoided.

The gas-fittings, designed by the architect, were executed by Messrs. Strode & Co.

The modelling was done by Mr. W. Aumonier. The organ was made by Messrs. Hill & Son.

The general contractors for the building, which has been excellently carried out, were Messrs. Higgs & Hill, and the cost, exclusive of site, has been about 10,000l.

Mr. P. A. Beveridge acted as a most efficient clerk of works.

The drawing from which the illustration is taken is exhibited at the Royal Academy.

[We may add that we published a double-page view of the exterior of the church in the *Builder* for June 27, 1891.]

ST. OLAVE'S GRAMMAR SCHOOL, SOUTHWARK.

The building is taking the place of one erected some forty years ago, and which has been pulled down this year owing to its arrangement being unsuitable for modern requirements. The external walls are faced with red bricks. The plinth and other dressings are of Portland-stone, and the roofs are being covered with green Westmoreland slates. All the floors are fireproof, and the stairs are of stone.

The internal accommodation comprises a central hall, 80 ft. by 40 ft., which is open to the roof, and twelve large class rooms, besides a lecture-room and three laboratories which occupy the whole of the second floor. A room for the governors is provided, with others for the Head Master, and the Clerk, and for the assistant masters; there is also a good-sized library. The dining-room, on the first floor, is 40 ft. by 27 ft., with a kitchen and domestic offices over it. In a detached building there are several workshops, with a gymnasium over, measuring 51 ft. 6 in. by 40 ft. The works are being carried out by Messrs. W. King & Son, of Vauxhall Bridge-rd., at a cost of 26,000l. Messrs. Berry & Son are doing the heating by low-pressure hot water. The architect is E. W. Mountford, and the drawing is exhibited at the Royal Academy.

THE "BELFRY," UCKFIELD.

This house is faced externally on the ground floor with red-facing bricks with Corshill stone dressings. The walls of the upper floor, as well as the roof, are covered with red Broseley tiles, the external walls being cavity walls. The wood-work externally is painted white, and the plastering is of "rough cast." The walls of drawing-room, dining-room, gun-room, hall,



"The Belfry," Uckfield.—Plan.

staircase, and gallery are fitted with wood-framed dados, and the floors of these rooms have borders of oak parquet; all internal walls are covered with adamant plastering. The cost of the building was about 3,500l. The architects are Messrs. Lainson, of Brighton; the builders, Messrs. Garrett, of Brighton.

JEWISH MORTUARY CHAPEL, BRIGHTON.

The Brighton Hebrew Committee, having recently enlarged their cemetery, have erected a mortuary chapel. The building is octagonal on plan with angle buttresses. The walls are built as cavity walls and faced externally with red facing bricks with red Corshill stone dressings, the roof being covered with red Broseley tiles. The flooring is laid with marble arranged to form a design, and the windows filled in with tinted leaded glass. The architects are Messrs. Lainson & Son, of Brighton, and the builders Messrs. Garrett, of the same town.

SCULPTURE AT ROYAL ACADEMY:

"CIRCE"; BY MR. ALFRED DRURY.

THIS is one of the prominent groups in the Lecture-room at the Academy, and the figure, in combination with the pedestal and the animals, victims of Circe's enchantments, grouped with it, is a very good piece of decorative design. As a representation of an ancient Greek mythical personage the design fails, just as Mr. Hacker's painting of Circe fails, through want of imaginative power and idealism. The "Circe" is no goddess, but merely a nude model. To architects the whole group will be interesting, however, from the carefully-studied ensemble of figure and pedestal.

"APPLAUSE"; BY MR. E. ONSLOW FORD, A.R.A.

This little work, to be understood, must be considered along with the companion work of last year, "Song," which showed a nude songstress on a similarly designed pedestal with Egyptian detail. The artist this year shows us one of the audience. The figure is very graceful and the design of the pedestal admirable. The size of the whole is just such as to bring the figure level with the eye. It is a kind of treatment which forms rather a new suggestion in what may be called cabinet sculpture.

ARCHITECTURAL ASSOCIATION SUMMER VISITS:

CHENIES, BUCKS.

ON Saturday last, some of the members of the Association visited the pleasant Buckinghamshire village of Chenies, formerly known as Isenhamstead-Chenies, in order to see the ancient manor-house and church. The party were met by the rector, and first inspected the church, which has rather a modern aspect under the influence of restoration, by which some of the character has been altered, as was manifest from a comparison between the present edifice and old views of the church shown to the party by the rector. The chief feature of the church is, of course, the private mortuary chapel of the great Russell family, which forms the north aisle, as it were, of the church, and has recently been enlarged. The monument of the first Earl and Countess of Bedford, the latter being the heiress of Sir John Sapote, by whose marriage to Lord John Russell the manor of Chenies passed to the Russell family, is a remarkably fine example of Elizabethan tomb work in alabaster. The monuments of Francis, Earl of Bedford, who died 1585, his Countess, daughter, and grand-daughter, and of the Earl Francis who died in 1641, are, though

perhaps less exquisitely wrought than the first, of remarkable interest. From these there descend a series of monuments to deceased members of the Russell family, reaching down to that of the late Duke, erected in 1892.

Within the church itself are several very good brasses of fifteenth and sixteenth century date, to the memory of members of the Cheyne family, and others, including former rectors of Chenies and the adjoining parish of Latimers. A couple of stone effigies of early fifteenth-century date, now deposited in the Bedford Chapel, are supposed to represent members of the Cheyne family, but there does not appear to be any certainty on the point.

The manor house has now but a shadow of its former greatness. At one time a royal palace, at which Edward I. and Edward III. occasionally resided, it was for many years the house of the Cheynes; from the Cheynes it passed to the Sapcotes by the will of Agnes, Lady Cheyne, in 1494, and by the marriage of the heiress, Anne Sapcote, as above mentioned, to the first Earl of Bedford, came into possession of the Russells.

The present house was evidently part of that erected by Lord Russell, of which erection or "restoration" Leland says, "The old house of Chenies is so translated by my Lord Russell, that hath this house in right of his wife, that little or nothing of it remaineth ontranslatid, and a great deal of the house is even newly set up and made of bricks and timber." Part only of this house remains, the foundations which are occasionally met with showing that it must have been of far greater extent, and apparently enclosed three sides of a quadrangle of considerable extent. Some of the chimneys have very fine examples of carved brick chimney stacks, and there are a few windows with mullions and transoms of "timber" which are sufficient to show the way in which the house was erected. A curious feature is the arrangement of the fireplaces on the south side of the remaining wing, so that no windows face in that direction. It has been suggested that this was done for the purposes of defence, but the suggestion is somewhat far fetched in view of the general plan, disposition, and treatment.

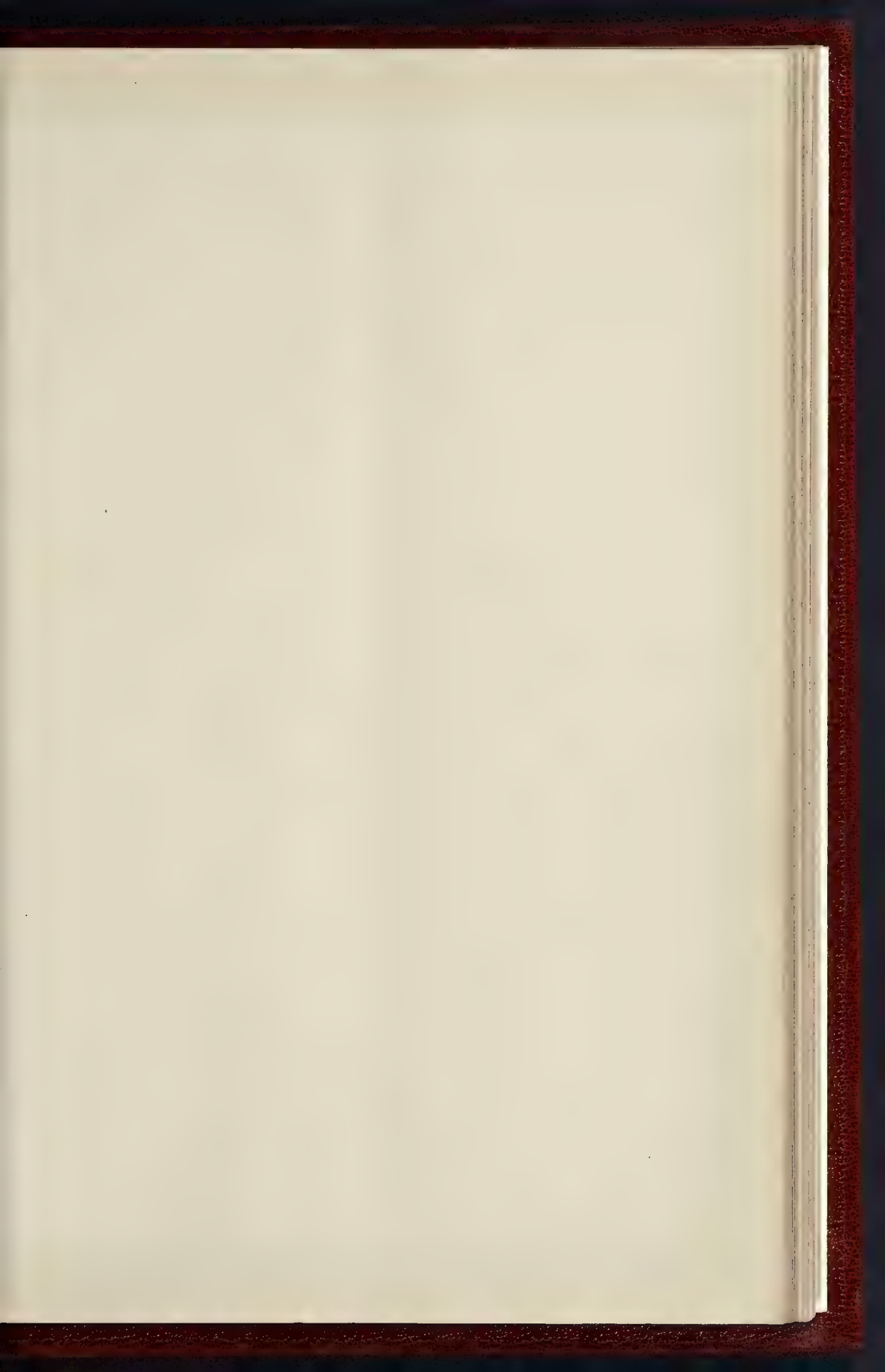
COMPETITIONS.

LOCAL BOARD OFFICES AND TECHNICAL INSTITUTE, LEYTON.—The awards by the Leyton Local Board in the competition for new offices and Technical Institute have just been made known as follows:—1st premium, 100l., to Mr. John Johnson, of London; 2nd premium of 75l. to Messrs. Ashton & Farrow, of London; and the third premium of 50l. to Mr. R. Creed, London.

THE PROPOSED NEW TECHNICAL SCHOOLS, BIRMINGHAM.—The members of the Technical Schools Committee of the Birmingham City Council met on Monday and decided to extend the time until which plans for the new Technical Schools about to be erected by the Municipality in Suffolk-street can be received to the 24th inst. The drawings will be examined by the architect who has been appointed by the committee in the selection of the most suitable designs on the 28th, 29th, and 30th inst. They will afterwards be on view to the members of the committee for a few days.

BUCHAREST AND ESSEG.—Two important international architectural competitions have been decided in the East, one at Bucharest, the other at Esseg. The Bucharest competition was one for the design of a large terminal station, and an extensive block of offices for the railway administration. Here the first premium of 10,000 francs (together with a commission of 100,000 francs for a set of working drawings), has been awarded to Messrs. D. Mariel of Paris, and Blanc of Bucharest; the second premium of 30,000 francs, has been taken by M. Farge of Paris, and the third by Messrs. G. Magni and G. Parisi of Rome. Fifty-one designs were sent in. The Esseg competition was for the design of a large church. In this case, Germany, represented by Herr Langenberg, of Bonn, took the first premium, and Herr August Kerstein of Vienna, the second. Some thirty candidates had sent in drawings.

NEW HOSPITAL, GOTHENBURG.—English specialists in hospital architecture can, if they are inclined, try their skill in comparison with their foreign confreres in a competition for a small model hospital at Gothenburg, in South Sweden. Two main blocks, with sixty beds each, are required, besides an isolation ward in a separate building, the administration offices, kitchens, laundry, mortuary, and chapel. There will be a jury of four assessors, the majority of whom are eminent





ST. OLAVE'S GRAMMAR SCHOOL. SOUTH

Rebuilt by the late Mr. 1896

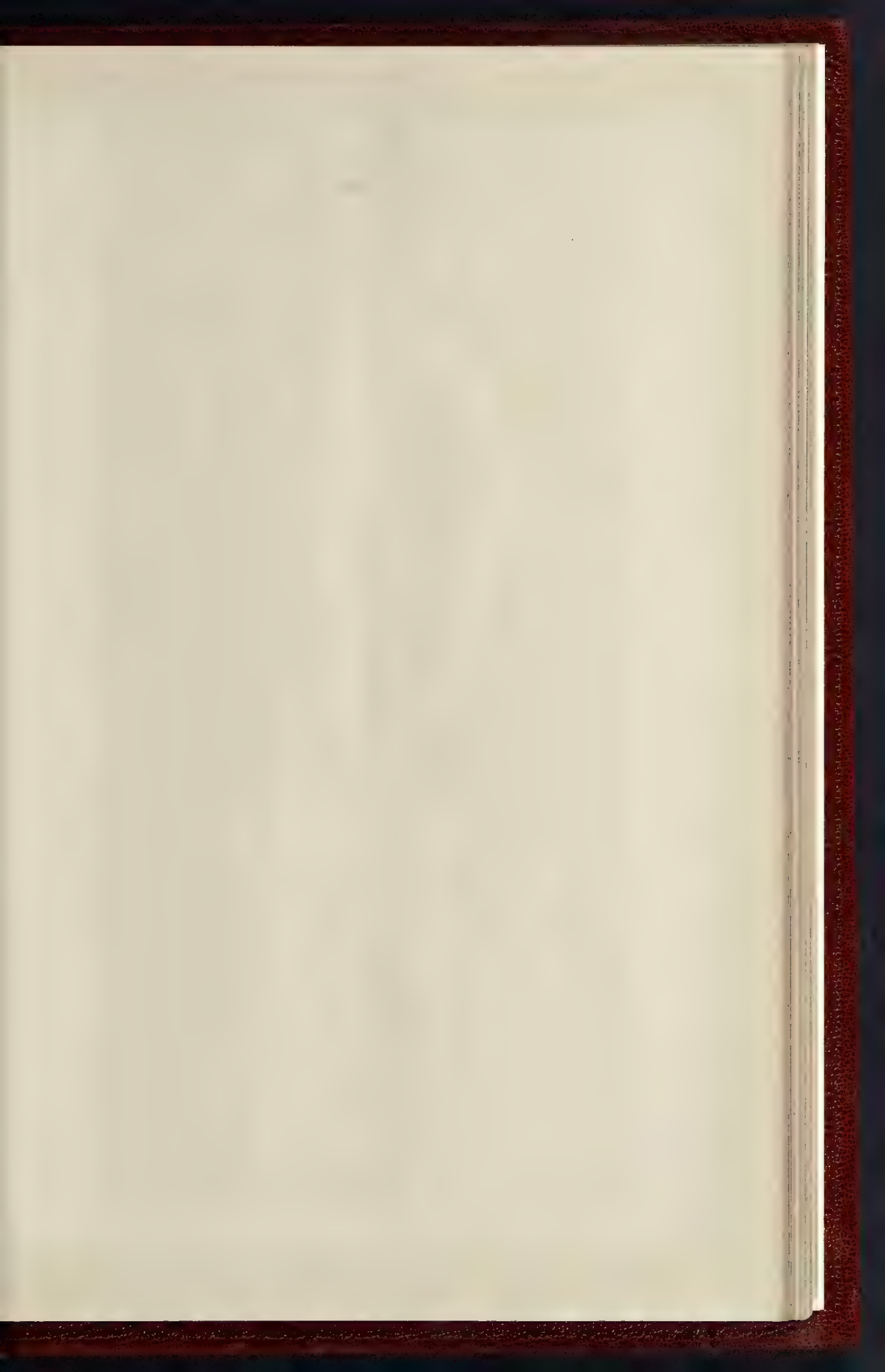


MR. E. W. MONTGOMERY, F.R.I.B.A. ARCHITECT



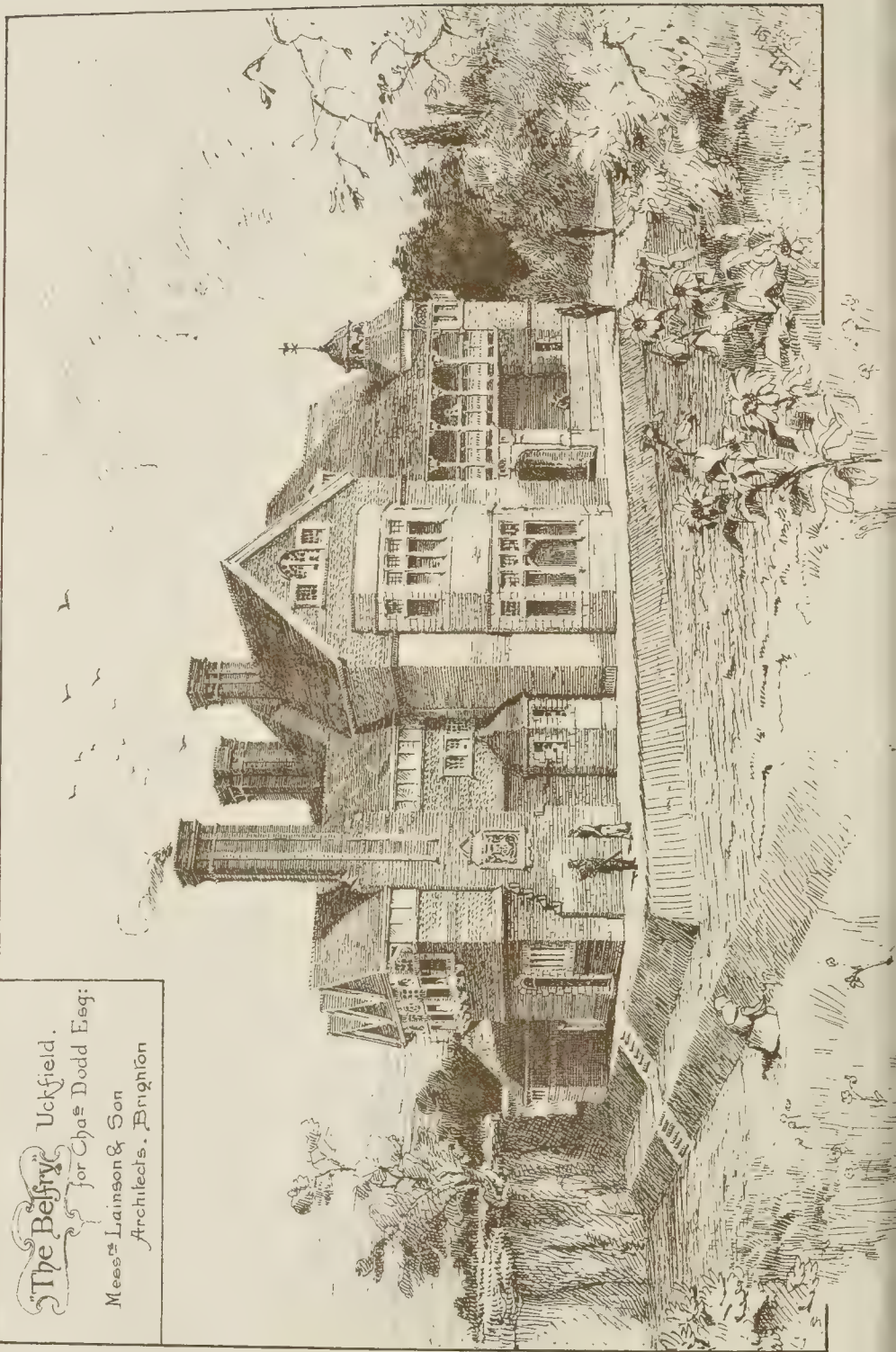


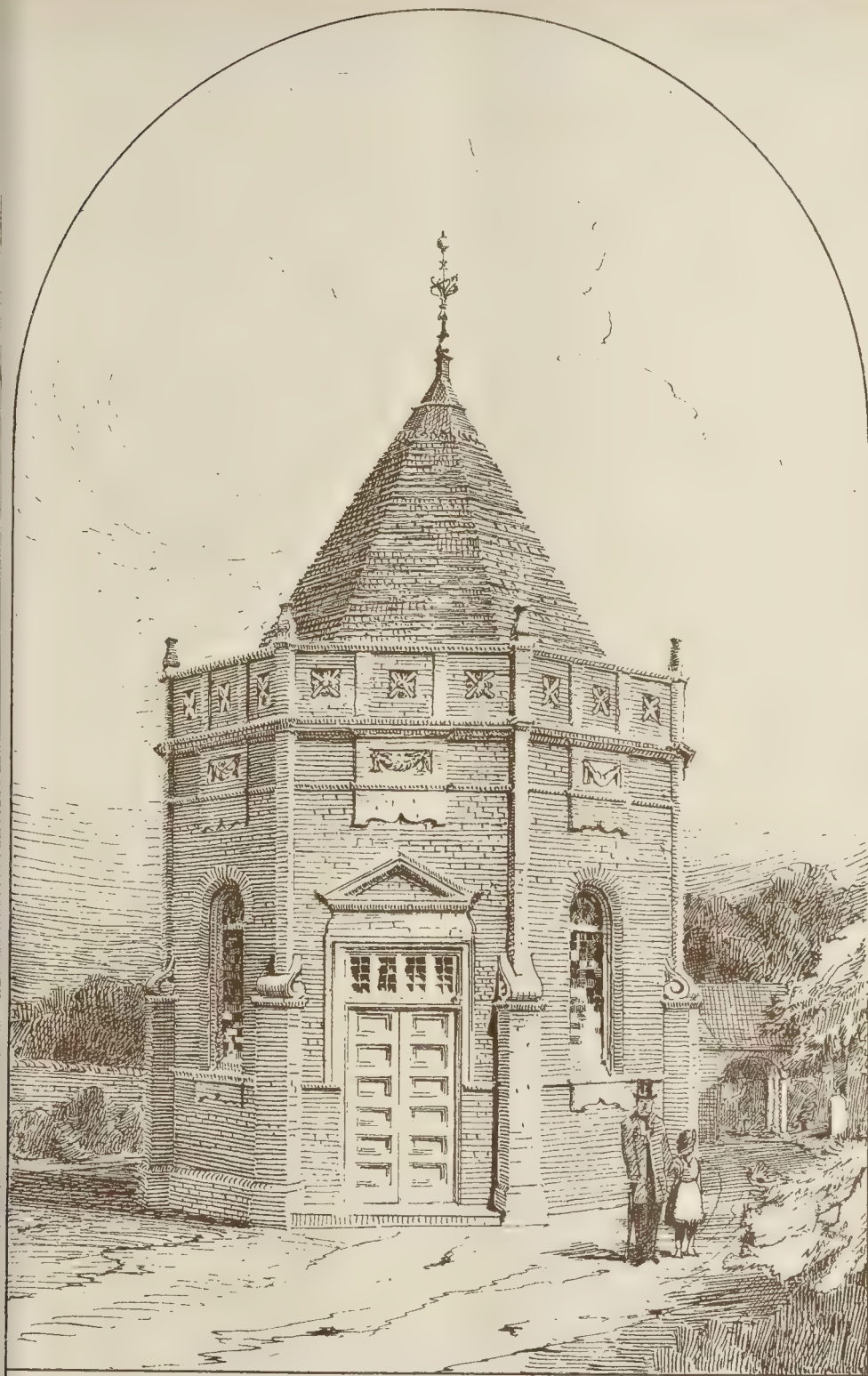
SCULPTURE AT THE ROYAL ACADEMY.
"CIRCE." BY MR. ALFRED DRURY.



THE BUILDER, JUNE 10, 1893

The Belfry Uckfield.
for Chas Dodd Esq:
Messrs Lainson & Son
Architects. Brighton



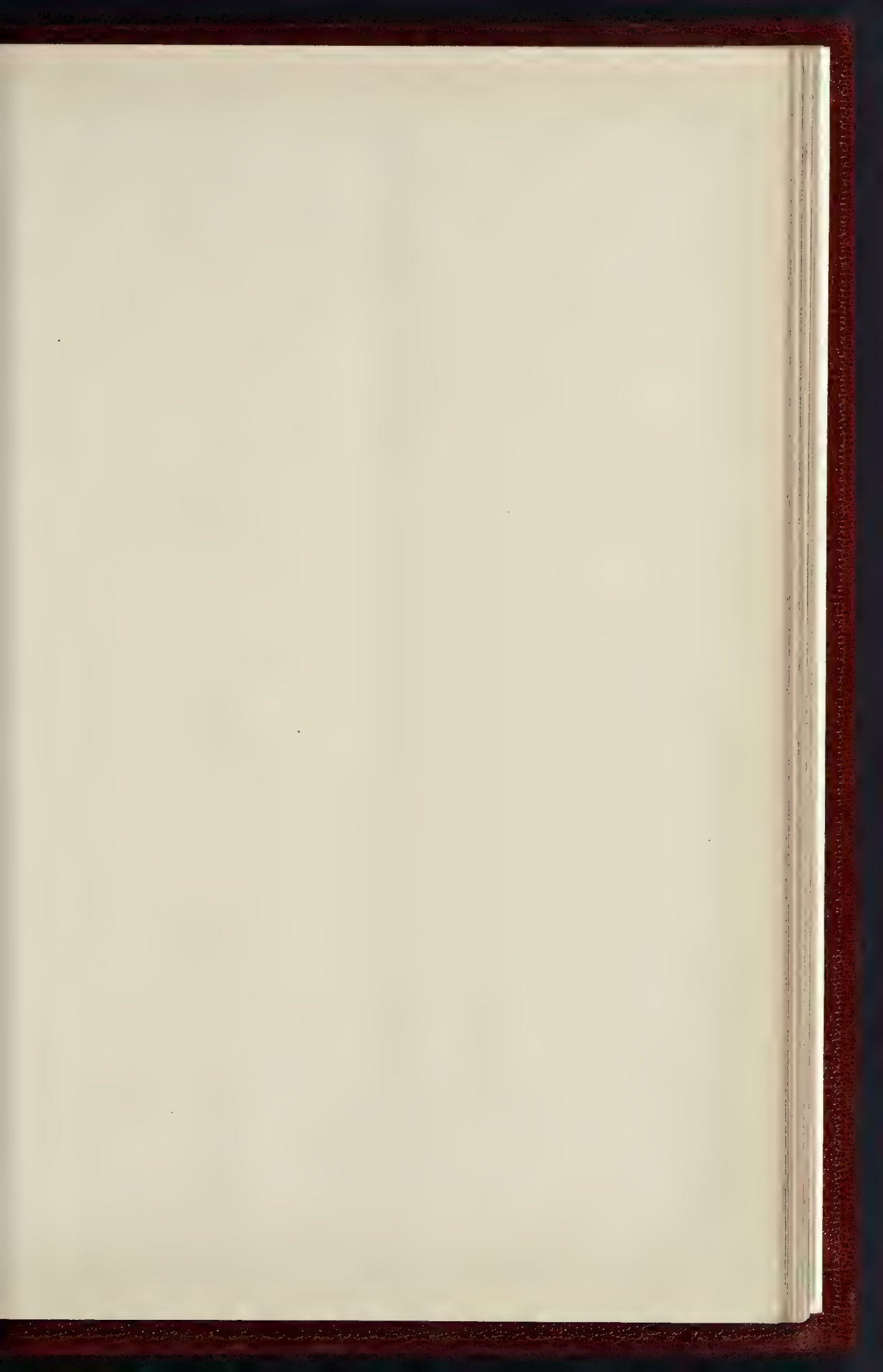


Mortuary Chapel • Hebrew Cemetery • Brighton • Linson & Son • Archts.

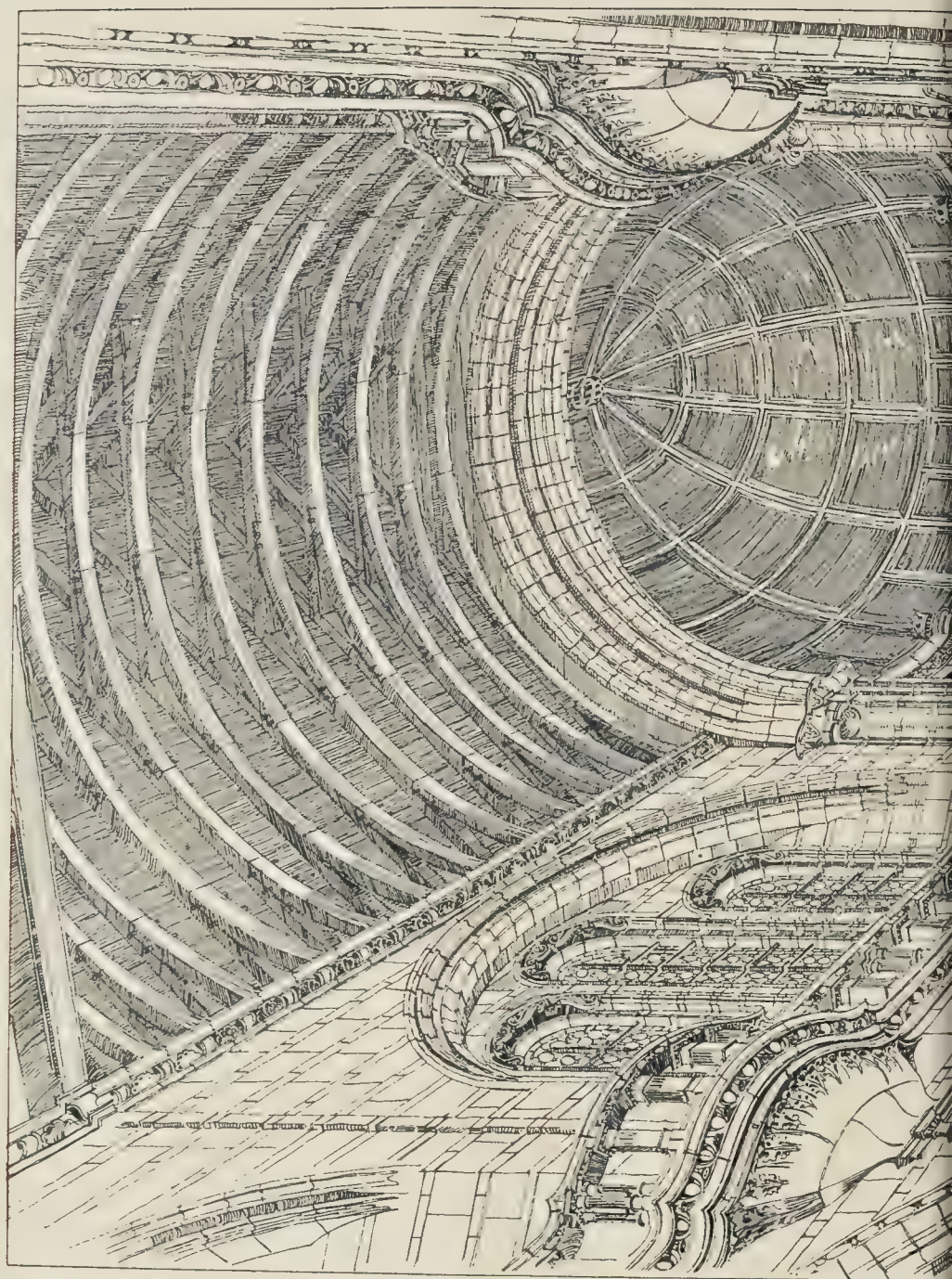
PHOTO BY THE BUILDER



SCULPTURE AT THE ROYAL ACADEMY
"APPLAUSE." BY MR. F. ONSLOW FORD A.R.A.



THE BUILDING. JUNE 10, 1893.



medical authorities. Three premiums are to be given of 3,000, 1,500 and 750 crowns respectively, and the sending in day is August 31. Particulars may be obtained from Dr. E. von Sydon, Gothenburg, Sweden.

ARCHITECTURAL SOCIETIES.

NORTHERN ARCHITECTURAL ASSOCIATION.—The first excursion of the season of this Association took place on the 3rd inst., when nineteen gentlemen left Newcastle for East Hartlepool. Visits were made to the old Church of St. Hilda; the Docks; the Municipal Buildings (Messrs. Freeman & Robins, architects); the Church of St. Paul (Mr. C. Hodgson Fowler, architect); the Church of St. Aidan (Mr. J. H. Morton, architect); and the old Church at Stanton, renovated (Mr. J. H. Morton, architect).

EDINBURGH ARCHITECTURAL ASSOCIATION.—The members of the Edinburgh Architectural Association had their annual excursion on the 3rd inst. to Cupar and district. The company included Mr. W. W. Robertson, President, and Dr. Rowand Anderson, Vice-President. Mr. Thomas Ross acted as leader throughout the day. On arriving at Cupar the party first visited the old church there, where they were received by the Rev. John Scouler. The church was erected by the Priory of St. Andrews in 1415. Only fragments of the original edifice now remain, including a north-west tower, the spire of which was added in 1620 by the parish minister. Within the modern church, and set into the gable, is a mural effigy of Sir John Fernie. The next place visited was Preston Lodge, a residence of the seventeenth century. Internally the principal feature is the timber staircase, in perfect preservation. The party then drove to Dairsie Church, a few miles east from Cupar, where they were received by the Rev. Robert Wright. The church was built by Archbishop Spottiswoode in 1616. Adjoining the church is Dairsie Castle, a ruin of the sixteenth century. The Bridge of Dairsie, in the immediate vicinity, was also inspected. Supposed to have been built in 1522, there are evidences that a bridge was there in 1496, and on one side are to be found the arms of Archbishop Beaton. Driving through Durrie Den, a hall was made at Ceres, and a visit was paid to the old church there. From Ceres the company proceeded to Craighall Castle. Struthers Castle was next visited. The castle, now a ruin, was for centuries the chief residence of the Lords Lindsay. Lastly, the party visited Scottarvit Tower, an example of an old Scottish keep. From Scottarvit the party returned to Cupar, where they dined in the Royal Hotel. After dinner the company returned to Edinburgh by train.

ARCHAEOLOGICAL SOCIETIES.

NEWCASTLE SOCIETY OF ANTIQUARIES.—A meeting of the Newcastle Society of Antiquaries was held on the 31st ult. in the Old Castle, Newcastle, the Rev. Mr. Adamson presiding. Mr. J. P. Gibson, Hexham, read some notes on the Roman Wall, contained in a letter to himself from a Scottish archaeologist, Mr. Smith said he was inclined to think the wall was anterior to, or coeval with the Vallum, and prior to many of the stations. He could not admit that the Vallum was a stockaded road. Stockaded it may have been, and probably was, but that was to increase its defensive capabilities. He looked upon the Wall and the Vallum as a part of one defence, the one necessitated by the other. He was also led to the conclusion that Hadrian was the builder. The Rev. C. E. Adamson M.A., read some notes on Haltwistle Church, which, he said, belonged to the early part of the thirteenth century. Considering its proximity to the Border, it was wonderful that the church had come down to the present day with so little injury. Mr. Blair read some "Notes on Skeletons and on an Ancient Key found at Hartlepool," by the Rev. E. Taylor, F.S.A. Votes of thanks were passed to the writers of the papers, and the meeting ended.

EAST YORKSHIRE ANTIQUARIAN SOCIETY.—On the 30th ult. the Antiquarian Society of East Yorkshire held the first of their series of summer meetings. The chief feature of the day was the opening of a barrow on the Marton estate of Mr. Ralph Creyke. The members first proceeded to the nearest point of Dames Dike, where a paper was read, illustrated by specially prepared maps and diagrams, by the Rev. E. Maule Cole, Vicar of Wetwang. On returning to Marton

Hall the company, which now numbered about eighty, gathered round the opened-out prehistoric grave, whilst Mr. Cole and Mr. Mortimer explained the general features of the Yorkshire Wold barrows, with particular reference to the interesting finds at Marton and Driffield.

THE LONDON COUNTY COUNCIL.

The London County Council reassembled on Tuesday afternoon at Spring-gardens, after the Whitsuntide recess, Mr. John Hutton, Chairman, presiding.

Dwellings for the Working Classes.—The Finance Committee's report contained the following:—

"On the 1st March (No. 11) the Council passed the following resolution:—

"That the rents to be charged for dwellings erected by the Council shall not exceed those ruling in the neighbourhood; and shall be so fixed as to provide a net return of not less than 3 per cent. (after allowing for a sinking fund for rebuilding and all outgoings) upon the value of the land (subject to the obligation to erect dwellings upon it) plus the cost of building with ordinary foundations, and that all such dwellings shall be so designed that the cost of erection may not exceed a sum which will enable the Council to carry out the foregoing conditions."

and instructed the Finance Committee to report fully on the financial aspects of the subject. As the Council's officers are not yet in a position to furnish any detailed information on this subject except as regards the site at Brook-street, Limehouse, we confine our observations to that scheme for the present.

The estimated receipts and payments on maintenance account on the Brook-street site are as follows:—

RECEIPTS.		PAYMENTS.	
Estimated rental	£684 0 0	Rates and taxes	£79 9 6
		Water rate	17 0 0
		Insurance	6 0 0
		Repairs	62 8 0
		Management	40 0 0
		Gas	25 0 0
		Loss of rent and empties	31 4 0
		By balance surplus of receipts	362 18 6
	£684 0 0		£684 0 0

It must be borne in mind that the Council, unlike a private company erecting dwellings of this nature, can only obtain the capital required to erect the buildings by the issue of stock, and is obliged under the Money Act to provide a sinking fund to redeem the stock at the end of sixty years or such shorter term as the stock may have to run; and in the present case, as the capital required will not be large, the advance will be made out of stock which has fifty-six years unexpired. The question of the rate of interest and of the mode of repayment of the capital has been carefully considered, and we have come to the conclusion that for this case the rate of interest should be 3 per cent., and for sinking fund that the basis of calculation may fairly be taken on the annuity method, replacing the capital in fifty-six years by a 2½ per cent. cumulative annuity. This works out as follows:—

Balance of receipts from maintenance on account		Interest and Sinking Fund on cost, viz.,	
Amount to be added out of rate each year	£362 18 6	Land	£1,200
	64 13 4	Buildings	10,700
		Plans, &c.	500
			£12,400
		Interest at 3 per cent., 154 years	£372 0 0
		Sinking Fund—Cost	£12,400
		Less selling price at end of 56 years	5,760
			£6,640
		Cumulative annuity at 2½ per cent. to provide £6,640 in 56 years	55 11 10
	£407 11 10		£407 11 10

It will be seen that under this plan there will be a charge of 64s. 13s. 4d. on the rate each year, assuming that the receipts and expenditure are as above stated. The total charge during the whole period (i.e., 56 years) on this basis will be 3,621s. 6s. 8d.

It has been contended that the allowance for repairs and loss of rent is too low, but it is submitted that, as the rent of the lodgings has been placed at as low a rate as those of the locality, and the rooms and accommodation are superior, there is little probability of the rooms not being occupied by paying tenants. The buildings will provide accommodation for 198 persons.

We report the foregoing for the information of the Council, and are of opinion that it would be desirable before any definite order is given for the erection of further buildings that a report on the financial bearings of each of the blocks of buildings proposed to be erected should be first submitted, and the desirability of the work being carried out by the Council or of the land being sold or let to private persons for building workmen's dwellings being considered."

Limit of Height of Buildings, whether on Old or New Foundations.—The consideration of the Special Report of the Building Act Committee on this subject was again adjourned until next week. We gave the text of the report in the *Builder* for April 29 last, p. 326.

Railway Stations in London.—The Building Act Committee also reported as follows:—

"The Council on July 12, 1892, referred it to us to consider and report on the expediency and practicability of obtaining such an amendment of the Metropolitan Building Acts as to bring within the provisions of those Acts and of the Metropolitan Management Acts the London railway stations and other excepted structures; and on March 29 last we submitted a recommendation, which was however referred back to us. Having again considered the subject, we submit the following recommendation, viz.:—

"That the following words be added to the exemption clause of any new Building Act:—

"Provided that nothing herein contained shall exempt any building or structure from the provisions of the said section of the Metropolitan Management Amendment Act, 1869, as to general lines of buildings, or from those of the said and following sections of the Metropolitan Management and Building Acts Amendment Act, 1891, relating to building within 'the prescribed distance' of the centre of the roadway, and the Acts amending the same."

Further we are of opinion that if the Council decides to apply for further powers of control over the railway companies, such powers should be sought for by other means than an amendment of the Building Act, and, inasmuch as the Highways Committee have already for some time past had the matter in hand, we think the whole question should be referred to them. We recommend:—

"That it be referred to the Highways Committee to consider and report whether any further powers of regulation and control with regard to the construction of railway stations should be sought by the Council."

The recommendations were agreed to.

The Duchy of Cornwall's Insanitary Property in Lambeth.—The Public Health and Housing Committee presented a long report on an area situate to the rear of and parallel with Stamford-street, Lambeth, known as the Salutation-place area, belonging to the Duchy of Cornwall, and submitted the following recommendation:—

"That, subject to an estimate being submitted by the Finance Committee, in accordance with the statute, and subject to application being made to the Secretary of State for an order determining the amount of contribution to be paid by the Vestry of Lambeth, unless the Vestry shall previously agree to bear half the said cost, the Council do pass a resolution, under section 39 (1) (b) of the Housing of the Working Classes Act, 1890, in respect of the Salutation-place, Lambeth, area, and do order its seal to be affixed thereto; and do direct a scheme under Part II. of the Act to be prepared for the improvement of the area; and that the Committee be authorised to prepare a scheme accordingly."

The following was the resolution referred to in the recommendation, viz.:—

Resolved—"That it appears to the Council that the closeness, narrowness, bad arrangement, and bad condition of the buildings situate upon a certain area, known as the Salutation-place area (comprising houses in Salutation-place and Peer's-coopage) in the parish of Lambeth, in the county of London, delineated and coloured red on the plan now before the Council, marked A, and the want of light, air, ventilation, and proper conveniences, and other sanitary defects in the said buildings, are dangerous or prejudicial to the health of the inhabitants of the said buildings and of the neighbouring buildings, and that the demolition, re-construction, and re-arrangement of the said buildings is necessary to remedy the said evils, and that the area comprising those buildings and the yards, out-houses and appurtenances thereof and the site thereof is too small to be dealt with as an unhealthy area under Part I. of the Housing of the Working Classes Act, 1890. The Council do therefore by this resolution direct a scheme to be prepared under Part II. of the said Act for the improvement of the said area."

In the course of the discussion which took place, Mr. John Lloyd expressed the opinion that inasmuch as the Duke of Cornwall (or in other words H.R.H. the Prince of Wales) was a member of the Royal Commission on the Housing of the Working Classes, it would only be necessary that his attention should be called to the property to get it put in a sanitary state. Eventually, it was decided to send a copy of the report to the Duchy of Cornwall.

Statistics as to Sanitary Inspectors in London.—The Public Health and Housing Committee's report also contained the following statement as to sanitary inspectors in London:—

"It is obvious that the proper performance of the duty of sanitary inspection of workshops by the various sanitary authorities is dependent upon the adequacy and efficiency of their sanitary staff. The

provision made by the sanitary authorities in this respect has been for some time under consideration, and as far back as 1889 a return was prepared showing the number of sanitary inspectors in the several districts of the county. The list has been revised from time to time, and the Medical Officer was instructed to report on the subject. This he has now done, and we have had the report and the return accompanying it printed and circulated among the members of the Council and the sanitary authorities.

The following extract from the report summarises the information obtained, and we therefore think it desirable that it should be recorded in the minutes of the Council—

"The present return shows that the total number of sanitary inspectors in the County, inclusive of 5 vacancies and 17 temporary officers, is 288. This number, for a population of 4,230,474 persons, is equivalent to 1 inspector to every 22,303 inhabitants. In order to compare the number of inspectors at the present time with the number employed in 1889, when the last return of the number of these officers was made, it is necessary to deduct the number of inspectors of the City and Whitechapel, i.e., 15, seeing that information as to these districts was wanting when the 1889 return was prepared. Excluding these two districts, the number of inspectors employed in 1889 was 115, as compared with 173 in 1893, or an increase of 58.

This increase, however, is more apparent than real, for before the passing of the Public Health (London) Act, 1891, the police were concerned in the abatement of nuisances, a duty which, as the result of the passing of that Act, now devolves solely upon the sanitary authorities. I am informed that, before the year 1891, 48 police constables were engaged in this duty, 25 of whom were wholly occupied in connexion with it, and the remaining 23 partially.

In the interval between the two returns, the Infectious Diseases (Notification) Act, the Housing of the Working Classes Act, the Public Health (London) Act, and the Factory and Workshops Act have become law.

It is very difficult to supply any precise material for comparing one district with another, in respect of its need of inspection and the sufficiency of the staff employed, particularly as the duties which devolve upon the inspectors are not identical in every district. Thus, in some districts the inspectors are provided with clerical assistance in the keeping of registers of complaints and proceedings and in the preparation of notices, while in other districts the inspectors do not receive assistance of this sort.

We desire to record our opinion that the increase in the number of inspectors, as shown in the report, has not been adequate, having regard to the additional duties imposed upon the authorities by recent legislation. We think it well, however, that the sanitary authorities should have an opportunity of considering the report before we make any recommendation to the Council. We report the course taken for the information of the Council."

Proposed New Building Act.—The Building Act Committee presented the following special report as to the proposed new Metropolitan Building Act:—

"In accordance with the terms of its reference the Building Act Committee has, during the past four years, spent a great deal of time in considering 'the amendment of the law with regard to the formation of new streets and the erection of buildings, and other matters relating thereto.'

It may be taken as generally agreed by architects, builders, and lawyers alike, that the building laws of London are greatly in need of consolidation and amendment.

The late Government prepared a Bill to consolidate the Metropolitan Building Acts, which we reported upon. Their suggestions were forwarded to the Local Government Board with a request that an opportunity might be given to the Council to suggest amendments of the law, with a view to their incorporation in the Government measure. This was assented to, and a number of amendments, with the approval of the Council, were sent to the Local Government Board early last year. These amendments were referred to the officers of the Board, whose report thereon was not ready in time for the Bill to be introduced that session.

A change of Government followed, and the present Government has not, as yet, seen its way to promising to undertake this very complicated and difficult piece of legislation.

We feel that the matter should not be delayed indefinitely, but that the Council should itself draft a Bill. Such a Bill should, we think, not only embody the Acts comprised in the consolidation Bill of the last Government, but also those clauses of the Metropolitan Management Acts which deal with the laying out of new streets and lines of frontage, also perhaps the Sky Signs Act.

We have submitted to the Council our proposals as to open space at front and in rear of buildings, as these entail important interference with the rights of property, but as regards the many amendments of small details (mostly of a highly technical character) it will probably be sufficient for the Council to see them in the draft Bill, which will in due course be submitted to the Council.

It will rest with the Parliamentary Committee to decide in what way it would be best to introduce the Bill. We recommend—

'That it be an instruction to the Parliamentary Committee, in conjunction with three members of the Building Act Committee, to prepare a Bill to consolidate and amend the laws relating to the laying out of new streets and the

erection of buildings within the county of London with a view to its introduction in the next session of Parliament."

This was agreed to.

Proposed Site for new County Hall and Offices.—The consideration of a report of the Establishment Committee, recommending the Council to acquire a large site, with frontages to Parliament-street and Great George-street, for the erection of a new County Hall and offices, at a cost, for the site alone, of 750,000*l.*, was postponed.

After transacting other business, the Council adjourned.

Books.

Is My House Healthy? How to Find Out. By J. SPOTTISWOODE CAMERON, M.D., Medical Officer of Health, Leeds. London: Simpkin, Marshall, & Co. Leeds: R. Jackson.

THIS is one of the best small books for educating the popular mind in the direction of sanitary existence that we have met with. Short, clearly expressed, and well illustrated with diagrams, it is a *résumé* of the conditions of health in a house which all fairly educated persons can understand, and which does not trouble them with more details than general readers can reasonably be expected to follow. There are only one or two points we have noticed to which we should be disposed to put notes of interrogation, and one of these is a point on which there is still much difference of opinion even among very competent judges, viz., the place and method of admitting fresh air to an apartment. Dr. Cameron thinks that "the inlets should, if practicable, be so placed that the air entering may pass up towards the ceiling to mingle with the heated air there before reaching the inmates." With this we cannot at all agree. The heated air there is what the inmates have breathed, or part of it, and the fresh air must to some extent be fouled by it or bring down some of the fouled air again with it. When the temperature is such that the fresh air requires to be warmed, it should be warmed by other means than that, and if warmed it may be introduced at the level of four or five feet from the floor, much better than sending it up to the ceiling before it is breathed. In speaking of inlets and outlets we should have expected the writer to make it clear which we do not observe that he does) that though several inlets may be desirable, only one outlet ought to be used, otherwise one of the outlets is apt to make itself an inlet under some circumstances, and neither of them will under any circumstances act so efficiently as a single one. In speaking of the ventilation of drains the author does not appear to have taken into consideration the most recent and to our thinking the only rational system, of having the inlet and the downcast down the soil pipe, and the upcast leading from the opposite end of the drain, so as to have the flow of air and drainage always the same way, instead of the one interfering with the other every time a water-closet is used. And in referring to the desirability of small soil-pipes, in consideration of the limited amount of flushing-water allowed by many water companies, a medical officer should have taken the opportunity of making a strong protest against the insanitary limit of "two gallons" insisted upon by too many companies in regulating and approving the fittings. Dr. Cameron speaks as if two gallons were a kind of accepted rate, like five per cent. in money matters, which it certainly ought not to be.

These, however, are only small deficiencies or questionable points on what is in the main a most admirable and useful little book.

The Story of My House. By GEO. H. ELLWANGER. London: G. Bell & Co.

THIS is a very pretty little book, the main interest of which is literary rather than architectural; a kind of journal of reflections on the associations and sights connected with a country house and with the different seasons of the year. The first chapter only, "The Perfect House," bears at all upon the architectural and practical element in house building, and this chapter contains all the old prejudices which we are familiar with about the architect who spoils everything by his want of feeling and want of practical knowledge of the requirements of a house. There are unfortunately a good many architects who are open to these charges (though much fewer than there used to be); but what about the amateur's house? Mr. Ellwanger, like a good many other people, does not seem to be aware that to find that one of the windows is not well placed, or

that a cupboard is omitted by the architect where it would have been useful, is quite another thing from being able to plan and design the house *ab initio*. Let him try that, and he will probably find either that he will be fain to call in the architect's assistance before he has done, or that he will eventually produce a house tenfold fuller of inconveniences and absurdities than any which he can fix on the architect. We knew one of these clever people—he is dead now, and perhaps knows better—who delighted to gird at architects, and designed and planned his own house, in a sort of gimcrack Gothic style, with wonderful pie-crust ornaments in the drawing-room, and showed his skill in planning by placing the ground floor w.c. with the door opening direct on to the central staircase hall, close to and between the drawing-room and dining-room doors and facing the entrance door. That is the sort of thing that generally results from the planning of these people who are so ready to sneer at the architect.

The author's statement that the architect has never devised so simple a contrivance as "an invisible small wardrobe in the wall adjoining the entrance, a receptacle for hats wraps and water-proofs," is of course sheer nonsense. But this is a very small part of the book, and the remainder contains many pleasing thoughts and word-paintings, though we may say that the farther the author gets away from "the house" the better he is. The book is very prettily got up.

Water Tower and Pumping Power Station Designs. New York: The Engineering Record. 1893.

THESE are a set of designs sent in for prizes offered by the *Engineering Record* (New York) for the best designs for treating water towers and pumping stations with architectural and picturesque effect, with due regard to economy. As a set they are highly creditable to their authors, and prove that such erections may be made perfectly agreeable in an architectural sense without any more expenditure than is bestowed upon the ugly and unpicturesque erections which engineers generally devise for these purposes. Whether American engineers are any better than their English brethren in regard to these things we do not know; we imagine the designs in this book are mostly the work of architects; but their authors have the credit of having shown how the thing can be done, and we recommend the book to the attention of English engineers, who might do worse than take some hints from it.

The Mechanical Engineer's Pocket-Book. By D. K. CLARK. London: Crosby Lockwood & Son. Second Edition. 1893.

A HANDY book of reference for ready use in engineering practice, containing 650 pages, well printed, in addition to a general table of contents and a comprehensive index, forming a volume measuring 6 in. by 4 in. by $\frac{1}{2}$ in., suitable for carrying in the pocket. The publishers have wisely abstained from over-encumbering the volume with advertisement. The preface states that the compilation of tables, formulae, rules, and data contained in this pocket-book are arranged with a view to meet the requirements of the mechanical engineer; but in the present day, mechanical engineering is included in civil engineering, and may only be considered to form a distinct branch of study, so far as the process of manufacture is concerned. The mathematical tables, list of weights and measures, particulars of manufactured metals, strength of materials, information connected with milling, electrical apparatus and combustion, will be alike useful to the civil engineer, to the military engineer, and to the manufacturer, as to the so-called mechanical engineer. In the second edition, various new matter has been imported into the text, and we confidently can recommend the possession of a copy of this book to the active practitioner. The next best thing to having data in the memory, is to know where to find such data when occasions demand it.

"The Appraiser, Auctioneer, Broker, House and Estate Agent, and Valuer's Pocket Assistant." By JOHN WHEELER, Valuer, revised, &c., by C. NORRIS, Surveyor, Valuer, &c. London: Crosby Lockwood & Son. 1893.

THERE are excellent points about this little book. Considering the smallness of its size, a very large amount of information is packed into its pages. The usual tables for calculating the value of real and leasehold estate, annuities, &c., are to be found here, together with a well-written introductory chapter on the valuation of property. In the half-score pages devoted to the law of

dilapidations and fixtures a lucid statement of general principles is given which we commend to the attention of the general public as well as of professional men. Probably not one lessee in fifty is aware of the fact that "the duty of leaving the premises in a tenable state of repair is one from which the lessee cannot be excused by the circumstance that the property was not in repair when he entered upon it." The section on mensuration contains some useful odds and ends of information, and not so many extracts from school-books as we usually have to regret in manuals of this kind.

Of other parts of the book we cannot speak so highly. In the long lists of prices of personal property and effects such wide alternatives are commonly given that they are of little value. Thus, "Brass cornice rings, per dozen, 3s. to 12s." The pages on the valuation of builders' work are, we fear, all but useless. But that was inevitable. *No sutor ultra crepidam.*

Notes as to existing Artisans' Dwellings in Flats. By JOSEPH CORBELL, Borough Engineer of Salford. Salford: W. F. Jackson.

THIS is merely a pamphlet containing notes made by the author for the special sub-committee of the Health Committee of Salford, of visits made to various towns to examine the different systems of houses in flats to be found in them. The publication is useful as giving a series of plans of such buildings in various cities, drawn to the same scale, and it may be worth the attention of those who are going to build dwellings of this type.

The Railway and Traders' Calculator; containing Tables for all Rates from the 100th Part of a Penny to 100 Shillings. By M. B. COTSWORTH. London: M'Corquodale & Co. THIS is a large series of tables, which it must have been a work of great labour to compile, giving the rates for weights from a quarter of a cwt. to one hundred tons, computed for all charges up to 5l. It ought to save a great deal of trouble to those who have a large business in sending goods by rail.

Charing Cross to St. Paul's. Notes by JUSTIN MCCARTHY, M.P., and Vignettes by JOSEPH PENNELL. London: Seeley & Co.

We presume it is on account of the illustrations that this book is sent to us. The writing is of very little value, and such as any man with an average power of literary expression could produce in any quantity without much demand on his powers of cerebration. Mr. Pennell's sketches are excellent—in their way; in general effect and in the putting in of the characteristic figures of the London streets. But as the book is sent to an architectural journal, we must say that from the architect's point of view the buildings are almost all very badly drawn, the detail only indicated in the roughest manner, and often indicated wrong. If it is replied that the general pictorial effect was what was aimed at, and that this would have been spoiled by going too much into detail in the buildings, we know that perfectly well, but we are of opinion that pictorial effect is quite consistent with drawing buildings upright, and that we do not think it any improvement to see them crooked.

"The Great Eastern Railway Company's Tourist Guide to the Continent," edited by Percy Lindley (London: published at the Continental Office, Liverpool-street Station), is a useful little illustrated handbook, compiled for the use of travellers by the Great Eastern Railway Company's route to the Continent. By the opening-up of the new "Hook of Holland" route, fresh districts in Holland and North and South Germany are brought within easy reach of the tourist—"districts not yet popular, and not yet spoiled," we are told. "Hook of Holland" is the English of the corner or "Hoek van Holland," at the mouth of the Maas, where new quays and a station have been built. The book (which is perhaps a little too much characterised by attempts at "fine writing," without which it would be quite as useful) can be purchased for sixpence. An abridgement of this guidebook, also illustrated, is published for one penny.

"The World's Columbian Exposition, Chicago, 1893: Official Guide (European Edition)," is a somewhat unwieldy paper guide-book of some 250 pages, of which about 200 pages are advertisements. The book contains a great deal of information as to means of getting to Chicago, and what to see when there and

while en route. The guide is sold for 1s., and is published by Reuter's Telegram Company, London.

WORKS OF REFERENCE.

"The Local Government Annual, 1893," edited by S. Edgcombe-Rogers (London: Local Government Journal Office, Salisbury-square, E.C.) is the second year's issue of an excellent and very convenient publication, of which we spoke favourably on its first appearance a year ago. It has the merit of bringing together a great deal of information hitherto only to be found scattered through various official or semi-official publications. The price of the book is only 1s. 6d. The present edition embodies several improvements, though we cannot include under that head the advertisement which spoils the appearance of the front page of the cover, and makes it look like a trade catalogue. We hope that next year the front cover will resemble last year's in being free of matter extraneous to the title. The work would also be improved by ceasing to interleave advertisement pages with the pages of the work itself. In the list of "Associations of Officers connected with Local Government," we observe the name of one which was missing from last year's issue, viz., the Incorporated Association of Municipal and County Engineers. We are glad that the omission has been supplied, but we think that the name of this important society might have been given precedence in order over some of the other bodies enumerated. So far as we have been able to test it, the work has been carefully revised and brought up to date.

"Every Man's Own Lawyer: A Handy book of the Principles of Law and Equity" (London: Crosby Lockwood & Son, Stationers' Hall Court), is a very useful book, enabling its possessor to form some idea of his legal position in regard to his affairs, business or private, and informing him of his rights, duties, and responsibilities as a citizen. It is now in its thirtieth edition (a fact that says much for its general reliability), and is brought up to date so as to include the legislation of the Session of 1892. It is the work of a barrister, and has been carefully revised. Its price is appropriately enough 6s. 8d., and the expenditure of that sum in its purchase is calculated to save many a fee of the same amount, in that the book will give its possessor a good idea of his position, and will prevent him from too rashly entering upon litigation. Moreover, the book will be of use in an educational sense, inasmuch as it affords a useful key to the laws of the country. Of especial interest to our own readers we may mention the sections devoted to the law of contract, Public Health law, the law relating to the tenure of land and property, employers' liability law, and the law of apprenticeship. The work contains nearly 700 pages, and is well indexed. It is no doubt as true as ever that, where weighty and important interests are concerned, the layman who is his own lawyer has a fool for his client, but it is not the aim of this book to enable the public to dispense with lawyers altogether; indeed, it is likely to open the eyes of people to the necessity of obtaining competent legal advice in all matters of great moment.

"Willing's British and Irish Press Guide, 1893" (London: James Willing, 162, Piccadilly) is one of the handiest and most compact of the now numerous Press directories. It is well arranged and printed, and is sold for one shilling. It is now in its twentieth year of publication, having been formerly known as "May's" Press Guide.

"The Advertiser's A.B.C. of Official Scales and Charges, and Advertisement Press Directory of the United Kingdom, India, and the Colonies" (London: T. B. Browne, 161, Queen Victoria-street) is a large and comprehensive Press directory, and will be found of especial use by advertisers. It embodies several new features, including a useful list of the principal foreign newspapers. It is sold for half-a-guinea.

"The Electrical Trades' Directory and Handbook for 1893" (London: Electrician Office, Salisbury-court, Fleet-street) is now in its eleventh year. Besides the usual directory information, it contains a great deal of matter likely to be useful to all who are or may be concerned with electricity in its now numerous applications. Its published price is 7s. 6d.

"The Gas Engineer's Pocket Almanack and Lighting Table for 1893" (London: W. Sugg & Co., Vincent Works, Westminster) is a very useful pocket-book, containing valuable information for those who have much to do with gas-works and gas-lighting. Its price is 2s. 6d.

"The Garden Oracle, and Floricultural Year-

book, 1893" (London: *Gardeners' Magazine* office, 4, Ave Maria-lane) is the thirty-fifth yearly issue of a very useful illustrated publication (some of the illustrations being coloured). It contains an interesting illustrated article on "garden foes."

The book is to be bought for a shilling.

"Milestone Guides" (London: "Milestone Guides" Office, 81, Carter-lane, E.C.) comprise a very handy series of small volumes for reference by those who walk, ride, drive, or cycle along our country-roads. Apart from railway travellers, cyclists are no doubt the most numerous class of people who go any considerable distance, and these books will be found very handy by them, as they indicate the various points on alternative routes, with the distances. Vol. I., now before us, deals with the Southern section of the country, with London as the starting-point. The volume is sold for 1s., but it can also be had in separate parts at 1d. each. To young architects and others travelling by cycle on sketching tours these guides will be found very useful.

Correspondence.

To the Editor of THE BUILDER.

COTTINGHAM'S COLLECTION—THE FONT OF ARMAGH.

SIR,—Some time back a correspondent, "W. E. D. M.," recalled some interesting information about Cottingham, the architect, and his museum, dispersed in 1850. I should be greatly obliged if he could afford some further information. Among other appropriations, Cottingham carried away from us here the ancient font of the Cathedral of St. Patrick of Armagh. Need I say that this is still a grief and grievance to Irish Ecclesiologists, to whom every relic of this most ancient foundation and primal seat of our church is sacred. It had been buried in troubled times, and recovered in 1810 only to be (well, *de mortuis nil*)—"exported" by Cottingham thirty years later. The "alleged" copy which he gave us (at the cost of Primate Beresford) is no consolation to us.

Perhaps "W. E. D. M.," with access to the catalogues he mentions, and possibly to the original sale-book at Christy & Manson's, and an interest in the subject, could do a great kindness in endeavouring to trace this relic, if it still exists, that, by some chance, restitution might still be made to the church.

It could be but a rude fragment of little interest or value out of Armagh. It is described as resembling a section of a pillar and rudely adorned with figures of angels and sacred symbols.

THOMAS DREW, F.R.I.B.A.

Christ Church, Dublin, June 4, 1893.

ARCHITECTURAL ASSOCIATION DINNER.

SIR,—From your report of what I said, I apparently did not convey that I was speaking of the past views on architectural education, and not of the present.

About the present Architectural school at the Royal Academy I said nothing, except this, that if the profession wanted staid taught there they must let their desire be known.

G. AITCHISON.

SOIL-PIPES AND WASTE-PIPES.

SIR,—As one much interested in the scientific and common-sense treatment of house drainage in opposition to the rule-of-thumb methods so often adopted, I am pleased to see Mr. Arthur Baker's letter in your issue of May 27.

He has hit the right nail on the head when he refers to the adoption of the smallest size of pipes that can with safety be used, and as an advocate for small pipes I should like to be allowed to say a few words in their favour.

For soil-pipes I consider that for all practical purposes one of 3 in. in diameter is not only sufficient, but much superior to one of larger bore. The w.c. apparatus mostly in use is a valve closet, the valve commonly only measuring 2½ in. in diameter, though some measure as much as 3 in.; it follows then that the water discharged through a 2½ in. or 3 in. orifice cannot fill, and therefore cannot properly flush, a soil-pipe of more than 2½ in. or 3 in. diameter respectively. To make a perfect flush the water should descend in the pipe as a piston, fitting closely to the walls of the pipe, which will then be left quite clean after each discharge; whereas should the water &c., be discharged through a 2½ or 3 in. orifice into a pipe of 4, 5, or even 6 in. diameter, it, passing through the oblique branch-pipe, strikes

against one side of the soil-pipe, rebounds against the opposite side, and descends in a zigzag manner, fouling the soil-pipe more or less as it goes. The fixing of a number of closets on one soil-pipe will not necessitate an increase in the diameter of the pipe, for it is rarely, if ever, that more than one closet is discharged at the same moment, and as the discharge would fall through a vertical pipe of 50 ft. in height in less than three seconds, should several be discharged together no inconvenience would result.

It has been urged that a 3-in. pipe would more readily become stopped than a larger pipe, but such is not the case, as the force of the discharge being greater in the smaller pipe ensures that the pipe shall be left clean, whereas the larger pipe may, and generally does, become encrusted.

I am informed that a certain firm of plumbers, who keep one or two men exclusively for unstopping closets and soil-pipes, though they have fixed hundreds of small-bore soil-pipes have never been once called upon to unstop one.

In all wastes, whether soil-pipes or lavatory, bath or sink wastes, the great point to be observed (though usually ignored), is that the outgo of the receptacle shall be of greater area than the waste-pipe itself, thus ensuring a thorough scour at each operation; stoppages and foul pipes thus become impossibilities.

Acting on this axiom I use a 3-in. soil-pipe with a w.c. of 3½-in. outgo, but not a valve closet. For lavatories and sinks I use a 1½-in. outgo with 1-in. waste, and for baths 2-in. outlets (*i.e.*, collective size of holes), with 1½-in. wastes, and I find that these small wastes of short length and fixed without traps under keep perfectly clean, and sweet; the trap is then not only unnecessary but objectionable, as spoiling the force of the discharge and holding foul water; whereas a smaller outlet to the receptacle with a larger waste soon gets so foul that it is absolutely necessary to fix a trap to keep the sink down; this it does very imperfectly, as the trap itself and the short length of pipe above are themselves coated with filth.

BERNARD DICKSEE.

The Student's Column.

CHEMISTRY.—XXIII. ORGANIC CHEMISTRY.

FORMERLY, chemistry was divided into two branches, viz., *Inorganic Chemistry*, treating with the substances which form the mineral portion of the earth, and *Organic Chemistry*, treating with the compounds which were found in plants or animals. This division was adopted when it was believed that the organic substances could only be formed by the agency of the process which we call "life." In 1828, however, Wöhler manufactured urea artificially, and since then a large number of the compounds found in living organisms have been prepared artificially from inorganic substances. As the compounds found in organisms are not confined to organic structures, it has been proposed to substitute the term *Chemistry of the Carbon Compounds* for the term *Organic Chemistry*, because all organic compounds contain carbon. But the inorganic substances called carbonates also contain carbon, hence this latter appellation is little better than the former. The terms *Chemistry of the Hydro-carbons* and *Chemistry of Compound Radicles* have also been suggested, but the original term, "Organic Chemistry," still remains the most popular. Modern organic chemistry may be regarded as that branch of the science which treats with all the compounds of carbon other than carbonates.

One large class of the carbon compounds consists only of carbon and hydrogen, such compounds being termed *hydro-carbons*. Thus naphthalene, which is largely used for the "alcohol" light, is a hydro-carbon having the formula $C_{10}H_8$, and anthracene, which is obtained from coal tar, is another hydro-carbon and has the formula $C_{14}H_{10}$. The latter has become of great importance since the dye, alizarin, has been prepared from it.

In order to study organic chemistry in a systematic manner, it is usual to draw up a classification of the compounds, grouping the substances connected with one another into their various classes. Thus we have groups (1) the hydro-carbons; (2) the alcohols; (3) the ethers; (4) the aldehydes; and so on. It is only intended here to consider a few of the more important compounds classed under organic chemistry with regard to their properties and the sources from which they are obtained, without considering their classification or their chemical relation to other carbon compounds.

Oil.

Oils are divided into two classes: (1) Fixed Oils, and (2) Volatile or Essential Oils.

Fixed Oils.

Fixed oils, when obtained from plants, are usually extracted by pressure from the seeds, the capsules, or the pulp surrounding the seed. They are not often obtained from the roots. When obtained from animals, the fixed oils are usually found in the cellular membrane. Fixed oils are divided into two classes, viz.—(1) Drying oils, and (2) Non-drying oils. Linseed, poppy, nut oils, &c., when exposed for a considerable length of time to the atmosphere become thick, and finally dry up completely into a varnish through oxidation. Such oils are termed drying oils. Olive oil and many similar vegetable oils become rancid and acid when exposed to the atmosphere. These are termed non-drying oils, and are not employed in paint.

The drying oils are mostly obtained from the seeds of various plants.

Linseed Oil, which is by far the most important oil used for paint and putty manufacture, is obtained by compressing flax-seed. The product thus obtained is allowed to settle for a long time. A clear oil, known as *raw linseed oil*, can then be drawn off. The pasty mass which is left behind in the tanks is known as "foots;" it contains water and organic impurities from the seeds. Raw linseed oil should be transparent and of a light colour, and should possess very little odour. Freshly extracted linseed oil should never be employed in paint. It is not fit for use until at least six months after it has been expressed from the seed. Linseed oil begins to boil at about 500 deg. F. At this temperature it decomposes, and gives off acid fumes. The so-called "boiled" oil is prepared by adding certain metallic oxides, such as litharge and red lead, to the raw oil (previously heated to about 200 deg. F.) and heating the mixture to about 350 deg. F. This boiled oil dries much quicker than the raw oil, but produces an inferior surface. For common paints it is usual to employ a mixture of equal parts of boiled and raw oil.

If a film of raw linseed oil is spread upon sheet glass, it should become dry in two or three days, while boiled oil treated in a similar manner should become dry in from twelve to fourteen hours (Proc. Soc. Engineers, 1875). If the oil has been adulterated with a non-drying oil it will remain sticky for several months if treated in the same way. It is said that resin is a common adulterant of linseed oil. This compound darkens the colour of and thickens the oil.

Coreil has recently shown that resin oil may be detected by passing chlorine gas through the suspected oil. It is rapidly blackened if an appreciable amount of resin oil is present.

Nut Oil is expressed from the kernel of the walnut (*Juglans regia*). It dries rapidly, but the resulting varnish is inferior to linseed oil in durability. The oil should be colourless, or very nearly so.

Poppy Oil is also an almost colourless oil. It is inferior to both linseed and walnut oil. It is expressed from common poppy seeds.

Non-drying Oil. *Palm Oil* and *Cocoa-nut Oil* are both non-drying oils, which become rancid upon long exposure to the atmosphere. They are both largely employed for the manufacture of soap and candles. *Cocoa-nut oil* is obtained by crushing the kernel of the cocoa-nut (*Cocos nucifera*) under great pressure. *Palm oil* is obtained from a west African palm (*eleois guineensis*). *Cotton seed oil* is another non-drying oil of considerable commercial importance. It is used for lubricating purposes, and also for soap manufacture. It is also used for adulterating the more expensive oils. Much of the "olive oil" of commerce consists wholly or in part of cotton seed oil. *Fish oils* are fixed, non-drying oils; they are used as food and sometimes as lamp oil.

Volatile or Essential Oils. Essential oils are sometimes obtained by distilling parts of certain plants with water, sometimes by mere pressure of the plant, and sometimes by the distillation of glutinous liquids termed *Balsams*, which exude from punctures or incisions in certain trees and shrubs. *Oil of Turpentine*, the most important of the essential oils, is obtained by distilling crude turpentine with water. Crude turpentine is a semi-fluid mass which flows from incisions in the wood of certain species of *Pinus*. Common resin is left in the still or retort when this crude turpentine is subjected to distillation. The oil of turpentine which distils over is purified by redistillation. The best oil of turpentine comes from America, and the following tests and particulars, published by John Lucas & Co., of Philadelphia, should prove of service in determining the quality of such an oil:—

Turpentine.

Colour—crystal clear and water white. Commercial weight—7 lb. to gallon. Boiling point—320 deg. to 346 deg. Fahr. Specific gravity at 60 deg. Fahr.—0.875 (31 deg. Baume). Usual adulterants are—(1) Rosin oil. (2) Petroleum benzene (or naphtha). (3) Head light oil (150 deg. test).

Tests.

Rosin oil, if present, will retard evaporation. Its presence in any considerable quantity may be detected by allowing the turps to evaporate from a small dish or open cup, when the adulterant will remain as a sticky, resinous oil, with very characteristic resin odour if ignited.

Benzene (or naphtha) shows itself generally by its characteristic odour and rapid evaporation. Tested with the hydrometer 5 per cent of this adulterant will make a difference of $\frac{1}{2}$ per cent. Baume.

Pure turps at 15 deg. C. (*i.e.*, 59 deg. Fahr.), is 31 deg. Baume.

5 per cent. benzene at 15 deg. C. (*i.e.*, 59 deg. Fahr.), is 32½ deg. Baume.

15 per cent. benzene at 15 deg. C. (*i.e.*, 59 deg. Fahr.), is 34 deg. Baume.

25 per cent. benzene at 15 deg. C. (*i.e.*, 59 deg. Fahr.), is 38 deg. Baume.

Headlight oil (petroleum, paraffin oils, &c.):—These adulterants retard evaporation, and can usually be detected by the delicate "bluish bloom" or smoky bluish-yellow cloud they impart to the turps.

(a.) To detect small quantities of these adulterants, fill two white glass vials, bottles or tumblers (the longer the better), one with pure spirits, turps, one with the doubtful article: hold both over a piece of black paper, and look directly down into the liquid; 3 to 5 per cent. of any petroleum will impart a decided bloom or cloud to the turps.

(b.) Test with hydrometer: 5 per cent. of headlight oil will make a difference of $\frac{1}{2}$ deg. Baume.

Pure turps at 15 deg. C. (59 deg. F.) is 31 deg. Baume.

5 per cent. headlight oil at 15 deg. C. (59 deg. F.) is 31½ deg. Baume.

10 per cent. headlight oil at 15 deg. C. (59 deg. F.) is 32 deg. Baume.

25 per cent. headlight oil at 15 deg. C. (59 deg. F.) is 34 deg. Baume.

33½ per cent. headlight oil at 15 deg. C. (59 deg. F.) is 35½ deg. Baume.

Baume or Beaumé Hydrometer.

The *hydrometer* is an instrument for determining the specific gravity or the density of a liquid.

There are several forms of hydrometers. By most instruments the specific gravity of the liquid is determined by noting the depth to which the hydrometer sinks in the liquid, but in some it is ascertained by observing the weight which is required to sink the hydrometer to a given depth in the liquid. The Beaumé hydrometer (Fig. 17) indicates the gravity of a liquid by the depth to which it sinks in that liquid. There are two Beaumé hydrometers, (1) the salimeter, for liquids heavier than water, (2) the alcoholometer, for liquids lighter than water. In the alcoholometer the zero point at the bottom of the scale indicates the point to which the instrument would sink in distilled water containing ten per cent. by weight of common salt. The second point, marked 10, is the point to which the hydrometer would sink in distilled water at the standard temperature. From 10 the scale is continued upwards. Tables giving the specific gravities which correspond to the readings of the Beaumé hydrometers may be obtained by reference to the larger standard works on chemistry, but the highest authorities differ somewhat as to the exact value of the readings given by the Beaumé hydrometer. According to Thorpe, the mark 10 on the Beaumé alcoholometer corresponds to a specific gravity of 1.000; 20 to 0.936; 30 to 0.880; 40 to 0.830; 50 to 0.785; and 60 to 0.745.

Gums, Resins, and Varnishes.

Gums are obtained by subjecting the glutinous matter which exudes from certain trees to distillation. The gums are left as a residue and become hard and brittle upon cooling. They are all more or less soluble in water.



FIG. 17.

Resins are obtained in the same manner as gums, but differ from gums in being insoluble in water, and therefore more suitable for varnishes. Gum Resins consist of a natural mixture of resin and gum.

Varnishes consist of resin dissolved in oil or spirits.

Common Brown Resin, or Rosin, is obtained as a residue by distillation of spruce fir turpentine. It is regarded as having a composition represented by the formula $C_{10}H_{16}O_2$.

White Resin is obtained from Bordeaux turpentine.

Mastic and Sandarach are fragrant resins. The former is said to be yielded by *Pistacia lentiscus*, the latter by the juniper tree (*Juniperus communis*).

Gum Anime is obtained from a leguminous tree of Zanzibar.

Copal appears to be yielded by several trees. The copal obtained from Inhambane is produced from *Copaifera Gorskiana*.

Gum Dammar is yielded by the kauri pine of New Zealand.

Lac exudes from various species of *Ficus*. Shell lac is prepared by melting natural lac, straining and compressing it into sheets. It is purer than the natural lac. Shell lac is much used for lacquers and in the manufacture of sealing-wax. The best gums are usually those of ancient origin. They are dug from the ground beneath the trees which yield them, and in many cases where those trees no longer exist.

Oil Varnishes are made by dissolving the best and hardest gums in oil, usually boiling linseed oil. They dry slowly, but the coat finely produced is superior and more durable to that obtained with other varnishes.

Spirit Varnishes and Lacquers are made by dissolving gums, such as shell lac or sandarach, in methylated spirit or in wood spirit. They dry quickly, but the dry surface of gum which remains is apt to crack and peel off upon exposure to weather.

Turpentine Varnishes are prepared by dissolving the softer resins, such as common resin, mastic, &c., in the best commercial oil of turpentine. They are mostly lighter in colour than oil varnishes, they dry quickly, but the surface of dry varnish produced is less durable than that obtained with oil varnishes.

A Water Varnish is sometimes manufactured by dissolving shell lac in a very dilute hot solution of ammoniac, potash, or soda. The varnish produced is, however, an inferior one.

India-rubber or Caoutchouc.

Caoutchouc may be classed with the resins. It is obtained by drying the juice which exudes from certain trees, notably the *Elasticas*. Pure caoutchouc is white; the black colour of commercial rubber is caused by the smoke of the fires employed for drying the juice. Vulcanized india-rubber is obtained by heating the rubber with sulphur. Vulcanite or Ebonite is also manufactured by heating rubber with sulphur.

Gutta Percha is closely allied to caoutchouc. It is yielded by a large tree sometimes termed *Sonondra Gutta*, but also known under the name of *Dichopsis Gutta*. To collect the milk or juice which yields the gutta-percha, the trees are cut down and their bark is stripped off. The juice which then flows from the tree is collected and exposed to the atmosphere. Many other trees yield juices from which substances, more or less resembling caoutchouc and gutta-percha, may be obtained.

OBITUARY.

MR. GEORGE POTTER.—The death is announced of Mr. George Potter, once well known as a trade unionist of the old school. He died on Saturday last. He was born at Kenilworth in 1832 and served his apprenticeship to a carpenter at Coventry. In 1854 he came to London, soon made himself popular with his co-workers, and became a prominent member of the Progressive Society of Carpenters. It was in the great lock-out in the building trades of London in 1859 that he became prominent.

THE ENGLISH IRON TRADE.—Business in several branches of the English iron market exhibits a slight amelioration. Crude iron shows a slight recovery in the Cleveland district, and in a few instances finished iron is said to meet with more inquiry. The tripleplate department remains in a fairly active condition. Steel is in better demand, and heavy rails in the North West have recovered. Shipbuilders and engineers report a slight increase of activity. The coal trade is still rather unsatisfactory.—*Iron*.

GENERAL BUILDING NEWS.

CHURCH, WESTHAM, WEYMOUTH.—In a limited competition for a proposed new church at Westham, near Weymouth, the plans submitted under motto "Pro Aris," by Mr. George H. Fellowes Prynn, F.R.I.B.A., were selected by the arbitrator, Mr. William White, F.S.A., and have since been adopted by the committee.

NEW TRANSFERS, ST. BARTHOLOMEW'S, SMITHFIELD.—On Monday last the Prince of Wales was present at the opening of the new north transept in the Church of St. Bartholomew-the-Great, Smithfield. Mr. Aston Webb is the architect. In the *Builder* for September 17 last we gave three double-page illustrations showing the interior and exterior of the new north transept and the interior of the south transept, together with a ground plan showing the whole of the church precincts.

THE MUNICIPAL BUILDINGS AT BATH.—The foundation stone of the important enlargement of the new Municipal Buildings at Bath was laid on the 1st inst. by the Mayor, Mr. Jerom Murch. We gave a large view of the elevation of the buildings of High-street, and plans and description in the *Builder* for January 9, 1892. We also gave a perspective view on our number for May 28, 1892. Mr. J. M. Brydson, F.R.I.B.A., is the architect, and Messrs. J. Hayward and E. W. Wooster are the contractors.

THE NEW BUILDING FOR THE ROYAL UNITED SPITAL, WESTMINSTER.—The foundation stone of this new building was laid on Tuesday last by H.R.H. the Prince of Wales. Messrs. Aston Webb and E. Ingress Bell are the architects, Messrs. Mowlem & Co., are the contractors, and Mr. G. Berry is the clerk of works. We published views and plans of the new building in our issue for May 18 last.

ARUNDAL CHURCH.—The oak roof of the nave of the fine old church at Arundel has been carefully examined and reported on by several well-known architects, and owing to the ravages of worm the main timbers have been condemned as unsafe. The work of entire renovation has been placed in the hands of Mr. George H. Fellowes Prynn, of Westminster. The roof which was restored by Sir Gilbert Scott some seventeen years ago, will be carefully copied in detail and renewed in English oak, only such timbers as are found to be untouched by worm being reused. The contract has been undertaken for the sum of 1,058l. 9s. 7d., by Mr. Burrell, builder, of Arundel.

THE NEW CORONER'S COURT AND PUBLIC MORTUARY, WESTMINSTER.—The foundation stone of this building was laid by the Duke of Westminster on the 1st inst. It is being erected by the Vestry of St. Margaret and St. John. The site of the new buildings has a superficial area of 8,175 ft., with a frontage on the Horseferry-road of 75 ft., and a depth of 100 ft. The freehold having been given to the parish by the Duke of Westminster in order to prevent the erection of the mortuary upon the burial ground close by, which has since been laid out as a public garden with the assistance of a grant of 1,000l. by His Grace. The buildings will comprise a public mortuary, constructed in three sections—for the reception of bodies to await inquest, another for the use of parishioners whose dwelling accommodation may render desirable the removal of the deceased to await interment, and the third for use in case of death from infectious disease. There is a post-mortem room, with all proper accessories. A spacious entrance-hall, and rooms for the caretaker's residence complete the accommodation on the ground floor. On the first floor is the Coroner's Court, 34 ft. by 22 ft., with a Coroner's room, a jurors' room, waiting rooms, and the usual adjuncts. On the second floor a suite of rooms has been provided for the free accommodation of families who may have temporarily to quit their dwellings during fumigation or disinfection after the occurrence of infectious illness. The elevation of the principal block of buildings is to be of red brick and Portland-stone dressings, and in the Renaissance style. In the rear, entirely isolated from the main structure, is a chamber for the disinfection of bedding and clothing removed from homes in which infectious diseases have occurred. The plans, specifications, working drawings, &c., have been prepared by the Vestry's Surveyor, Mr. G. R. W. Wheeler, who is acting honorarily as architect. The contractor is Mr. N. Lidstone, of Blackstock-road, Finsbury Park.

BARRACKS EXTENSION IN NEWCASTLE.—According to the *Newcastle Chronicle*, the military barracks at Newcastle are undergoing some extension. A portion of the wall facing Spital Tongues has been pulled down, and will be rebuilt close to the road. On the vacant space will be erected new quarters for married men who are at present living outside the barracks. The new houses will number twenty-six, and adjacent to them will be reared a block of warrant officers' buildings. Additional quarters will be built in line with the wall, and they will extend to between 200 ft. and 300 ft. in length, the contract for the whole amounting to 10,000l. The contractors are Messrs. Kirk & Brown, of Newcastle.

CATHOLIC SCHOOLS, KILBIRNIE, Ayrshire.—Operations have been begun for building a school at Kilbirnie on ground belonging to the Roman Catholic denomination at Ayr. It will accommodate about 170 children. The architect is Mr.

Joseph Cowan, Glasgow, and the tradesmen are—Mr. John Keane, Lochwinnoch, builder; Mr. Alexander, Bridge of Weir, joiner; Mr. H. M. Braid, Glegarnock, slater; and Messrs. D. & J. Tait, Dalry, plasterers.

MANUAL AND COOKERY SCHOOLS, BIRMINGHAM.—On the 24th ult., a new centre for Manual Instruction and Instruction in Cookery for the pupils of the Church Schools in Birmingham, was opened in Bath-row by Sir Alexander Mackenzie, K.C.S.I., Chief Commissioner of Burma. The centre is one of a number which the Birmingham Church Council is endeavouring to provide. The premises adjoin the schools of the Church of St. Thomas, and include a cookery school, accommodating seventy-six girls for demonstration, and twenty-four for practice, and a manual training school fitted with benches, lathes and tools for twenty-two boys. Adjoining the cookery school is a house for resident pupils. Additional class-rooms have also been built, and new playgrounds formed for the exclusive use of the schools of St. Thomas. The buildings have been designed, erected, and fitted up under the direction of Mr. F. B. Osborn, architect, of Birmingham.

NEW BUILDINGS, SWANSEA.—Mr. Archibald D. Dawney, A.M.Inst.C.E., of London, has been instructed to execute the constructional steel and ironwork and fireproof flooring in Messrs. B. Evans & Company's extensive buildings, of which Messrs. J. P. Jones & Rowlands are the architects, and Mr. D. Jenkins, of Swansea, the contractor.

EXTENSION OF HOTEL, LANGLEY BAY, GLAMORGANSHIRE.—The Langley Bay Hotel, Glamorganshire, has just been considerably enlarged towards the west, and it has now a frontage of 60 ft. The building is in the Gothic style, and built of polished limestone, finished in native limestone with red Forest courses, and *voustairs* and freestone dressings, while the capitals are enriched with carvings. The new building has four stories, with a basement, one story having been added under the new plans. The extensions, which were carried out from the designs of Mr. John Gorton, of London, by Messrs. Perry & Co., of Bow, are as nearly as possible in the same style as the old building. The old tower, which was a small one, has been removed, and a much larger one built to the eastward. The general extension has been rendered possible by the cutting away of a large bank which previously existed in the ground to the westward, and in this bank was found sufficient stone to make the whole of the alterations—with the exception of the ornamental dressings. With the surplus stone thus acquired a new road has been made along the front of the tennis-courts, and the basis has been formed of a promenade to extend to a length of 900 ft. The principal entrance is at the east end. On the right of a roomy hall are the managers's apartments and reception room. The hall leads direct to the central corridor, which runs right through the building. On the left of this corridor are ranged the principal rooms of the hotel. At the western end of the hotel are the billiard and smoking rooms, which are approached by a covered bridge. For day visitors a grill-room and a bar and taproom are provided in this portion. The main staircase ascends from the entrance-hall, and there is a service staircase elsewhere. But there is also a fire-proof stone staircase leading to the outside of the building, whilst further precautions have been taken against fire by the creation of a bridge from the upper part of the hotel to the hill behind. Nearly all the bedrooms have a sea view. The water supply is obtained from a covered-in reservoir on the hill-top. There are ladies' and gentlemen's baths on each floor furnished with hot and cold, fresh and salt water, and there is to be a swimming-bath outside, 75 ft. by 25 ft., the excavations being already made. This will be reached from the main corridor without going outside the hotel. The whole of the work connected with the sanitary and hot-water apparatus was carried out by Mr. J. H. Nott, sanitary engineer, Swansea.

ST. PETER'S CHURCH, IFFIELD, CRAWLEY, SUSSEX.—The consecration of St. Peter's Church, Iffield, took place on the 21st ult. The church, which is designed in the Early English style, consists of a nave and north aisle, chancel, vestry, and organ-chamber, and stands on a triangular plot of ground with road on three sides. The materials employed are local Sussex sandstone for the external walls, and red brick for the interior, made at the adjoining brickfields. Monks Park-stone has been used for the nave, arcade and window dressings. The seating has been executed partly in oak and partly in pitch pine, by Messrs. J. Longley & Sons, of Crawley, and a member of the firm has presented the oak pulpit and lectern. The church is lighted by oil-lamps supplied by Messrs. Whipple & Co., of Haring Cross. The work has been carried out by the builders, Messrs. R. Cook & Sons, of Crawley, from the designs, and under the superintendence, of the architect, Mr. W. Hilton Nash, of London. The cost of the building was 2,500l.

ALTERATIONS AND ADDITIONS, MERCHANT TAYLORS' SCHOOLS, GREAT CROSBY, LIVERPOOL.—Alterations and additions to these schools have recently been carried out at the cost of about 5,400l., from designs and under the superintendence of Mr. W. Hilton Nash, architect, of

London. The schools consist of a boys' school for 300 boys, and a girls' school for 200 girls. They were originally founded in the year 1618 under the will of John Harrison, a native of Crosby. The girls' school was originally built in 1888 by the same architect, to accommodate 200 girls. The additions consist of class-rooms and a large hall on the first floor, 60 ft. long, for concerts, &c. At the boys' school the additions consist of class-rooms and a new science school and laboratory for 60 boys. The materials are Ruabon red bricks for the walls, and Grinskill stone and Runcorn stone for the window dressings. The builder was Mr. Samuel Webster, of Bootle.

TOWNS HALL AND MARKET, PONTYPRIDD.—The new Town Hall and Market recently erected at Pontypridd were opened on the 31st ult. by Mr. D. Leysion, Chairman of the Pontypridd Market Company. The building stands in the centre of the town, on the site of the old vegetable market, and has been erected at a cost of 6,000l. by Mr. Watkin Williams, builder, Coedpenmaen, from the designs of Mr. Thomas Rowlands, architect, Pontypridd. The market forms the basement. The new building contains sixty-six stalls, twelve lock-up shops, four restaurants, and store-rooms. The new hall, forming the upper portion of the building, is not yet complete. It will afford sitting accommodation for 1,500 persons, exclusive of the stage, which is large enough to afford accommodation for an additional 500. There will be three entrances.

CHURCH SCHOOLS, CARDIFF.—On the 31st ult. the foundation stone was laid of the new church schools of St. Monica, at Cathays, Cardiff. The schools will accommodate about 350 scholars, 200 of whom will be provided for in the mixed school and class-rooms, the remaining accommodation being for infants. There will be means of communication between the main schoolroom and class-rooms, and also glazed doors and screens between the classrooms. There will be a cooking kitchen and convenience for gatherings of a social nature. The architect is Mr. E. M. Bruce-Vaughan, and the contractors are Messrs. Herbert Lattey & Co.

BOARD SCHOOL, BLACKWALL-LANE, GREENWICH.—A new board school in Greenwich Marshes was opened on the 29th ult., by the Rev. J. R. Diggle, Chairman of the School Board for London. The school is erected in Blackwall-lane, and is built to accommodate 805 children, but with "halls" large enough for a future extension for 1,200 children at a small additional cost. It is built, from the design of Mr. T. J. Bailey, Architect to the School Board, by Messrs. Treasure & Son, builders.

WESLEYAN SCHOOLS, MARPLE, CHESHIRE.—New Wesleyan schools are about to be built at Marple, Cheshire, from the designs of Mr. T. A. Fitton, architect, of Manchester and Middleton, who was successful in a recent limited competition.

CO-OPERATIVE PREMISES, MEDONSLAY, DURHAM.—On the 27th ult. the new business premises of the Medonsley branch of the Annfield Plain Co-operative Society were opened by Mr. J. W. Taylor, of Dilton. The buildings have been erected at a cost of about 5,000l. The architect was Mr. J. W. Routhwaite, Benfieldside. Messrs. E. & J. R. Taylor, Benfieldside, were the contractors.

SANITARY AND ENGINEERING NEWS.

AIRE AND CALDER POLLUTION: ELLAND DRAINAGE.—With reference to the statement in the *Builder* for May 27 that the Local Board of Elland had engaged Mr. Malcolm Paterson, M.Inst.C.E., of Bradford, to prepare a preliminary scheme for the drainage and sewage treatment of their town, we are asked to say that Mr. Spinks, of Leeds, has also been asked to prepare a scheme, and that no selection of an engineer to carry out the work has yet been made.

PROPOSED DOCKYARD EXTENSION AT DEVONPORT.—For some time past, says the *Western Morning News*, the Government have had in view a scheme for extending the Dockyard at Keyham, but beyond approving of an estimate of 70,000l. for a pier, and 15,000l. for machinery, nothing had been definitely arranged. There are reasons, however, for believing, especially as plans have been prepared, that at no distant date, operations will commence at Keyham. At present there are four docks at Devonport and three at Keyham, varying in length from 272 to 437 ft.; but this accommodation is totally inadequate to meet the existing and rapidly increasing requirements of the Navy. The scheme provides for an extension of the Dockyard from the north-west end of Keyham along the foreshore of the Royal Naval Barracks to the southern point of land at the entrance to Camel's Head Creek. Just beyond the Barracks pier (which will be dispensed with) three docks are to be built, heading in a north-easterly direction, one 600 ft. and the other two 500 ft. each in length. The docks will be entered from a basin 700 ft. wide, the basin itself being entered through a lock 600 ft. long. At the southern end of the basin jetties are to be constructed for the purpose of facilitating the coaling of vessels on an emergency, or for repairing them when the docks are otherwise occupied.

SEWAGE PURIFICATION AT HUDDERSFIELD.—On the 31st ult., Alderman W. H. Jessop, the Chairman of the Health Committee of the Huddersfield

Town Council, opened the new sewage purification and disposal works which have been constructed at Deighton, Huddersfield, at a cost of between 80,000l. and 90,000l. The necessity, says the *Manchester Guardian*, for some such works had long been felt, and plans were made for an intercepting sewer in the time of Mr. J. H. Abbey, Borough Surveyor, but on his decease and on the appointment of his successor, Mr. R. S. Dugdale, C.E., the plans were rearranged, and in January, 1889, fresh plans were laid before the Town Council and adopted, and in October of the same year the first sod was cut. The site comprises forty acres, and lies on the north-eastern or Leeds side of Huddersfield. The approach to the works is along a road 600 yards long, and along that road the new intercepting sewer is laid. Up to now the whole of the sewage of the Borough has been turned into the river at a calculated rate of five million gallons per diem, but now the whole of this will pass into the sewage works and will there be chemically treated, and when it is turned into the river again at a point on the other side of the works it will be comparatively pure. There are twenty-four large tanks, each capable of holding 47,500 gallons, where the work of precipitation is carried on. Each tank can be worked independently. When the sewage has passed through the various processes it escapes into a channel to the outfall into the river Colne. The sediment which is left in the tanks is conveyed down separate channels back to the works, where it goes through a special process and is dealt with by the destructor which has been erected on the premises, and which is fitted with a number of chambers. The gases find their way into the atmosphere up a very finely constructed chimney. The works have been carried out under the superintendence of Mr. R. S. Dugdale, the Borough Engineer, and his assistant, Mr. A. E. Clayton, the resident engineer. We learn from another source (the *Leeds Mercury*) that the following are the contractors:—Messrs. W. Radcliffe & Co., Huddersfield, masons, excavators, and bricklayers, along with the joiners' and plumbers' work; Mr. G. W. Marchant, floating valves; Messrs. J. Bagshaw & Co., Limited, the structural iron work; Mr. W. Wolstoneholme, Radcliffe, Lancashire, the fixed valves; Mr. J. H. Suttard, painting; Messrs. Crompton & Co., London, the electric dynamo and installation; Messrs. Goddard, Massey, & Warner, Nottingham, the machinery; and Messrs. Mason & Co., Longsight, Manchester, the destructors and boilers.

FOREIGN AND COLONIAL.

FRANCE.—Sir Frederick Leighton has offered to the Luxembourg Museum two drawings, a study for "Andromache," and a study for the medal which he designed for Queen Victoria's Jubilee. To-morrow (Sunday) the statue of Arago is to be officially inaugurated. M. Georges Berger has been unanimously re-elected president of the "Union Centrale des Arts Décoratifs." A grand national "Congrès des Arts Décoratifs" is announced for 1894, to be organised by the Union Centrale and to be held at Paris, one object of which is to be the creation of a federation of all the French Societies of Industrial Art. M. Courajod, now assistant curator of the Louvre, is spoken of as the possible successor to the late M. Darel at the Cluny Museum. M. Guillaumie, architect to the Louvre, has had twenty-two pedestals executed in stone for the Tuileries Gardens, on the site of the old palace, which will shortly receive statues, among which will be the "Velleda" of Mairidon, the "Judith and Holofernes" of Lœncon, the "Quandmène" of Mercier, and the "Exiles" of Mathurin-Moreau. The decoration will be completed by vases placed in the middle of the grass-plots. The Académie des Beaux-Arts has expressed a wish for the preservation of the buildings of the ancient Faculté de Médecine, at the angle of the Quai de Montebello and the Rue de la Bûcherie. A monument is shortly to be erected at Mans to the memory of Germain Pilon. It will be the work of M. Dollivet (sculptor) and M. Blavette (architect), and will consist of a triangular pedestal somewhat like that of the group of the Three Graces at the Louvre. At the angles of the pedestal will be three caryatides, and on each of the three faces a small figure in bronze, representing "Painting," "Sculpture," and "Architecture." Above the pedestal will be a marble column and capital bearing the bust of Germain Pilon. The Government have fixed on the cape or point of Penmarch, near Audierne in Finistère, as the site for the new lighthouse to be built at the cost of the Marchioness de Bloqueville. The lighthouse, which will be called the "Phare d'Eckmühl," will be 60 metres high, and will be furnished with an electric lantern capable of being seen at a distance of thirty nautical miles. In the room at the foot of the lighthouse will be placed a reduced copy of the statue of Maréchal Davoust, erected at Auxerre. In six weeks the new lighthouse at Hève, near Havre, is to be completed, also an electric one, with a still more powerful light.

A new parochial church is to be erected, at the cost of the worshippers, on the Place des Abbesses at Montmartre. The building, of which the plans have been prepared by M. Bénard, diocesan architect, will be executed in iron and cement. The façade will have

on either hand two high towers terminated by fleches in the taste of the Renaissance. The nave and transept will be formed with a succession of cupolas covered internally by mosaics. The total expense of the building is estimated at 350,000 francs. The death is announced at the age of seventy-one, of the painter Alexandre Solde, formerly professor of drawing at the École Polytechnique, and a pupil of Léon Cogniet. From 1844 to 1868 he was a frequent exhibitor at the Salon. The award of the Chamber of Commerce is made for an annex to the École Commerciale as follows:—First premium to M. L. M. Detourbet; second to M. Jacques Lequeux; third to M. Gaston Hénard; all of Paris.

BERLIN.—All the Royal Collections are now open to the public on Sunday afternoons. In order that the subordinate custodians should not be the losers of this liberality on the part of the Government, soldiers are drafted into the museums to take their places on the day in question. Berlin is to have its "Salon des refusés." There seems to have been some unaccountable mistakes made by the Hanging Committee of the "International" Art Exhibition, and hence the proposed exhibition promises to be interesting. Amongst the works to be exhibited is a fine model of a monument to the late Emperor William by Herr Max Klein. The monument is intended for Stuttgart, where the author received the first premium for it in a competition. The "Vereinigung Berliner Architekten" has decided to arrange annually a good architectural exhibition. Architecture, as represented at the annual art exhibitions, is generally very mediocre owing to the profession having no confidence in the hanging of the managing committees of these exhibitions. The "Vereinigung" action is very popular, and is supported by the most influential architects of the country. The municipal authorities are constantly busy with proposals for the beautification of the city. Their latest scheme is one for the Gendarmen Market Place which with its two fine churches, Schinkel's Royal Jail House, and Begas's Schiller Monument ranks among the finest of the Continent. The spaces used for market purposes prior to the erection of covered markets in the neighbourhood are to be laid out as gardens and ornamented with statuary, fountains, and electric light standards. The historical building at the corner of the Leipzig Place formerly belonging to the Royal Porcelain Works is to be pulled down. The Porcelain Works were the hobby of King Frederick the Great, who was a constant visitor, and had some rooms set apart for him in the block. There are two buildings, one of 350 ft., the other of 180 ft. frontage, both built from the designs of the Government architect, Bonmann, who was afterwards imprisoned for having carried out the King's order to build during frosty weather with warm mortar, and then having the misfortune of seeing the smaller building collapse.

VIENNA. The competition for the designs of a monument to the late Frederick von Schmidt has now been decided, the first premium being awarded to Herr Ed. von Hofmann, a sculptor who had worked together with Professor Deigner, an architect of some repute. The statue shows the deceased architect in the commonplace position holding a pair of dividers and a plan in his hands. The architectural adjuncts are of the simplest kind. The portrait is considered to be a good one. There were thirty-three competitors for the three premiums. The Vienna Theatre Exhibition of last year has not been a financial success. There has actually been a loss of 40,000 florins, which sum is to be made up by the promoters, i.e., by what was termed "the general committee," a body of some 200 members. On the 24th, 25th, and 26th ult. there was a conference at Vienna of gentlemen interested in the arrangement of some systematic tests for building materials which are to be recognised throughout Germany and Austria. This was the fourth conference on the subject. The preparation of the subjects under discussion had been in the hands of a specially-elected Berlin committee. The City Architect of Vienna, Herr Berger, acted as president of the Vienna local committee. Professor Bausinger, of Munich, was chairman on the opening of the proceedings.

RUSSIA.—The foundation-stone of the pediment of the large memorial monument to Alexander II. was laid at the Moscow Kremlin with much ceremony on the 26th ult. On the 2nd inst. a Health Exhibition was opened at St. Petersburg under the auspices of the "Hygienic Society." Although not yet complete, the exhibition already claims to rank among the most interesting ones of the last decade.

MUNICH. It is to have its annual art exhibition this year, although Berlin is holding an "International" one. The Crystal Palace will again be adopted for exhibition purposes, and from all reports a large number of pictures are expected.

MISCELLANEOUS.

HORSE-GUARDS' AVENUE.—This is the name of the new street leading from Whitehall to the Victoria Embankment. The road, which was formerly opened by the Prince of Wales on Tuesday, runs down by the side of the Banqueting House in Whitehall, past the south end of the big block of residential flats known as "Whitehall Court," and across what

was formerly a part of the Embankment Garden. The road has been made, in pursuance of powers present by Act of Parliament, at the cost of the proprietors of Whitehall Court, to which building it forms a convenient approach. The roadway is not at present of uniform width throughout, owing to the presence of buildings which cannot yet be acquired, and a rather awkward corner is presented at a point where the new road passes on to the Embankment, owing to the London County Council's desire (laudable enough in itself) to preserve one of the Embankment trees. Mr. Arthur Cates, who has taken great interest in the formation of the new avenue, was present on the occasion of its inauguration, as were Mr. Chas. Mason, the Surveyor, and other representatives of the Parish of St. Martin-in-the-Fields, to whom the road has been handed over.

KEIM'S METHOD OF MURAL DECORATION.—We were present on Monday last at some chemical demonstrations of the durability of Herr Keim's process of mural painting. Herr Keim claims to have invented and perfected a process which will revolutionise the decoration of buildings as a process. It is now the property of the Indestructible Fresco and Mural Decoration Company. The most important feature of the process, it is urged, from a commercial point of view, is that it is applied in as simple a form, and at as inexpensive a cost, as common house paint, and is as readily applicable to inside walls and ceilings. The tests which were witnessed on Monday were very severe, and apparently conclusive, as far as they went. We may mention that in the *Builder* for February 16, 1894, we gave a detailed description of the process, in the shape of a paper read by the Rev. J. A. Rivington, M.A., before the Society of Arts.

SURVEYOR'S APPOINTMENT.—Mr. W. Stringfellow, M.C.E.C.E. chief assistant to Mr. Joseph Hall, C.E., Borough Surveyor and Water Engineer, Cheltenham, has been appointed Town Surveyor and Water Engineer to the East Stonehouse Local Board, Devon.

REEREDS, THE PARISH CHURCH, WOODLAND, DEVONSHIRE.—A reered has been erected at the parish church of St. John the Baptist, Woodland, near Ashburton, to the memory of Catherine Rodber Allen. It is of carved oak, and is composed of five main compartments, divided by pinnacled buttresses, and capped with carved cornice and cresting. Immediately above the central panel, which contains a scene in New Zealand wood (Rever. Rewa), the reered rises in gabled outline with canopy work to its extreme height of 8 ft. In the two divisions north and south of the centre are vesica-shaped panels filled with the interlaced monograms X. P. and A. O., with a background of Australian black wood, whilst in the two outer compartments the Lord's Prayer and Belief occur painted in subdued colours. On each side of the reered proper the remainder of the eastern wall space is lined with framed and carved oak panelling. The reered has been executed by Mr. Herbert Read, of Exeter.

THE IRON, HARDWARE, AND METAL TRADES' PENSION SOCIETY.—We would call the attention of our readers to the fact that H. R. H. the Prince of Wales will preside at the Jubilee Festival of this Society, which will be held by the kind permission of the Court of Common Council, in the Guildhall of the City of London, on Wednesday, June 21, Mr. Howard F. Kennard, the president of the Society, in the vice-chair.

THE SOCIETY OF ENGINEERS.—At a meeting of the Society of Engineers, held at the Town Hall, Westminster, on Monday evening last, Mr. William A. McIntosh Valon, J.P. (President), in the chair, a paper was read by Mr. Robert Carey on "Hydraulic Lifts." The author commenced by observing that there were lifts or elevators of endless variety, and they were of immense importance for business and other purposes. The safety apparatus as applied to lifts is a feature of interest, and a considerable amount of ingenuity has been expended upon it. Power lifts driven by belts from pulleys on shafting may be used for almost any purpose; they are generally constructed with worm and wheel gearing. Continuous passenger lifts should be more frequently used. They are very convenient, and there is no waiting for the cage. It is doubtful whether electric lifts will ever be as safe and smooth-running as the almost perfect hydraulic lift. Of all lifts the most important is the passenger lift, and nothing present equals water under pressure for working them. The author divided hydraulic lifts into two broad classes—direct-acting and suspended. He then pointed out the advantages of balancing cylinders for direct-acting lifts, and gave a description of a direct-acting lift with a cylinder bored and fitted with piston, no overhead gear, which afforded great safety. He then observed that suspended lifts, on account of greater cheapness, were becoming more common. When the cage is suspended by four wire ropes, the question arose, should one rope do all the work or should all do

equal work? If only one rope breaks out of four no great harm is done. Entrance doors or gates were considered and their conditions of safety as to whether they should open and close automatically. The author advised locking the starting rope when the entrance door was open. He also recommended the inspection of passenger lifts by Government inspectors, to avoid the dangers attending cheap-made lifts.

A NEW HYGROMETER.—Owing to the urgent need of a good percentage hygrometer suitable for general use in dwellings, Mr. O. Krell has occupied himself with the subject for some time past, and the results of his investigations are published in a recent issue of *Geundhering-Ingenieur*. The commonly employed hygrometers are very liable to derangement, and they fail as a rule to indicate the degree of moisture as a percentage ratio, since they record the same upon some arbitrary scale. The instrument of August, which is based solely upon thermometric readings, is not liable to damage. In its general form it consists of two juxtaposed thermometers, one of which indicates the air-temperature, while the bulb of the other is surrounded with muslin, kept moist by being dipped into a small vessel suspended below it, filled with water, the water from which rises by capillary action into the twisted muslin. The greater the difference between the temperature readings of the two thermometers with the wet and dry bulbs, at any uniform air-temperature, the smaller is the amount of moisture in the air, and the same holds good conversely. Mr. Krell substitutes for the suspended vessel of water a glass tube, open at the top, but capable of being securely closed by means of an india-rubber stopper. The lower end of this tube is drawn out to a small diameter, and is curved into a semi-circular form so as to point upwards. This tube is placed on a board between the two thermometers, which are graduated to read from 8 degs. to 20 degs. Reannur, between which limits the maximum range of temperature in dwelling rooms may be assumed to fall. The lower end of the thermometers is enclosed in muslin, attached to the upward curving end of the water tube, and above the apparatus is a board, with a table giving horizontally the readings for each degree, from 8 to 20 degs., with the temperatures indicating each per cent. of moisture in the air in a series of vertical columns beneath. By simple reference to this table, on reading the thermometer from the two thermometers the approximate amount of moisture in the air can be determined at a glance, or, if greater accuracy is needed, intercalation can readily be made.

"ANTI-COLLAPSIBLE" HOT-WATER CYLINDER.—Messrs. Wright Sutcliffe & Son send us a drawing and description of their hot-water cylinder, which is strengthened internally by a 3-in. coil as a buttress against the collapse to which copper cylinders in a hot-water system are occasionally subject from the exhaustion of air from the interior. The same firm send us also a prospectus of their brass combined overflow, waste, and trap, for lavatory basins, sinks, &c. The whole can be removed bodily by screws, and cleaned, when needed, by dipping in boiling water.

FARMHOUSE, NABY, YORKSHIRE.—On the 23rd ult. the Right Rev. Monsignor Witham laid the foundation stone of a new farm house on his estate at Naby. The building will be erected by Mr. Hepworth, builder, from plans by Mr. John Clark.

LEGAL.

DISMISSAL OF A DISTRICT SURVEYOR:

PARSONS v. THE LONDON COUNTY COUNCIL.

The plaintiff in this case (which came before Mr. Justice Stirling on the 2nd inst.) seeks to restrain the defendants from dismissing him from his office as District Surveyor.

Mr. Percy Wheeler (with whom was Sir Richard Webster, Q.C.) applied to have the case set down for hearing with witnesses. From his statement, it appeared that the plaintiff on September 9 last had been convicted of having travelled on the South-Western railway with intent to defraud, and that in consequence of that conviction the County Council had dismissed him from his office. He understood that the Council were not unwilling to reinstate him if he could establish his innocence.

The plaintiff's case was that he had been wrongly convicted, and had not, owing to the state of the criminal law, been able to give evidence in his own defence before the magistrates. He desired to have the opportunity of proving his innocence to the satisfaction of the Council and so regaining his livelihood. He did not dispute that the Council were entitled to exercise their discretion by dismissing him, but the dismissal was based upon the assumption that his conviction was right. He could not appeal against the conviction, because, under the Summary Jurisdiction Act, an appeal could only be brought where imprisonment was an alternative penalty, which was not the case here.

Mr. Hastings, Q.C. who, with Mr. Methold, appeared for the London County Council, stated that his clients, though not waiving their absolute right to dismiss the plaintiff, were willing to reinstate him if he could establish his innocence, and they did not desire to oppose any obstacle to the

trial of the action. They desired, however, to avoid the unnecessary expense of bringing all the witnesses together in case the Court should be of opinion that the plaintiff's action could not be maintained.

Mr. Justice Stirling said that he did not wish in any way to fetter the action of the Council, who must act as they might be advised. He would allow the case to be set down for trial in the witness list. —*Times*.

VALIDITY OF ARCHITECT'S CERTIFICATE:

TRAPPITT & BATLEY v. CHADWELL ST. MARY SCHOOL BOARD.

This was an action tried on June 7, before Mr. Justice Grantham and a jury, for recovery of balance of account for contract work and extra work under the contract done by plaintiffs at the Tilbury Dock Board School.

Mr. Jeff. Q.C., and Mr. Glen, instructed by Mr. Edridge, were for the plaintiffs; Mr. Reid, Q.C., and Mr. Manisty for the defendant board.

It was stated that one of the conditions of the contract was that orders for extra work should be given in writing signed by Mr. H. T. Bonner, the Architect to the Board, and countersigned by two members of the Board; such orders were given and signed from time to time and payments made upon the architect's certificates on account; but two orders for extra work, although signed by the architect were not countersigned by two members of the Board—one member of the Board to whom such orders were sent for signature having died a few days after such orders were delivered to him for signature, and these orders were afterwards lost or destroyed by some one in his house. The architect, according to the terms of the contract, having ascertained the value of the extras and omissions, gave the plaintiffs a final certificate, including the amount for work done under the lost orders. A new board having meanwhile been elected, the new members, by a resolution, refused to pay for the extra work included in the lost orders, but payment of 700*l.* on account was made upon the architect's final certificate. No defence was set up that either the work was improperly done or overcharged for or for fraud.

Without witnesses being called his Lordship ruled that the work having been properly done the architect's certificate was final and binding on all parties concerned, and the jury gave a verdict for the plaintiffs for 285*l.*, or the full amount claimed and costs. —*Communicated*.

CAPITAL AND LABOUR.

CARPENTERS AND JOINERS AND THE LEGAL EIGHT HOURS DAY.—It is reported that the branches of the Amalgamated Society of Carpenters and Joiners throughout the country have taken a vote in regard to an eight hours day for all workmen by legal enactment. A motion in favour of the proposal was carried by a majority of 13,600.

MEETINGS.

SATURDAY, JUNE 10.

Incorporated Association of Municipal and County Engineers.—Eastern Counties District Meeting, to be held at Bury St. Edmunds.

MONDAY, JUNE 12.

Clerks of Works' Association (Carpenters' Hall).—Paper by Mr. E. Moore. 8 p.m.

WEDNESDAY, JUNE 14.

Incorporated Auctioneers' Benevolent Fund.—First Ordinary General Meeting, Auction Mart, Tokenhouse Yard. 4 p.m.

THURSDAY, JUNE 15.

Society for the Encouragement of the Fine Arts.—Dr. Phené on "The Classification of Artistic Design, and Geographical Extent of Pelagic and Emplecton Construction." *Society of Antiquaries*.—8.30 p.m.

SATURDAY, JUNE 17.

Liverpool Engineering Society.—Excursion to Thirlmere Aqueduct.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

4,286.—**PAVING SLABS, &c.**: E. A. Fulcher.—This refers to an invention having for its object the construction of a machine in which a number of paving slabs, or building, ornamental, or other blocks and bricks can be moulded at the same time. The apparatus is made chiefly in wood, and consists of a bottom board about the size of two of the blocks to be made. A vertical partition is fixed upright across the bottom, and two hinges of the same size as the partition is hinged on their lower ends. A cross-bar holds the ends in vertical position when the blocks are being made, and these are formed between the partition and the ends, one on top of the other, their thickness being regulated by horizontal distance pieces, the latter being held by fillets on division boards placed between each block with sheet zinc slabs to prevent sticking. By removing the cross-bar, the ends, being hinged, fall down, and the blocks can be readily taken out.

6,216.—**FALL PIPES**: C. H. Kiley.—This patent refers to an improved method of ventilating and trapping fall pipes. It consists in combining the ventilating shaft and fall pipe so as to form one pipe or shaft, serving the two purposes of ventilating the drain with which it is connected, and conveying the rain water from the eaves trough to the

May 30. — *Eastman*. *Ber*. 159, 165, Stansford, rd.
Forest Hill, ut. 50 yds., gr. 84, r. 490, *510d* — *By Field &
Sons*: 48, St. Kilda's rd., Stoke Newington, ut. 86 yds.
gr. 108, 565-6 — *By Messrs. Willmott*: 77, Aytoun
rd., Stoke Newington, ut. 100 yds., gr. 108, 565-6 —
Harvey, Sons & Cassell: Three f. detached residences
Chipping Norton, and 42 or 159, 15001; two f. cottages
with gardens, 2001 — *By Debenham, Tewson & C.*
Trehula, Woodford, and 21 acres, 4, 430d.
June 1. *H. Harcourt*, 51, Grenville Lane, Wood
Green, ut. 70 yds., gr. 41, 45, 51, 52, 53, 54, 55, 56, 57, 58,
Norwood, f. 465-1 — *By Perkins & Cress*: 4, Claud
Villas, Peckham, ut. 79 yds., gr. 51, 58, r. 321, 245-1.
Brookfield rd., Victoria Park, f. r. 324, 410-1.
July 1. *By Messrs. W. & A. G. Smith*: 52, 53, 54, 55, 56,
Hackney, ut. 59 yds., gr. 161, r. 112, 113, 114, 115, 116, 117,
Rutland-rd., ut. 59 yds., gr. 302, r. 1401, 1451, 1452, 1453, 1454, 1455, 1456, 1457, 1458, 1459, 1460, 1461, 1462, 1463, 1464, 1465, 1466, 1467, 1468, 1469, 1470, 1471, 1472, 1473, 1474, 1475, 1476, 1477, 1478, 1479, 1480, 1481, 1482, 1483, 1484, 1485, 1486, 1487, 1488, 1489, 1490, 1491, 1492, 1493, 1494, 1495, 1496, 1497, 1498, 1499, 1500, 1501, 1502, 1503, 1504, 1505, 1506, 1507, 1508, 1509, 1510, 1511, 1512, 1513, 1514, 1515, 1516, 1517, 1518, 1519, 1520, 1521, 1522, 1523, 1524, 1525, 1526, 1527, 1528, 1529, 1530, 1531, 1532, 1533, 1534, 1535, 1536, 1537, 1538, 1539, 1540, 1541, 1542, 1543, 1544, 1545, 1546, 1547, 1548, 1549, 1550, 1551, 1552, 1553, 1554, 1555, 1556, 1557, 1558, 1559, 1560, 1561, 1562, 1563, 1564, 1565, 1566, 1567, 1568, 1569, 1570, 1571, 1572, 1573, 1574, 1575, 1576, 1577, 1578, 1579, 1580, 1581, 1582, 1583, 1584, 1585, 1586, 1587, 1588, 1589, 1590, 1591, 1592, 1593, 1594, 1595, 1596, 1597, 1598, 1599, 1600, 1601, 1602, 1603, 1604, 1605, 1606, 1607, 1608, 1609, 1610, 1611, 1612, 1613, 1614, 1615, 1616, 1617, 1618, 1619, 1620, 1621, 1622, 1623, 1624, 1625, 1626, 1627, 1628, 1629, 1630, 1631, 1632, 1633, 1634, 1635, 1636, 1637, 1638, 1639, 1640, 1641, 1642, 1643, 1644, 1645, 1646, 1647, 1648, 1649, 1650, 1651, 1652, 1653, 1654, 1655, 1656, 1657, 1658, 1659, 1660, 1661, 1662, 1663, 1664, 1665, 1666, 1667, 1668, 1669, 1670, 1671, 1672, 1673, 1674, 1675, 1676, 1677, 1678, 1679, 1680, 1681, 1682, 1683, 1684, 1685, 1686, 1687, 1688, 1689, 1690, 1691, 1692, 1693, 1694, 1695, 1696, 1697, 1698, 1699, 1700, 1701, 1702, 1703, 1704, 1705, 1706, 1707, 1708, 1709, 1710, 1711, 1712, 1713, 1714, 1715, 1716, 1717, 1718, 1719, 1720, 1721, 1722, 1723, 1724, 1725, 1726, 1727, 1728, 1729, 1730, 1731, 1732, 1733, 1734, 1735, 1736, 1737, 1738, 1739, 1740, 1741, 1742, 1743, 1744, 1745, 1746, 1747, 1748, 1749, 1750, 1751, 1752, 1753, 1754, 1755, 1756, 1757, 1758, 1759, 1760, 1761, 1762, 1763, 1764, 1765, 1766, 1767, 1768, 1769, 1770, 1771, 1772, 1773, 1774, 1775, 1776, 1777, 1778, 1779, 1780, 1781, 1782, 1783, 1784, 1785, 1786, 1787, 1788, 1789, 1790, 1791, 1792, 1793, 1794, 1795, 1796, 1797, 1798, 1799, 1800, 1801, 1802, 1803, 1804, 1805, 1806, 1807, 1808, 1809, 1810, 1811, 1812, 1813, 1814, 1815, 1816, 1817, 1818, 1819, 1820, 1821, 1822, 1823, 1824, 1825, 1826, 1827, 1828, 1829, 1830, 1831, 1832, 1833, 1834, 1835, 1836, 1837, 1838, 1839, 1840, 1841, 1842, 1843, 1844, 1845, 1846, 1847, 1848, 1849, 1850, 1851, 1852, 1853, 1854, 1855, 1856, 1857, 1858, 1859, 1860, 1861, 1862, 1863, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872, 1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880, 1881, 1882, 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896, 1897, 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034,

The Builder.

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ILLUSTRATIONS.

"Holy Women of the New Testament." Part of a Frieze by Mr. N. H. J. Westlake	Double-Page Ink-Photo.
The South-Eastern Hotel, Deal: View facing the Sea.—Messrs. James Brooks & Son, Architects	Double-Page Photo-Litho.
The New "Cathedral" Hotel, Cologne.—Messrs. Kayser & von Grossheim, Architects	Double-Page Ink-Photo.
House, "Chalgrave," Harrow-on-the-Hill.—Mr. Arnold B. Mitchell, Architect	Single-Page Ink-Photo.
House, "Woodside," Stanmore.—Mr. Arnold B. Mitchell, Architect	Single-Page Ink-Photo.

Blocks in Text.

Hinges, St. Albans Abbey, and Notre Dame, Paris	PAGE 460	Plan of the South-Eastern Hotel, Deal	Page 458
Lock in the Klagenfurt Museum	461	Plans of the Cathedral Hotel, Cologne	459

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Decorative Iron-work.



IN spite of the extent to which iron is now employed in the construction even of many buildings which ostensibly profess to be independent of its aid, the interest of architects in iron-work

is still mainly directed to its decorative use in more or less ornamental forms, and the use of it in this manner in connexion with Mediæval architecture is still the main interest of architectural students when they pay any special attention to iron-work. Yet it would be impossible to exaggerate the enormous difference between the use made of iron in modern structures and its use in Mediæval buildings. In the latter it was used only in what may be called the adjuncts of building—in hinges, and lantern brackets, and railings; objects of utility in the first instance, but which by the Mediæval iron-worker were turned into objects of beauty. In the present day it is the essential material in which many of the largest and most important structures are carried out. But in this structural application its use is still almost entirely confined to erections which are purely utilitarian in their objects, and make no pretence to artistic beauty. Much has been said about the duty laid upon architects to take this new constructive material in hand and show how it can be architecturally used to produce not only fit but beautiful structure; yet in spite of all this philosophising the architect seems to hang back, and only employs iron as an integral part of the construction when he can manage to keep it out of sight. This system of using iron without (architecturally) admitting it seems the most undesirable of all, yet it has been done in some of the most noteworthy modern buildings. And this evasion of the acknowledged use of iron is comprehensible enough when we consider

how thin are the proportions and how hard the lines produced by constructive iron-work, and how completely at variance with the desire for the breadth and solidity of appearance which has been the characteristic of the finest architecture of every period; besides the doubt which must be felt as to the enduring quality of an iron construction in comparison with one in masonry or brick. So that on the whole one can hardly think that the architectural instinct is wrong in its shrinking from the use of iron as the leading material of an important structure. It may lead to novelty of effect, when frankly accepted and treated; but the effect is too novel; so much so that the result has little affinity with architecture as all the world has hitherto regarded the art; it means practically giving up what we have hitherto understood as architecture and substituting something else for it.

Mr. Starkie Gardner's new book on "Iron-work,"* being mainly historical, and coming only down to the close of the Mediæval period, of course deals with iron entirely in regard to its decorative use. The book may be taken as representing the present standard of opinion and taste in regard to iron-work, which after all does not differ much from that enunciated by Pugin sixty years ago, and by Digby Wyatt forty years ago; but the opinions expressed by Pugin are now popular, and then were only the expressions of himself and a small Mediævalising clique. We have collected and noted more examples now, but there is not much to add or alter in the way of artistic criticism since Pugin. Where Mr. Gardner makes his own mark in his book, by comparison with such a writer as Wyatt, is in his more direct practical knowledge of the process of iron-working, and in his more systematic arrangement of his subject. He is quite alive to the immense difference between modern and ancient times arising out of the modern constructional use of iron, but this is only alluded to in the opening chapters and does not form part of the subject of the book.

* "Iron-work, from the Earliest Times to the End of the Mediæval Period." By J. Starkie Gardner. With fifty-seven illustrations. London: Chapman & Hall. 1893.

which is divided into "The early history of iron-work," "The age of the blacksmith," "The transition," and "The age of the locksmith." A more comprehensive division might be made into iron as (1) the material for tools, (2) the material for adjuncts to buildings treated decoratively, and (3) the constructive material. The first use of iron was for tools to work other substances with, including fighting implements, which are only tools for carving each other. This use for it has obtained ever since the first invention of iron tools, but soon became an accepted and matter-of-course fact, and when we refer to Mediæval iron-work we refer not to the tools but to the decorative work. To a modern engineer this use of the metal again drops out of sight, and he thinks of iron-work only in a constructional sense.

Mr. Gardner only treats at any length of the second of our divisions. But he adds to the usefulness of his treatise by a chapter on the early history of iron-work and one on the manufacture of iron, which are sufficient as a groundwork for understanding the main subject dealt with, the decorative treatment of iron.

Mr. Gardner's first period, that of the blacksmith, extends to the fourteenth century. During this period hammer and heat were the sole agents in working iron, with the assistance in the later part of the period of stamps, and more or less of rivets, though rivetting is much less important in the blacksmith's than in the later period.

The ductile quality of hot iron under the hammer seems in itself to suggest the employment of design into which curves and scrolls entered largely, though the author suggests one reason for the aversion to straight lines in the oldest smith's work, viz., the fact that the Mediæval smith probably only received his material in the shape of somewhat rough bar ingots, and "perhaps the most difficult task that could be set was to handle and beat out a long and heavy ingot into a bar with mathematically true angles." The hinge from St. Albans Abbey (Fig. 1), now in the South Kensington Museum, is a very typical example of the method of decoratively treating wrought-iron

which the nature of the substance and of the older materials for working naturally suggested. There could hardly be a better example than this of the way to treat iron-work in such a position and for such an object. It is not only a fine bold design in exact accordance with the character of the material, but it gives an additional practical value to the hinge, spreading its grip over a large surface of the door, rendering its attachment a great deal stronger, and serving also as a clamp to assist in holding the door together and strengthening it. So much was this latter function of the extended hinge appreciated, that we find many examples in which, in addition to the hinges, the door is strapped across in various directions by bands of iron, mostly worked into a more or less decorative shape, each piece separately, but often not arranged in accordance with any general design. One or two of those which are illustrated, that at Willingale Spain in Essex for instance, though interesting as specimens of the work of their day, are by no means artistic or beautiful, and probably were not thought so or meant to be so by those who made them; the separate pieces were cut to a design, but the main object was merely to strengthen the door in the readiest way, and the work was a practical but on the whole rather clumsy piece of patching. The hinges on this same door, forming a nearly complete circle with the approaching extremities shaped ornamentally, and the back of the hinge, where the attachment was, being out of reach behind the stone rebate of the doorway, form a very suitable and strong hinge design; but the rest of the ironwork cannot be called design. The ironwork at Earlwood church, given on another plate, is a design, but a very ugly one; the door at Haddiscoe church, on the other hand, is a fine piece of work both practically and in effect, an especially good point being the cutting up and intersecting of the central crossing pieces of metal. From the examples given by Mr. Gardner it appears that in some parts of Europe in which the system of covering the doors more or less with a design in iron has been adopted, the true constructive element in the design has been even more lost sight of than in some of the English examples. In the south of France the tendency was to treat the iron as if the design spread from an originating point in the centre of the door, which of course at once removes the greatest constructive value of the iron, in extending the grasp of the hinge upon the door. One or two examples given of this style of French treatment of door iron-work are pretty but exceedingly feeble in effect. The same tendency is seen in the well known Norman door in Durham Cathedral (illustrated page 429 *ante*). Here the hinges develop properly from the door-post, but the remainder of the iron-work is entirely without connexion with them, and merely an *appliqué* design growing from the centre. It would be far more effective, both practically and artistically, if it were connected constructively with the hinge.

The true principle, in short, of such iron-work on a door is that which is set forth in Fig. 1. It all comes round to that type of treatment, so long as you are to have it constructively connected with the hinge at all.* And in fact we find from time to time this type of design carried out in the earlier Gothic period, with a good many varieties of detail, but all on the same idea of scrolls emanating from a central stem which is the real hinge. Various types of detail may be used. Mr. Gardner gives an example from Market Deeping Church, in which the stems are thin with small pointed leaves budding from them, the whole appearance being semi-realistic. This is interesting as an example but somewhat weak in effect, and moreover it is further spoiled by the introduction of sharp and irregular curves, not

* In the Gothic revival period numbers of iron-work designs for doors were made in which the foliations of the iron emanated from a sham hinge, the real hinge being an ordinary trade one, kept out of sight! We do not know whether this kind of absurdity is still carried on.



Fig. 1.—Hinge from St. Albans Abbey.

tangential at their springing. This last fault is a fatal one. The very method of joining the sprays by soldering suggests for practical reasons a 'tangential curve, and of course artistic reasons for this are paramount. Nothing is more offensive to the eye than wrought-iron scrolls, based on a foliage idea, showing any realistic imitation of foliage. The contrast between the soft and tender material of nature, and the hard stubborn material in which the imitation is made—the actual impossibility, in fact, of making the pretended imitation at all—is at once forced on us. A great variety of scroll

because one of the essential characteristics of wrought-iron-work is that every portion is a separate piece of handiwork, and there is therefore opportunity for continued variation in detail. Even a successful attempt at complete symmetry is apt to have a hard and mechanical effect, as in the case of the Renaissance gates of the Clarendon printing-office, or in the example from the Château of Brunswick, given by Hefner-Alteneck in his "Serrurerie de Moyen Age," where a centre stem, with three absolutely symmetrical scrolls on each side of it, is repeated identically three times in the



Fig. 2.—Hinge, Notre Dame, Paris.

forms is possible even under the most strict conventionalism. A fine example of the thin delicate style is given by Mr. Gardner in his illustration of the doors from a press in the Church of St. Jacques at Liège. This is a very carefully-designed piece of work, in thin clean lines, the thinner scrolls springing from the thicker ones in due subordination. There is an attempt in this case to make the curves entirely symmetrical on each side of the centre. We question whether this should be done, in the first place because from the character of the material and method of working it is very difficult to get at all a true symmetry, and also

height of the door. It is unusual to find such formal and tasteless symmetry in the wrought iron-work of the early Gothic period (eleventh century, the example in question is said to be). The same writer gives, as the first plate to his second volume, a very remarkable example of a door in the National Museum at Munich, which is perfectly conventional in design, but in which the branching stems, leaving the main stem tangentially, develop not into spiral scrolls, but into long, straight, slightly tapering branches ending in charmingly designed circular six-leaved bosses; the whole having something of the spring and elasticity of

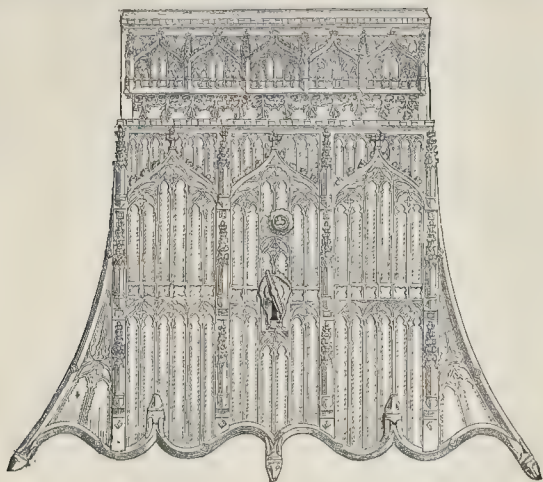


Fig. 3.—Lock in the Klagenfurt Museum.

look of natural stalks, but in a perfectly legitimate conventional way. This is a work of the fifteenth century. A form of branching iron-work, which was a favourite in Germany in the latter part of the fifteenth century, is a flat band with flat branches from it, the whole lined with parallel incised lines (two or three) which give direction and flow to the design. This is a good type of design for this class of work, with which something more might be done. The crowning effort of the scroll form of hinge is the grand work on the door of Notre Dame, Paris, of which Mr. Gardner gives a partial illustration which we have been able to borrow (Fig. 2). Comparing this with Fig. 1, it will be seen that the principle of design is exactly the same in both cases; the St. Albans example is the simple and unadorned form of the scroll which in the Notre Dame work has assumed such exuberant magnificence of detail.

It may be suggested that one task for the modern designer and worker in wrought-iron is to look for some novelty of treatment and detail, without departing from the proper treatment of the material. The scroll is an admirable way of treating wrought-iron, but its forms have been a good deal repeated. The choir grille at Lincoln is admirable in effect, no doubt, but it is the multiplication of one very obvious detail. In the more elaborate modern examples we see the old forms of scroll very much repeated. Only let not the designer seek for variety by introducing naturalistic sprays, which is the very vulgarisation of metal work. On the other hand, let the designer remember that freedom and variety are the proper qualities of wrought iron-work, and above all that it has no affinity with strictly architectural (*i.e.* masonic) forms. This was what it became to a great extent reduced to in the later Gothic period, and though some charming and most delicate work of this architectural standard was produced, it is the imitation in iron of forms which belong to quite another class of construction. The northern early Mediaeval metal artists understood this, the Italians often did not. The whole of the Santa Croce screen (fourteenth century) is a formal reproduction of details properly belonging to architecture, with formal repetitions of parts, and entirely misses the freedom which should characterise wrought-iron work; it might almost as well have been cast, as far as design goes, though the sharpness of execution would of course have been different.

Mr. Gardner's "Age of the Locksmith" is the period, in the fifteenth and sixteenth centuries, when heat was only applied in the preliminary stage of working, "and the

greater part of the work was accomplished by the file and saw, or by embossing the iron." For this school of iron-work we are taken in the first place to France, and thence to Belgium, and here we find the architectural treatment of iron predominant. In the larger works, buttresses, windows, and pinnacles; in the smaller, Gothic tracery. The example engraved in the book, and taken from a specimen in the South Kensington Museum, of a rich Flemish "guichet," appears to be admired by the author; it is very elaborate work certainly, but to our thinking as unsuited to iron-work as anything well could be, and the "wattle" device, of rod-iron strung in and out between the "buttresses," is about as ugly and unmeaning a feature as could be. The class of articles which we can admire most in this era of iron-work are the German lock-plates, ornamented sometimes with tracery, sometimes with conventional foliage. Of the tracery style we are able to reproduce one of the best examples (Fig. 3), a lock in the Klagenfurt Museum (fifteenth century). The general shape, spreading slightly from a narrower base, and placed sometimes vertically and sometimes horizontally, is the favourite one in German work of the late Mediaeval period, and a very elegant shape it is.

Mr. Gardner's book is to be completed by a second part illustrative of iron-work from the Renaissance to the present day. The two together will form a very good *résumé* of the subject as regarded from our present standpoint of knowledge and criticism. In this respect it will be a useful and interesting addition to the literature of the subject; but its best use will be if it suggests to any of our designers a new departure, on the basis of the work already done in the past, but not repeating its forms. Perhaps Mr. Gardner may have some suggestions to make on this subject when he comes to his second volume.

THE INSTITUTE ROYAL GOLD MEDALLIST FOR 1893.

THE Royal Gold Medal of the Institute of British Architects is to be presented this year, for the first time, to an American architect, Mr. Richard Morris Hunt, who is by common consent at present the leading architect in the United States. We are glad to see that an effort has been made to give a more specially ceremonial character to the meeting at which the medal will be presented, making it an evening reception

rather than an ordinary meeting, an example which may very well be followed on future occasions. The effort of the President, however, to do honour to the occasion, must depend for its success in part upon his being well supported by the members; and we draw attention to this because it was felt by many that the attendance last year, when the Medal was presented to Mr. César Daly, was by no means what it should have been. We believe this was partly occasioned by the fact that the younger generation of members were by no means generally aware of M. Daly's reputation in France and elsewhere on the Continent, and some who heard afterwards of the remarkable address which he delivered on the occasion expressed their great regret at not having been present. We presume there are not many members of the Institute who are in like manner ignorant of Mr. Hunt's claim to the award of the Medal; but in any case it will not be inappropriate to give here a brief account of his career and works.

Mr. Richard Morris Hunt was born at Brattleboro', Vermont, in 1828. His architectural education was gained on the Continent. In 1844 he entered the atelier of Alphonse Darier, in 1845 the atelier of Hector Lefuel, and in 1846 the Ecole des Beaux-Arts in Paris. After a protracted foreign tour, extending to Asia Minor and Egypt, he was appointed Inspecteur aux Travaux de la Réunion des Tuileries au Louvre, where, through the influence of his patron, M. Lefuel, who succeeded Visconti as architect of the works, he was placed immediately in charge of the Pavillon de la Bibliothèque, opposite the Palais Royal. All of the studies and the full-sized drawings of this pavilion, as well as the main dormers on the Rue de Rivoli, were made by Mr. Hunt.

Returning to America in 1855 Mr. Hunt spent a short time as assistant on the Capitol of the United States at Washington, under the late Mr. Thomas U. Walter, then architect of that building. Soon after he opened an office in the city of New York, where the larger part of his life-work has been done. He took an active part in the establishment of the American Institute of Architects, and succeeded Mr. Richard M. Upjohn and Mr. Thomas U. Walter as its President. He was also President of the re-organised American Institute of Architects—a body that succeeded the earlier organisation. In addition to his office practice Mr. Hunt introduced, early in his career, an architectural atelier for students, conducted on the French system, and where many of the present leading architects of America received their technical education. This work has now been superseded by the architectural schools attached to several of the American colleges, but Mr. Hunt's atelier was organised at a time when architectural education was quite unknown in America, and this important part of his work was of the greatest value to the development of architectural taste in the United States.

Mr. Hunt has been the architect of many important buildings in America, especially in New York city. Among the more notable public structures designed by him mention may be made of the Lenox Library and the Presbyterian Hospital, both in New York; the U.S. Academic Building at West Point, N.Y.; the U.S. Naval Observatory, at Washington; The Yorktown Monument, Yorktown, Virginia; the Soldiers and Sailors' Monument at Portland, Maine, and the pedestal of the Liberty Monument in New York Harbour. Business buildings of special moment include the Tribune Building and the Delaware and Hudson Canal Building, in New York. The former of these was long the highest commercial structure in New York city, but it has since been overtopped by many more recent structures.

Mr. Hunt's most important work, perhaps, has been his private residences. He has had unusual opportunities for the designing of large residences, having been the architect employed by a number of the wealthiest

families in New York. His work under this head includes residences for Mr. William K. Vanderbilt, Mr. C. O. D. Iselin, and Mr. Henry G. Marquand, in New York; a villa for Mr. William K. Vanderbilt at Newport, Rhode Island; and a chateau for Mr. George W. Vanderbilt at Biltmore, North Carolina. Equally important, both as contributions to American architecture and as affording opportunities for the exercise of the talent of the architect, are the residences now in process of construction in New York for Mr. E. T. Gerry, Mr. John Jacob Astor, Mrs. William Astor, Mr. Cornelius Vanderbilt, and Mr. O. H. P. Belmont. The work on Mr. Cornelius Vanderbilt's house consists of extensive additions, which will make it the largest and most palatial city residence in America. The chateau for Mr. George Vanderbilt, in North Carolina, will, on the other hand, be the largest country house in America, being planned on a scale of great splendour, and carried out with a luxury of treatment that marks a new epoch in American architecture.

Of these residences special mention should be made of the two houses built for Mr. William K. Vanderbilt. That in New York was erected several years ago, while the Newport Villa was first occupied last summer. The former is in a French Renaissance style, and is a most successful application of the picturesque chateau style of architecture to the somewhat rigid conditions of an American city lot. It ranks as one of the most successful private residences in New York. The Newport villa is equally remarkable, though designed in a severely Classic style. Being of white marble, and planned without reference to a restricted site, it has a noble dignity of proportion that makes it one of the most successful of Mr. Hunt's buildings.

In addition to these private buildings Mr. Hunt took a prominent part in the erection of the buildings for the World's Columbian Exposition at Chicago, where he was personally the author of the Administration Building, though his advice was constantly sought in the planning of the general scheme of the Fair.

Mr. Hunt has long been recognised as the leading man of the day among American architects. This position he has gained, not only through his long life of professional activity, not alone from the fact that many living architects first studied their art under his direction, but especially from the scholarly and artistic quality of his work. The first American architect to study at the Ecole des Beaux-Arts, he was the first to introduce the traditions of the French school into America. There it has obtained an ascendancy scarcely less than it has in France itself, and it is to-day the dominating influence in American architecture. This is largely due to the personal influence and activity of Mr. Hunt. Properly speaking there was no architecture in America when he began to practise. Architecture was not dead there; it had not yet begun to live. It needed but a man of courage and strong convictions, as well as of a keen artistic temperament, to make the art vital. Such a man was Mr. Hunt, and to him, more than to any other single man, American architecture owes what truth and honesty of purpose it possesses.

Mr. Hunt has been the recipient of many public honours. In 1882 he was chosen Honorary and Corresponding Member of the Académie des Beaux-Arts of France; in 1884 he was made Chevalier of the Legion of Honour; in 1886 he was elected member of the Société Centrales des Architectes Français; and Honorary and Corresponding Member of the Royal Institute of British Architects; in 1887 he was elected Honorary and Corresponding Member of the Ingenieurs-und-Architekten-Verein of Prussia; in 1892 he received the academic degree of LL.D. from Harvard University, Cambridge, Massachusetts, a distinction especially notable since it was the first degree given by that University to an

artist. He became Academician of St. Luke, Rome, in the same year. In addition to these honours Mr. Hunt served on the Fine Arts Jury of the International Exhibition at Paris in 1867; on the Corresponding Jury at the Centennial Exhibition at Philadelphia in 1876, and on the Fine Arts Jury of Selection of the World's Columbian Exposition at Chicago, 1893.

NOTES.

IT is announced that the Royal Commission on Metropolitan Water Supply is to hold another sitting for the purpose of taking evidence with reference to an epidemic prevalence of enteric fever in several towns situated in the valley of the River Tees in South Durham and North Yorkshire. The outbreaks occurred during September and October, 1890. The outbreak was inquired into by Dr. Barry, on behalf of the Local Government Board, and in his first report he said:—

"I have personally no hesitation in attributing the epidemic to the water pumped from the river Tees during the fortnight ending August 23, at a time when the river was in flood, and when it must have contained abundance of excremental matter. And I consider that as long as water for drinking purposes is drawn from the Tees, the condition of that river remaining as at present, so long will there be the danger of the recurrence of similar epidemics in the districts thus supplied with Tees water. If the sewage and excremental and other refuse of the various towns and villages above the pumping stations were prevented from passing into the Tees, the danger of specific pollution of the water would be very greatly reduced; but even under these circumstances it is still doubtful whether the water pumped from the river at a point upwards of forty miles from its source, is anywhere in this country a desirable supply for drinking purposes."

The town of Barnard Castle drains into the Tees thirteen miles above the intakes; but all the water of the supplies named is filtered before it is delivered to the consumers. The case is one of those mentioned by Mr. Binnie in his report to the London County Council on the Metropolitan Water Supply. He also quotes from official reports several similar cases in which disease has been traced to water supply. The conclusions of Dr. Barry in the Tees case were questioned in a series of articles in a local newspaper. It was suggested to the Royal Commission that they should investigate this case by Dr. S. F. Murphy, Medical Officer of Health of the County of London. Dr. Murphy said the Tees case was important and instructive, because it dealt with pollution running a considerable distance, the probability being that the river was infected from Barnard Castle, seventeen miles above the intakes of the companies, who filtered the water before supplying it.

THE railway companies have just issued a revised "General Classification," embodying all the numerous modifications and alterations which have been announced from time to time since the publication of the obnoxious classification of January 1. The book is extended by no fewer than forty-six additional pages, and the great majority of articles are now restored to their original classes. The "small" scale, and the regulations relating thereto, are revised, and although the new scale is still rather higher than that of 1892, it must not be forgotten that it only applies to consignments of 3 cwt. or under, whereas the old scale ranged up to 500 lb. An absurd regulation providing that each package weighing less than 14 lb. has been abandoned, and it is noticeable that several "general" conditions that had been quietly dropped out have now been restored. Probably the majority of the rates will now be found comparatively reasonable, although we notice that some traders—particularly the London coal merchants—still express themselves greatly dissatisfied with the present state of affairs. Their grievances are doubtless of a nature not affected by the revision of the classification. Sir Courtenay

Boyle considers that it would strengthen the hands of any conciliation board if it were provided by statute that unjust or unreasonable rates were illegal. He admits that the Railway Commission is a very expensive tribunal, but does not appear to favour the idea of putting much more power into the hands of the Board of Trade. Lord Balfour of Burleigh also expressed a strong opinion against constituting the Board of Trade a court of arbitration between the companies and the traders, looking at it as equivalent to the setting up of a tribunal for fixing prices as between buyer and seller. One very important point has been made clear during the present inquiry, viz., that the companies are bound to give an analysis of any rate on application, irrespective of whether it is below the maximum or not.

WE regret to see that the veteran sanitarian, Sir Robert Rawlinson, has been endeavouring to persuade the public through the columns of the *Pall Mall Gazette* that there is no objection on sanitary grounds to wood pavements in cities. Of course a new wood pavement like some of those to which Sir Robert Rawlinson specially refers, is not insubstantial; but the laying of large areas of pavement made of a porous substance like wood, which holds such a large quantity of dirt in its substance, and which is subject to decay and disintegration at a much greater rate than any other substance employed for street paving, must have an unhealthy influence. There is far too much wood paving in London already, and we should consider it a great mistake if it is further extended. Buildings and pavements in large cities ought to be as little porous as possible, in order that rain and artificial watering may wash off their surfaces whatever impurities are clinging there. No one would question, we imagine, that a stone or brick-built town is healthier than a timber-built one; and the consideration applies doubly to streets, which are the receptacles of more dirt than walls, and where it lies more. A wood pavement, except when it is just new laid, is not swept clean by rain or watering as an asphalt, or even a good macadam roadway is; the rain sinks into it, and with it much of the dirt and decaying matter which remains to poison the air in dry weather. We should urge on all our local authorities to avoid by all means increasing the extent of wood pavement in London; and if they have to take up a wood pavement that is decayed, to seize the opportunity to replace it with something more sanitary.

THE case of *Foster v. Fraser*, decided last week by Mr. Justice Kekewich, is *prima facie* a decision that the word "building" does not include a hoarding. But this must not be too broadly accepted, because the question arose on the construction of a covenant in a deed, by which buildings, except of particular dimensions, were prohibited on a certain space of ground. The covenant also stated that any building erected should have a slate roof and cemented front, which obviously was impossible in the case of a hoarding for the exhibition of advertisements. But, apart from these particular circumstances, it may fairly be contended that a prohibition of buildings is not a prohibition of a wooden hoarding, however large or unsightly. Fortunately the remedy is easy. A hoarding can be specifically mentioned in a deed in addition to the word "building," then there can be no doubt about the matter.

THE case of *Perry v. Chotzner and Farmer*, recently decided by Mr. Justice Cave, should not be unnoticed by landlords and tenants. The first defendant was the occupier and the second defendant the lessee under a ninety-nine years' lease of a house at Harrow. The plaintiff was the

ground landlord, and he sought to obtain possession of the house, as well as damages, on the ground of a breach of a covenant to repair. That covenant was the ordinary one to keep in repair the tenement, out-buildings, and walls, and the main and primary purpose was to keep up the stability of the house and to prevent an injury to the reversion. There were also covenants in the lease whereby the lessee undertook to paint the outside once in every five years and the inside once in seven years. The so-called breaches of the covenant were, however, defects of a character which would all have been made good at the stated period of papering and repairing, such as cracks in the cornice, and so forth. The judge, therefore, decided that there had been no breach of covenant, the test of a breach being whether the reversion has been diminished in value. Mr. Justice Cave said that a man would be an idiot who could assert this, and therefore he gave judgment for the defendant, characterising the action as a frivolous and obnoxious one. This language appears to be quite justified, since it is unreasonable for a landlord to endeavour to eject a tenant unless there has been a real and well ascertained breach of covenant.

FROM the report in the Sheffield papers of the last meeting of the Improvement Committee, it appears that Mr. E. W. Mountford is experiencing some difficulty in persuading the Town Council to go to the expense (not relatively very large) of lining the staircase and some parts of the corridor with marble. In his letter to the Improvement Committee, Mr. Mountford said—

"It may be desirable to point out 'it is proposed to line the whole of the walls of the staircase hall (over 40 ft. square) with marble above the line of the steps. These steps, together with the balustrade, are already of marble, under the contract, therefore the lining of the walls with marble will tend to make the whole more harmonious than if part is marble and part stone. Then the walls of the principal corridor beginning at the Cheney-row end, right round to the staircase leading to the Town Clerk's department from Surrey-street, will be lined with marble to a height of 10 ft. from the ground, and the various doors opening into this corridor (ten in all) will have moulded marble architraves."

It is proposed to use Irish, Devonshire, and Derbyshire marbles. The Improvement Committee resolved to recommend the Council to adopt the suggestion. We hope they will do so; it will add very much to the monumental effect of the interior.

ST. JOHN'S GATE, Clerkenwell, one of the very few of its kind remaining in London, and now forming the headquarters of the Order of the Hospital of St. John of Jerusalem and the St. John Ambulance Association, has been extensively repaired, and will be re-opened on the 24th inst. by the Prince of Wales. Mr. Thompson, of Peterborough, the well-known builder, has carried out the work, under the superintendence of Mr. J. Oldrid Scott, architect. The gatehouse was built by Thomas Docwra, Grand Prior, in 1504, of brick faced with Reigate stone. In the old cuts in the *Gentleman's Magazine*, it appears without the battlements which form a feature in the present restoration. Until lately the eastern portion was occupied as the "St. John's Gate" tavern: the north-western tower was the entrance into Cave's printing offices. In 1845-6 Pettit Griffith re-instated the stone-work, added battlements to the north, and (in part) the south, fronts, and restored the windows. In 1866 further repairs were made; and some years ago Mr. Norman Shaw restored an upper room as a chapel.

IN his account of a provincial tour he made in June, 1654, Evelyn writes—"Then to Aldermaston, a house of Sir Humphrey Forster's, 'buit à la moderne.'" Sir Humphrey had built that house in 1636-7

upon an estate to which his ancestor* had succeeded on marrying the heiress of the Delamares. It was a plain brick mansion, having a bold blocked cornice, and two front doors with pediments and twisted columns; but had a handsomely-fitted interior. In Vol. IV., second series, of his "Seats," J. P. Neale gives views of the main front, and the grand staircase. Having been almost destroyed by fire, the house was rebuilt in the Elizabethan style, in 1856, by P. C. Hardwick, who incorporated the staircase, with some of the chimney-stacks, in the new building. It will be offered for sale at the Mart, on the 26th inst., together with the estate, lying in the valley of the Kennet, and formerly, it is said, an outlying chase of Windsor Forest, and the entire village of Aldermaston. Elizabeth, sole heiress of Sir Humphrey Forster, Bart., brought the property in marriage to William, third Lord Stawell: their only child Charlotte married, 1752, Ralph Congreve; of that family was Congreve, the poet and dramatist. Amongst the pictures at Aldermaston, Neale mentions two portraits of Congreve, one by Kneller. In the parish church of St. Mary, formerly a chapel of the Benedictine priory at Sherborne, near Basingstoke, are some monuments of the Forsters, including that of Sir George Forster (obit 1526) and his wife Elizabeth. Aldermaston belonged to King Harold, and was granted by Henry I. to Robert Achard, the heiress of whose house married Sir Thomas Delamare.

WE have received a prospectus of the "Photographic Salon" to be held in the Dudley Gallery in October next, which is to be devoted exclusively to "pictorial photography," and which is to "help to remove the misconceptions and unjust prejudices which exist as to the power of photography to make artistic representations." We do not know exactly what is meant by the phrase "pictorial photography," and on the other hand we very much doubt whether the promoters of the exhibition know what is meant by "artistic representation." If the exhibition is to include efforts to make pictorial groups and reproduce them by photography we know pretty well what the result will be. It has been tried before, and merely produces groups which, at their best, serve to indicate what an artist might have made of such a group had he painted it; and it is the same in regard to landscape. The mind and method of the artist is a factor in the production of anything worth calling a picture—often the chief factor, and this cannot in any way be represented by photography. The photographer may arrange groups as pictorially as he pleases, but the intellectual interest given to him in the painting of an artist, even in monochrome, cannot be represented. The nearest approach which photography can make to artistic work is in portraiture, where the head is placed in such a light as to produce an effect which gives it an interest beyond that of the mere likeness. Mrs. Cameron was the first to show how this could be done, and others have followed her lead with more or less success. But even then, in the case of a head which possesses anything more than superficial character and expression, the power of the artist in giving the essential character of the sitter is wanting. All that is obtained is a likeness of the features accompanied by an effective lighting of the head; and that is the nearest approach which photography can make to the effect of a work of art. The proposed exhibition may have its own interest, no doubt, but it can never be the same, either in kind or in degree, as that which attaches to an exhibition of artists' work. On the other hand, the greatest value which photography can have as a record is in representing architecture, as it

gives the facts with a minuteness and accuracy which the most painstaking draughtsman can hardly emulate. But that is just the class of work which is generally little represented in photographic exhibitions.

THE water-colour exhibition of the Dudley Gallery Art Society can hardly be said to be a remarkable one, though it contains some good works among a considerable amount of mediocre drawings. The small landscapes by Mr. George Marks are all worth looking at, "May Time" (257) and "A Surrey Heath" (120) especially. Mr. Walter Severn's large drawing entitled "Rhododendrons, Dunkeld" (199), a garden glade under trees, is rather cold and repelling in tone at first glance, but it improves on acquaintance; his "Windsor Castle" (187), is spoiled by the mechanical treatment of the water. Mr. Rupert Stevens's "Burning Weeds" (246) is more of a picture in the true sense than most of the drawings, his "Maldon" (281) also, though the treatment of the sea is rather unsatisfactory. Mr. Newton Benett's "Windsor in Gloom" (149), a misty effect, is a good little work. There are a good many small architectural subjects, of which Mr. Williamson's "Blackfriars, Early Morning" (112), is the best we noticed. Mr. F. G. Coleridge's "From Richmond Hill" (105) is a good rendering of the famous view, but the river is rather too hard and yellow in the sunlight. Among other drawings to be mentioned are Mr. Finn's (59 and 67); some clever sketches by M. Menta, at the top of the room; an excellent bit of still life by Mr. Block (14); "Evening," by Mr. R. Wane (82); "The Infant Napoleon," a pastel (89) by Mr. E. Tayler, who has cleverly indicated on the infantine face the future physiognomy of the conqueror; and "The Thames near Medmenham" (277) by Mr. F. G. Coleridge.

IBSEN's play, "The Master Builder," which has formed a prominent item in the series of performances just concluded at the "Independent Theatre" located in the Opéra Comique, and has been a bewilderingment to many in regard to its meaning and *motif*, may be said from our point of view to present one very clear and decided moral, viz., that architects who are too nervous or too stupid to climb about their own buildings in progress have mistaken their vocation. We remember Street drily saying to the members of the Congress of Architects, before they were to go up and inspect the vault of the great hall at the Law Courts,—"Architects who don't like going up ladders will find a staircase in the corner." Mr. Solness would have been among those who preferred the staircase. Under the inspiration, or the mind-willing, or whatever we are to call it, of Hilda Wangel, he for once goes up the scaffolding of his own tower, amid the sneers of his pupils who had assembled to see him "funk" it, and comes down headlong. Hilda Wangel may be incomprehensible—she certainly is *incomprise*; but the career of Mr. Solness has an obvious and pointed moral for architects.

FORMATION OF A MASTER PAINTERS' ASSOCIATION IN LEEDS.—On the 12th inst. a meeting of master painters was held at the Griffin Hotel, Leeds, for the purpose of forming a Master Painters' Association for Leeds and district. At a preliminary meeting a sub-committee had been appointed to consider the matter, and they recommended that such an association should be formed, and submitted a code of rules. It was agreed to form an association, and the suggested rules were adopted. Mr. J. T. Pollard was elected president.

OPENING OF A PARK FOR STOCKTON.—On the 8th inst. the opening took place of a park for Stockton-on-Tees. The park, which is situated in the south-west part of the borough, comprises thirty-six acres of land given by Major Ropner, J.P., and three acres purchased by the Corporation. The estimated cost for laying out the park was about 11,000*l.*, but this will be greatly exceeded. The contractors were: for the structural work Mr. W. C. Atkinson, Stockton; for excavating, draining, &c., Messrs. Weston, London.

* Sir George, son of Sir Humphrey Forster, Sheriff of Oxfordshire and Berkshire, in 15 Edward IV., who was buried in the old church of St. Martin's-in-the-Fields.

ARCHITECTURE AT THE ROYAL ACADEMY.

CONCLUDING NOTICE.

1,636: "Entrance Lodge, 'Mongewell,' Wallingford"; Mr. R. S. Wornum. A very slight pencil sketch of a lodge which unites Classic and Gothic feeling, or which is Classic and picturesque, though the projecting porch with its colonettes grows a little awkwardly out of the main building. The chimneys are collected into one square mass in the centre of the roof, which makes a finish to the building; a treatment perhaps rather better suited to an absolutely symmetrical design.

1,637: "Entrance Lodge at Chilton Lodge, Hungerford"; Mr. A. C. Blomfield. An unpretending, but pleasing little building, decidedly little, to judge by the scale of a figure at the door; the small window over the porch must be right down on the floor. The porch, with its balustrade and short columns on a high base, has a pretty effect. A sketch plan is given.

1,638: "Cartoon forming part of subject 'The Nativity,' for west window of St. John's Church, Silverdale"; Messrs. Shrigley & Hunt. The interior of the "courtly stable," with figures of Joseph and Mary; well designed, but the prevalent colour, owing perhaps to an attempt at too realistic treatment, is very dingy for stained glass treatment, which must above all things be decorative.

1,639: "The Danaids: design for a stained glass window"; Mr. Innes Fripp. A small-scale drawing with a good many figures, apparently a good composition as regards the figures, and agreeable in colour generally, but here again the large patch of something entirely undecorative (the slope up which the Danaids had to carry the water, apparently) makes a great hole in the decorative effect of the window.

1,640: "Design for the new Chapel at Gray's Inn Gardens"; Mr. W. J. Tapper. We have seen a better design for this among the rejected drawings of the year. This is a small, oblong, rectangular building with a hipped roof and a rather pretty lantern in the middle of the ridge, the side is treated with windows with Classic "dressings" and alternate curved and straight lined pediments; correct, but not very original.

1,641: "Houses on the Grosvenor Estate, Buckingham Palace-road; geometrical elevation"; Mr. J. J. Stevenson. Probably these are more attractive houses than they appear on this rather hardly drawn elevation, which, however, sufficiently indicates the treatment; a good example of a terrace of houses treated so as to compose as one block, but with sufficient variation in detail to give distinct character to each house. The skyline is broken by gables rising at intervals above the main cornice line, but the gables, while of the same general proportion, are all differently designed, and varied slightly also in the spacing. The windows are very simply treated, those on the first floor being a little accentuated by being placed in arched recesses. Some of the balconies have wooden (?) balusters, others wrought-iron balustrades; we are not sure that these two details quite harmonise when employed in the same block of houses. This is, however, a much more sensible and architectural style of street-terrace than that which used to characterise the Grosvenor estate. A specimen plan of one or two of the houses should have been added.

1,642: "Bidston Court, Cheshire"; Messrs. Grayson & Ould. If this is a new house, it succeeds remarkably in looking (in the drawing) like an old one. It is a building entirely built in elaborate half-timber work, extending round three sides of an irregularly shaped court-yard. The bay-windows, we read in a note in the corner, are copied from Moreton Hall, "in the hope that when those have perished these will remain." If this memorandum is engraved on the work itself it will be to the purpose, and may give the new lays a certain historical interest which they could not otherwise possess. The whole erection is picturesque, but it is somewhat too much of a timber-stack, and seems almost ostentatiously irregular and "heaps." No plan is given, so we cannot judge how the interior arrangement coincides with the irregularity of the exterior.

1,643: "House at Kelvin-side, Glasgow"; Mr. T. L. Watson. A water-colour drawing of a house, also with a good deal of timber work about it, but with sufficient masses of brick wall to afford support and buttressing to the lighter work. That is the want in No. 1,642; it seems a pile of timber with no solid support; the

special fancy of a client is very likely responsible for this. No. 1,643 also has no plan.

1,644: "West Front of the Cathedral for new Lucknow Diocese, India"; Mr. W. Emerson. A pen drawing of a solid but rather heavy cathedral building in a style combining elements both of Romanesque and of Early Gothic. The front has towers and spires with ponderous lucarnes at the base, the north tower being diversified by a large circular angle staircase turret with a solid conical finish to it. The main feature between the towers is a large circular window with massive tracery arranged in a geometrical design compounded of squares and circles. The drawing is a rather hard one and probably does not give the best aspect to the building, which though solid and powerful-looking, seems to want refinement in detail. No plan.

1,645: "Visitors' Staircase, Avery Hill, Eltham"; Mr. T. W. Cutler. The staircase leads up from under an arcade on one side of the hall, with square-panelled wainscoting up to the height of the impost, and decorative plaster work above. The ceiling is treated in a panel design of which each alternate panel is enriched and the others left plain.

1,646: "The Mansion House, Rosehaugh, N.B."; Mr. W. Flockhart. A very large pen drawing of a large and extended house in Domestic Gothic style, with a terrace in front of it. The design is irregular and unsymmetrical, the massive low square tower near the centre of the front is effectively contrasted with the light two-storied bay-window which seems to lean on it for support. The effect of the house is mostly obtained by picturesque variation in the treatment of the windows. As in many other cases, the point of this variety in treatment is much lost for want of a plan.

1,647: "Proposed Hotel, Madeira; Garden Front"; and 1,652, "Main Front" of the same; Mr. Henry Rose. A very agreeable specimen of a hotel designed by an English architect to suit the climate and architectural associations of a southern site. The main angle pavilions of the hotel, which is E-shaped, enclosing a courtyard or garden, are square blocks simply treated, with an open round-arched loggia and balustrade beneath the low-pitched hip roof, with wide eaves, which forms the finish of the pavilion. The centre block of the E, raised above the rest, is enriched with pilasters in the upper story, and shows a large space of wall decoration over the doorway, in a fashion distinctly southern. The garden front is agreeably varied in treatment, still preserving the same general character. The whole is a very pleasing specimen of hotel architecture. No plan.

1,648: "A Smoking-room in a London Mansion"; Mr. G. Aitchison, A.R.A. Geometrical drawings of three walls and the ceiling, the latter panelled and enriched; we do not make out the intention of the circular panels, which are shaded in the ceiling plan as if in relief, but do not show in the section. The window is a bare plate-glass opening in three divisions, with Elizabethan shaped pilasters between, larger at the top than the bottom; another side shows a white panelled wall with polished mahogany (?) doors, and the third side a pretty and effective fireplace of Adam type of work. It is probably a doing up of an existing room in a house of which the type of treatment was already fixed; but it looks rather cold and colourless for a smoking-room.

1,649: "Village Hall, Forest Row, Sussex"; Mr. J. M. Brydson. A very successful treatment of the village hall, a small domestic-looking house in front, and the hall extending in the rear, with a row of larger windows between buttresses, and a spirelet over. By the same architect is "Bournehead, Bushey, Herts" (1,650), a small neat country house of no very marked character. Plans of both of these are given, and both appeared among the illustrations in our issue of May 20.

1,651: "Court-yard of New House and Studio"; Mr. Howard Ince. Is this in England? There is a very foreign look about it. It is a slightly executed drawing in coloured crayons, and though simple, one of the most original and characteristic things in the room. It shows the interior of a courtyard with the greater part of the wall treated with a warm tint, divided off from the upper white wall by a string-course; the entrance gateway is emphasised by a wall decoration confined by a spiral wall shaft at each side, and with a niche containing a statue above, breaking through the line of string-course before mentioned. In the corner of the courtyard the entrance to the

house is guarded by two dwarf walls stopped by columns which carry statues. The treatment of the rest of the building is very quiet and plain, but there is a pleasant originality and good taste about the whole. A shallow wide fountain basin on a stalk occupies the centre of the court yard.

1,653: "Royal School of Art Needlework, Imperial Institute Road"; Mr. Fairfax B. Wade. A very pleasing and picturesque front, of a freely treated Elizabethan character. The wings, with gables of the usual character in this style, are kept very plain, giving effect by contrast to the richer curtain which connects them, consisting of an order of fluted pilasters of considerable projection, but which run up to the corona of the cornice instead of carrying the conventional entablature, the capital of the pilaster coinciding with the cantilever tier of the cornice. This piece of architecture is broken in the middle by a projecting octagonal turret, of which the lower portion, on rusticated open columns, forms the entrance porch. The whole is an exceedingly pleasing architectural composition. No plan.

1,654: "South and West Elevations of a Country House"; Mr. R. Willock. A plan is given, but too small to read at the height. The elevations show a soberly designed house of more or less Elizabethan character, with strongly marked horizontal string courses. We do not quite like the principal projecting bay placed out of centre with the gable over it.

1,655: "St. Quirinus, Neuss, Germany"; Mr. H. W. Brewer. A pencil version of a very interesting sketch of an old German street and church, which has appeared in slightly different form in our own illustrations.

1,656: "An Island Home, Loch Allen, Ireland"; Mr. Leonard Stokes. There is nothing specially characteristic of an "island home," as far as we can see, but it is a very picturesque and unusual house, both in plan and exterior. The plan is a long one with a break at an obtuse angle, where there is inserted an octagon morning-room, which serves to make the joining between the two limbs of the plan, and appears above the roof-ridge as a low circular battlemented tower, with good effect. The Hall is interposed on the left between this room and the dining-room, conspicuously marked externally by a large mullioned window; on the right the drawing-room occupies a considerable portion of the shorter right-hand limb of the plan. The left-hand portion is returned again at a right angle, with a verandah on the re-entering angle. The succession of small gables in the upper portion of the design has rather too much of an "almshouse" appearance, but in the main this is a very interesting house design.

1,657: "A new Town Church"; same architect. A church placed at what is called in America "a corner lot," the corner rounded and the entrance porch very cleverly fitted in between the street and the obliquely placed nave of the church. The porch portion develops above into a short circular tower with a small lantern or cupola on it. The main window is a round arched one with shallow mouldings of late Gothic character, and tracery which leaves the shape of a cross in the centre lights. The very large square paterne of Late Gothic type in the archivolt of the window are quite out of scale with the rest of the detail. A house connected with the church, and treated with horizontal wide-spreading eaves, and sgraffito decoration between the windows, does not at all appear to belong to the church but to have been separately built, which should hardly be the case, since the plan is actually connected with that of the church. In short, clever as this building or group is, there is a certain degree of unnecessary eccentricity about it which rather detracts from its merit.

THE SANITARY INSTITUTE'S EXAMINATION FOR LOCAL SURVEYORS.—At an Examination for Local Surveyors, held in London on June 9 and 10, by the Sanitary Institute, seventeen candidates presented themselves. Questions were set to be answered in writing on the 9th, and the candidates were examined *orid over* on the 10th. The following eleven candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of Local Surveyor, viz.: Messrs. A. E. Adams, G. T. Bassett, H. Busbridge, E. J. Elford, H. F. Haddock, L. W. Hogbin, J. Lambert, W. Phelps, T. K. Scott, J. Spink, and E. Worrall.

A BUSINESS CHANGE.—Messrs. J. Sagar & Co., wood-working machine-makers, of Halifax, announce that they have opened a London office at Aldermar House, 60, Watling-street, E.C.

NOTES ON THE FIRE BRIGADE TOURNAMENT AND EXHIBITION.

WHAT was originally so unfortunately advertised as a "Fire Congress," but is now more correctly known as the "International Fire Brigade Tournament and Exhibition," has been opened with some ceremony at the Agricultural Hall. As far as the exhibition is concerned, the term "International" does not hold good, our national trade being alone represented, if we except two American firms, and one Continental one. The tournament, however, although essentially a large gathering of English volunteer firemen, with a sprinkling of a few regulars, has some claim to be termed cosmopolitan, as it is being attended by a number of deputations or single representatives of foreign volunteer and even professional brigades. The "Tournament and Exhibition" was promoted by the National Fire Brigades Union, and a great deal of the credit for the show must be assigned to its energetic executive and its hon. sec., Mr. H. S. Folker, of Guildford.

We have in former numbers spoken of the inadvisability of the Union giving so much attention to show displays instead of advancing fire prevention and fire brigade organisation, and further we have referred to the specially coached firemen who are so conspicuous at the modern drill competitions. Taking the gathering, however, as we now find it, we have little doubt that at least the exhibition of fire appliances in connexion with it must be regarded as a success, as most of the exhibits on view are of a highly instructive character, and their arrangement in the roomy bays of the Hall facilitates careful inspection and comparison. The executive can be congratulated as to the arrangement of the space, and the trade on the pains taken to show its best, however self interested these efforts may have been. Further, the actual bringing together of so large a number of fire brigade officers deserves comment, as the interchange of ideas and experiences must be valuable to many of the individual chiefs. That the rank and file should be well represented, both for exhibition drills and competitions, is, however, not so satisfactory, as their presence in town is depriving their own districts of proper service. We are surprised that the managers, knowing the risks incurred by the absence (in some cases) of nearly entire brigades, should not have found means to prevent this distinct neglect of duty. The loss of a single life due to the Union's tournament would not be condoned by public opinion. The idea of bringing over some foreign teams is certainly praiseworthy, as some of their evolutions are decidedly instructive, but even greater advantage might have been obtained by a more careful selection of the forces to whom invitations were issued and the *bona fides* of the representatives. Nothing will have been more interesting at the show than the way the Portuguese regulars manoeuvre their apparatus, or more ridiculous than the unpractical circus performance of the specially-trained Kansas, U.S., athletes, with whose assistance Chief Hale is advertising his water-tower. It will, of course, be difficult to understand many of the foreign drill exhibitions without a knowledge of the localities and the risks the respective forces have to deal with, and yet even a performance such as is given by the Boulogne or Havre firemen, somewhat unintelligible as it may appear to the layman, cannot fail to give many a rural officer ideas for improvement to his corps. It is only unfortunate that the Union's invitations to some of the Austrian, Danish, Dutch, or German firemen by some mistake apparently did not reach their destination, otherwise even yet more instructive work than that of the Oporto Brigade might have been seen. The specially-framed tournament advertisements of some enterprising fire-engine makers have been quite insufficient to attract the more seriously-constituted brigades of those countries, although doubtless an official notification might have brought some of them to our shores.

In going through the exhibition we notice the Boston Woven Hose and Rubber Company to be the only important foreign exhibitor. This firm is essentially a purveyor of the smaller gear for American fire brigades. The goods exhibited, with a few exceptions (such as the tools and light ladders), cannot be practically introduced for factory or tenement "self-aid," and these few are too expensive for England. Some of the couplings and branches, of the same firm, intended for brigade work (which we know to have been satisfactorily tried on the Continent) seem to be priced at a remarkably low figure. The excellently got-up catalogue of the Boston

firm contains some interesting papers on fire-hose by Mr. J. R. Freeman. The Fire Appliances Manufacturing Company, a new department of the Vulcan Engineering Works at Northampton, has a good show of fire-engines and heavy apparatus. There are no special novelties for self-protection, but such small gear of old pattern as is shown, though not quite so well finished as that of some of the London firms, answers its purpose quite as well, and is obtainable at a lower price than the customary ones. We would here point out that we cannot find it so very important that a fire-bucket or hand-pump should be practically everlasting as far as wear and tear is concerned. Small gear is generally damaged by accident, or lost too quickly, to encourage extra outlay for the more expensive goods, and further, better ware generally means extra weight, a factor that must be avoided.

The two London firms, Messrs. Merryweather & Sons and Messrs. Shand, Mason, & Co., are represented by an extraordinary number of exhibits, embracing nearly every kind of fire appliance, from the heavy "Greenwich" steamer or Captain Simonds's new Water Tower to the smallest item serviceable for "self-aid" or brigade work. Both firms show their usual excellence in workmanship and design, though novelties of any special importance are not shown by either firm, as even Messrs. Shand, Mason & Co.'s exhibit of Mr. Simonds's Water Tower can scarcely be classed as such. Some neat appliances of the latter makers for storing hose under hydrants ready for quick "running-out" are worth attention. They are decided improvements, even on the combined hose-reel and hydrants lately introduced on to the Continental stages. Messrs. Shand & Mason have published a special catalogue with the history of steam fire-engines in connexion with the exhibition; and Messrs. Merryweather are issuing daily numbers of a small fire brigade journal known as the *Fireman*. Both these publications, though essentially used for advertisement by the respective makers, contain many interesting notes for the professional reader.

It would lead too far to take the other exhibitors in rotation, but we may point out some of special interest. A "Street Fire Alarm and First Aid Station," by Messrs. Tozer & Tippets, of Birmingham, consisting of the usual automatic fire alarm, a telephone, a hand-pump, buckets, a hatchet, an extension ladder, a lamp, and a stretcher with ambulance-box all neatly stowed away in a case, is intended for the use of the police or passers prior to the arrival of fire-engines. It is as practical a contrivance as any municipality could wish for. A bucket fire-extinguisher, by Messrs. Messer & Thorpe, of London, is an exceedingly practical adjunct to any scheme of fire protection in buildings where the water service is unreliable. The tanks are made to hold from ten to thirty buckets, with the necessary supply of water for filling them once. The buckets, being held in position by sliding channels resting easily on the top of one another, can be rapidly drawn and used either separately or in conjunction with hand-pumps. The size of the tanks is comparatively small; they can be so arranged as not to be too conspicuous, but the cost of the apparatus is considerable. We may add that Messrs. Messer & Thorpe's buckets for once have a shape that is almost perfect for throwing water with good effect. The only other firm which approaches perfection in this not unimportant detail is Messrs. Sinclair & Co., who otherwise have but an indifferent selection of small gear at the exhibition. The Tozer and the London "Brigade" hand-pumps, both perfect appliances, which are made with some small differences in detail by nearly every English firm, are somewhat too expensive for the small householder. A hand-pump (No. II.) by Messrs. Bauer & Co., of Bonn, in Germany, is a cheaper article, which will be quite efficient for all ordinary occasions, giving a good stream without requiring much exertion. It cannot, of course, vie with a Merryweather hand-pump as to durability, but, as remarked before, we do not consider the extra strength and weight necessary.

As is probably generally known, the old-fashioned screw coupling is still generally in use in London and the south of England, whilst the interchangeable express and bayonet couplings, have already been long introduced in the North and in many Continental cities. A numerous selection of these more modern couplings are to be seen at the exhibition sent in by at least a dozen patentees. To go into the merits of these different inventions would lead too far, but we would note that simple bayonet interchangeable connexions with their hooks inside, will probably be found to be the most serviceable. The "Storz" patent of Messrs.

Zulauf & Co., of Germany, has been found perfect for medium size hose, some connexions in a steamer destined for Belfast look practical, and the same can be said of the "Nunan" patent, although the hooks are here on the outside. More numerous even than the couplings are the many patent "self-saving" apparatus. In regard to these we would remark that fire-escapes are not intended for gymnasts but for the helpless, and that outside aid should not be relied upon when designing them. Of the many "self-aid" escapes the "Anidjah" shoot with a bell-pull rope inside can alone be said to completely realise its object.

Fire telegraphy is but poorly represented, and so likewise are fire-proof materials. Two items, however, call for attention in this division—the exhibit of silicate of cotton, and Messrs. Hayward Bros. & Eckstein's steel lathing for plastered partitions and ceilings, which combines strength with a good key for the plaster.

Reviewing the displays which commenced on Monday with a very pretentious general parade, we would only again wish to lay stress on the excellent practical exhibition of Portuguese regulars as represented by the Oporto firemen, who had their ladder truck with them, and their ingenious long ladder and scaling-gear. The Kansas representatives went through numerous exercises, the unpractical nature of which was often as obvious as the agility shown was admirable.

The Water Tower which Chief Hale exhibits is certainly a most beautiful piece of mechanism. Unfortunately a dry drill with such complicated apparatus is a very different thing from the actual trial at a fire, where this expensive toy is too easily damaged. The water tower of Mr. Simonds, a simple combination of a movable branch at the top of a fire-escape, is a far more serviceable appliance, any damage to which would not incur a great pecuniary loss. It is true that the London water tower is nearly as unwieldy to drive about as the American one, but this could be easily altered if Mr. Simonds would combine his branch with some other kind of long ladder, such as that, for instance, in use at Copenhagen.

The Metropolitan Brigade, under the last-named officer, gave a large display on Wednesday. It was unfortunately obvious that the brilliant spectacle of a musical drill by the picked and specially coached men of the force, testified far more strongly for the smartness of the brigade than the actual ordinary drills with appliances, which by no means came up to the general expectation. The "sham fire" was a most cleverly arranged event as far as it was intended to attract the public to the turnstiles; unfortunately, however, the practical details were not quite correctly carried out. Taken as a whole it would probably have been better if the brigade had not courted a criticism of its mode of work in the open arena. Its members are smart, practical, and intrepid at conflagrations, and their discipline is good, but there is a want of system in their organisation and training which does not bear the investigation of an intelligent audience which included a large number of foreign fire experts. As regards the minor displays they are too numerous to recount, with the exception, perhaps, of the French volunteers, who showed great smartness. The endless competitions are being gone through with precision, but afford no special scope for comment.

Two of the promised papers have been read, one by the Chief Officer of the Windsor Brigade, the other by Mr. Folker.

ST. MARTIN'S CHURCH, TRAFALGAR-SQUARE.—We observe that the masonry of the Church of St. Martin-in-the-Fields, which is all of Portland stone, is being dressed with the liquid known as "Fluate." The tower and upper portions of the church have been dressed, and the lower portions have yet to be done. The work is therefore now in the right stage for judging what effect the Fluate produces on the appearance of the stone. The work at St. Martin's Church is being carried out under Sir Arthur Blomfield & Sons, by Messrs. Holland & Hannen, and it will interest many of our readers to have a look at the building for themselves. ASSOCIATION OF BUILDERS' FOREMEN.—A new society, under the name of the "Bristol Association of Clerk of Works and Builders' Foremen," has been formed at Bristol; the members to be fully qualified mechanics, clerk of Works or builders' foremen, who shall have held an appointment in either branch for at least three years before becoming members of the Association. The main object is "to advance the general knowledge and capabilities of members," and to assist those who are seeking employment to obtain suitable appointments otherwise than by advertising: both most praiseworthy objects.

SOME LETTERS AND A MORAL.

The following correspondence has recently appeared in the *Times*:-

The *Times*, Monday, July 29

NEW LABORATORIES AT UNIVERSITY COLLEGE.

TO THE EDITOR OF THE "TIMES."

Sir,—The *Builder* complains that in their new laboratories the authorities of University College have disgraced and concealed Mr. Wilkins's beautiful architecture by the addition of unsightly sheds.

I am surprised that the *Builder*, which poses as a judge of architecture, should have made such a singular statement.

Wilkins's plans always contemplated additions, which are now being partly carried into effect.

Professor Roger Smith has addressed as closely as circumstances permitted to Wilkins's design in the three-story block which terminates the hitherto unfinished south wing.

It is true that the building which forms the commencement of the fourth side of the square has a temporary roof, but the building up to the commencement of that roof follows strictly Wilkins's design, and when the liberality of benefactors permitted the building to be completed on the lines laid down by its original architect, and the college will retain its character of being one of the most beautiful buildings in London.

I have the honour to be, Sir, your most

obedient servant,

DOUGLAS GALTON.

12, Cluster-street, Grosvenor-place, S.W.

MAY 27.

The *Times*, Tuesday, May 30.

Sir,—Either Sir Douglas Galton is writing in incorrect information, or his letter is an attempt to throw dust in the eyes of the public. In either case I do not think it ought to pass without correction in the columns in which his statement is made.

He carefully confines himself to a general statement that Wilkins "contemplated additions" to the building, without saying what they were. The design and plan in the library of the Institute of Architects show (what every architect knows) that Wilkins intended the completion of the wings up to the street line, but not the ever contemplated carrying the building round the fourth side of the quadrangle and blocking up the central portico from view. His plan indicates a low colonnaded screen across the opening, with a central raised gateway—a frequent treatment of buildings of this class, and which always has a fine effect. Unless the University College authorities can produce positive evidence that Wilkins ever contemplated continuing the three-story buildings along the Gower-street frontage, and blocking up the quadrangle, the letter of Sir Douglas Galton is a mere perversion.

The matter is in this position; the college quadrangle is now left in a thing like a railway station shed projecting half across the front, with an ugly mass of slated roof and a row of skylights along the top. It will probably remain so for many years, completely ruining the appearance of the building; and from the state in which the south wing is left, I presume that the only change from the deformation will be the building up of a complete return block the same height as the wings, shutting out the central feature of the buildings from view, depriving a crowded and ugly neighbourhood of the view at least of an open space and a fine piece of architecture, and injuring the sanitary condition of the college by shutting up the quadrangle and checking the circulation of air. I am surprised that Sir Douglas Galton, who (if I may imitate his own not very polite phraseology) "poses as a sanitary reformer, should overlook this point. Why, even two centuries ago the learned founder of Caius College left it as a condition of his bequest that the fourth side of the quadrangle should never be built up, for sanitary reasons. Sir Douglas Galton asserts that in doing all this the University College authorities are only carrying out the design of Wilkins. If they have any proof of that, let them produce it; the *onus probandi* lies with them. Unless they can produce it, I can only repeat here what I have said elsewhere, that they have deliberately deformed and spoiled one of the most remarkable buildings of its date and style in London in the interests of education." Yours faithfully,

H. HEATHCOTE SPATHAM.

46, Catherine-street, Covent Garden, May 29.

The *Times*, Saturday, June 3.

Sir,—Owing to absence I did not see Mr. Spatham's letter on Tuesday.

In reply, I need simply observe that Wilkins left more than the design for the completion of University College; that in the design as now being made Professor Roger Smith has followed, so far as they have progressed, the lines laid down by Wilkins for the original building—that, in what Mr. Spatham terms the projecting railway shed, the walls are completed on those lines high enough to make the ground floor habitable.

The college authorities regret that they have been unable, through want of funds, to complete the whole facade, although its completion would extend their means of education in much-needed directions. University College combines in itself the highest class of teaching in the liberal arts, and in the application of science to engineering, electricity, and physics; it possesses a medical school second to none, as well as one of the first art schools in the country.

It is a matter of regret that the many appeals for funds made by its governing body have hitherto failed to induce the inhabitants of the most wealthy metropolis to induce to give for the completion of its usefulness a fraction of the money which changed hands yesterday over the Derby.

I have the honour to be, Sir, your most

obedient servant,

DOUGLAS GALTON.

12, Cluster-street, Grosvenor-place, S.W.

JUNE 1.

The *Times*, Tuesday, June 6.

Sir,—Sir Douglas Galton's second letter, like his first, is only an adroit evasion of the real point. I challenged him to produce any drawing by Wilkins showing the building in state, showing, more than any other building in the world, what Wilkins "planned" more than any other building, without saying what it was. He asserts that "some buildings, so far as which is only true in the sense that Wilkins's design showed a one-story structure across the front (the high of quite a

different kind), and the new buildings are not carried beyond one story as yet. Even the treatment of the end of the new wing is not according to Wilkins's intention, but very different, and quite inferior, to it."

I believe even the suggestion about an alternative design by Wilkins is a mere shot in the dark, with no evidence to back it. Fergusson, who bestows considerable space on University College in his "History of Modern Architecture," gives no hint of it, and the engraving in the Institute of Architects' Library is entitled, "Design accepted by the Council for the University of London."

As an example of the degree of credit to be attached to the statements circulated by the University College authorities, I may mention that the newspaper reporters on the opening day were informed, and were requested to state, that there would be an opening too wide left between the ends of the two new wings. Whoever is originally responsible for that statement, it is a direct untruth. I looked carefully at the new buildings and the site, and when the two new wings are completed, according to the present architect's design, there will not be 50 ft. space left between them.

It would surely be more creditable to the University College authorities to have answered my criticisms by saying frankly "We want the new rooms, and we do not care a button about the architectural effect," which is the plain truth, instead of making a pretence that they are carrying out Wilkins's design.

Once more: if the college authorities can state in plain English that they have a design by Wilkins showing return wings built up three stories high along Gower-street, and the quadrangle closed, and will show me the drawing, I will admit that I am wrong, and apologise for having misrepresented them. But that is the only answer that I can recognise as any answer at all.—Yours faithfully,

H. HEATHCOTE SPATHAM.

46, Catherine-street, Covent-garden, W.C.

JUNE 3.

No answer has appeared to this last letter; for obvious reasons. Sir Douglas Galton's cool impertinence in referring to this journal as one which "poses as a judge of architecture," while he proceeds himself to pose as a judge of architecture and to inform the readers of the *Times*, on his single authority, that Wilkins's design is not being injured at all, may be passed over as a joke; but the deliberate attempt in both his letters to induce his readers to believe something which is not true, without actually saying it, is rather beyond a joke.

We have put the correspondence on record in our columns, because for many years past there seems to have been an idea with some people that if they are offended with any criticism in this journal the simplest thing is to write to the *Times* and endeavour to persuade the general public, who are entirely ignorant on architectural subjects, that we do not understand our business. We have hitherto left such attacks to answer themselves, but in the present case the editor did not feel disposed to allow such a journal to be misrepresented and the public misled on a subject of which most readers of the *Times* know nothing. The result may be instructive to others who think of adopting the same tactics. We do not think Sir Douglas Galton will try the experiment again.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday afternoon last at Spring Gardens, the Chairman, Mr. John Hutton, presiding.

The Works and Stores Committee to be Divided.

The General Purposes Committee submitted the following report relative to this Committee:

"The Works and Stores Committee deem it desirable that they should be divided into two distinct committees, one to deal with works and the other with stores. The reasons they assign for this are as follows—

1. The character of the work now done by the Works sub-committee is distinct from that of the Stores sub-committee. Under the present arrangement each of these sub-committees has to report to the main committee, and that committee passes these reports formally in a few minutes and practically without discussion.

In the case of each of these reports, one half of the members of the main committee are called upon, formally, to make themselves responsible for the decisions and recommendations arrived at by the other half, into which there is no time to inquire, and this is considered unfair to the members in question.

2. The detail work of the Works Committee alone will probably be as great as that of any other Committee of the Council. It is, moreover, of first rate importance, and should not therefore be delegated to a sub-committee.

3. Immediate decision and action are essential in carrying out works, and it is felt that due dispatch cannot be attained if matters are referred from the main committee to the sub-committee and then back from the sub to the main committee for confirmation before action can be taken.

In any case it will be no light task for a committee to undertake the executive functions usually left to one man, viz.: the contractor, but the difficulty of this task will be much increased if the committee be one which has no initiative or executive authority in itself.

4. Immediate decisions have had to be taken

already by the chairman on their own responsibility on urgent matters, for which they have been absolved subsequently by the main committee. This is hardly fair to the chairman, and the necessity for such action should be reduced to a minimum.

5. No difficulty arises as to the central stores and central works. In any case these must be kept absolutely apart and distinct, just as they are in any contractor's yard; any goods passing out of store must be booked against a particular job or a particular committee. A separate staff has already been arranged to look after the stores, separate except as to the manager himself, and there is no reason why the officer should not attend the two separate committees just as other officials do.

6. The Works Committee need have no special knowledge of the articles to be purchased by the Stores Committee, such as coal, clothing, caps, helmets, boots, oil, tallow, waste, and the numerous goods required by the Fire Brigade, Parks and Open Spaces, Bridges, Main Drainage, and other Committees. There appears to be no reason why the Stores Committee should not report on all these matters direct to the Council. If the Council resolves to make its own goods, the running of a factory is hardly that class of constructive building work for which it is understood the Works Committee was created.

7. It is proposed that the Works Committee should buy its own plant and materials, such as bricks, stone, sand, timber, &c., and any stores which it requires in common with other committees, should come through the Stores Committee.

Having carefully considered the proposal, and the reasons assigned for it, we are of opinion that it should be adopted, and we recommend—

1. That the Works and Stores Committee be divided into two committees, one to be called the Works Committee, the other to be called the Stores Committee.

2. That until the committees are re-elected in 1894, the present members of the Works Sub-Committee and of the Stores Sub-Committee do form the Works Committee and the Stores Committee respectively.

3. That in future the Works Committee do consist of fifteen members, to be elected as follows—three members to be elected by the Council and one member by each of the following committees—The Asylums Committee, the Bridges Committee, the Corporate Property Committee, the Establishment Committee, the Finance Committee, the Fire Brigade Committee, the Highways Committee, the Improvements Committee, the Industrial Schools Committee, the Main Drainage Committee, the Parks Committee, and the Public Health Committee.

4. That in future the Stores Committee do consist of twelve members, to be elected by each of the following Committees—The Bridges Committee, the Fire Brigade Committee, the Highways Committee, the Main Drainage Committee, the Parks Committee, and the Works Committee.

5. That the order of reference to the Works Committee be as follows—

(a) The Committee shall carry into execution all works which the Council resolves to execute without the intervention of a contractor.

(b) The Committee shall have the control of the staff exclusively employed in connexion with the works of construction, repair, and maintenance undertaken by it.

(c) The Committee shall consider and report to the Council as to the provision of and shall control all workshops and yards necessary for carrying out the works committed to it.

(d) The Committee shall consider and report to the Council as to the plant or machinery necessary for carrying out the Council's works, and as to timber or other materials which may be required for stock.

(e) When the Council shall have resolved to execute any works without the intervention of a contractor, or shall have resolved on the recommendation of the Works Committee to purchase any machinery, plant, or material for stock, and shall have passed the necessary estimate of the cost of such works or such purchase, the Committee shall have power to contract, on behalf of the Council, for the supply of machinery, plant, and material, subject to the following conditions, viz.:

The Committee shall not enter into any contract involving an expenditure of more than £100, except at a public sale or after inviting tenders, and

The Committee shall not enter into any contract which will cause the estimate approved by the Council to be exceeded without obtaining the special authority of the Council.

(f) The Committee may execute any works referred to it by a Committee of the Council, provided that the cost of each work is under £50, and in the case of emergency may execute any works which a committee of the Council or an officer of the Council is entitled in such case to order to be executed.

(g) The Committee shall keep separate accounts of liabilities entered into in connexion with each work, and information of every liability entered into shall be reported forthwith to the Comptroller of the Council.

(h) The Committee shall on the completion of the works referred to it forthwith report to the Council that the works are completed, with particulars of the estimated and actual cost thereof.

We further recommend—

6. That the standing order which makes it the duty of the Works and Stores Committee to consider the rates of wages and hours of labour to be paid to the workmen by the Council be amended so as to devolve this duty upon the Works Committee.

We recommend—

7. That the order of reference to the Stores Committee be as follows—

(a) The Committee shall consider and report as to the provision of all store depots.

(b) The Committee shall control all store depots, and the staff exclusively employed in connexion with the Stores Committee shall carry out the regulations of the Council as to store accounts, tenders for stores, and the ordering, issue, and condemnation of stores.

(c) The Committee shall undertake the preparation of the schedules and the consideration of the tenders for all goods supplied to the Council.

As regards the staff of the works and stores department, no material change will be needed, but there must be a slight readjustment of the duties of the Manager consequent upon the division of the present single committee into two committees. We recommend as follows:—

8. That the Manager be responsible under the Works Committee for—
 - (a) Advising as to the purchase of plant and material.
 - (b) The execution of all works carried out by the Works Committee on behalf of the Council.
 - (c) The employment and supervision of all officers and workmen in his department or employed on works.
 - (d) The regulation and direction of all workshops belonging to the Council.
 - (e) That the Manager be responsible under the Stores Committee for—
 - (a) Advising as to the purchase of stores.
 - (b) The regulation and direction of all store-wards and depots belonging to the Council.
 - (c) The supervision of all persons employed in connexion with store-wards and store depots.

The whole of these recommendations were agreed to without discussion, except clause *b* of recommendation No. 5. To this clause Mr. McCall moved to add the words

"The Works Committee shall at the same time present a report from an independent surveyor as to the value of the work done, based upon the prices current in London for similar work."

Mr. Campbell seconded the amendment, saying that the public ought to know what the work effected by the Council really did cost, and whether they got value for their money. He believed that the resolution of the Council to do its own work was one of the maddest things imaginable, and he believed that the result would be that the work done by themselves would cost at least 20 or 30 per cent. more than would be charged by a contractor for the same work.

Mr. John Burns, M.P., opposed the amendment, contending that clause *a*, as presented by the Committee, contained ample safeguards in the interests of the public. The estimated cost was to be compared with the actual cost at the completion of the work. What more, in fairness, could be asked? The amendment was only an attempt to give a left-handed dig at the Works Committee to hamper it just as it was commencing to get to work.

The Chairman said there was one point which had not been made clear by the speakers. To obtain a report from an independent surveyor as to the value of the work done would mean the expenditure of 3 or 4 per cent. upon the value of the work. Was that charge to be added to the total cost of the work, or was it to be an establishment charge?

Mr. Westcott said he hoped the amendment would not be pressed, because it implied a slur upon their chief officers, and insinuated that the Architect and the Engineer did not know their business. Surely the Council had officers whom it could trust? He agreed with Mr. Burns that clause *b* of the recommendation afforded ample safeguards in the direction indicated by the amendment.

Sir John Lubbock said he could not support the amendment, as he thought it would be unfair to the Works Committee to hamper them. At the same time, he thought that if the Council really desired that the Works Committee should do its work economically, the proper thing to do was to invite estimates for work from outside contractors as well as from the Works Committee, and then, if the Committee could do the work for less than an outside contractor, to give it to them to do.

After some further discussion, the amendment was rejected, and the report agreed to in its entirety.

Limit of Height of Buildings, whether on Old or New Foundations.—The consideration of the Special Report of the Building Act Committee on this subject was at last proceeded with. We gave the text of the report in the *Builder* for April 29 last, p. 326. The report was now supplemented by some Memoranda by the Chairman of the Building Act Committee (Dr. Longstaff) as to the requirements of the Model Bye-Laws of the Local Government Board, and as to the means adopted by the municipalities of Liverpool, Birmingham, Glasgow, Edinburgh, Bristol, and Manchester, for providing sufficient open space about buildings to ensure a free circulation of air. We have not space to print these, nor to reprint the report from our pages of April 29, but we reprint the draft clauses which the Building Act Committee framed for insertion in any new Building Act, and the adoption of which was recommended by the report of the committee, viz:—

"1.—If an old building be raised or extended in any direction, or if a building be rebuilt so as to be higher in any direction, or to extend further in any direction than it previously did, or if a building be erected wholly or in part upon the

site of a building existing within ten years previously so as to be higher in any part, or to extend further in any direction than such previously existing building, any portion of such building that is higher or that extends further in any direction than the old or previously existing building shall be subject in all respects to the provisions of the Building Acts and Local Management Acts, just as if such portions of the said building were new buildings situated in new streets, any provisions in such Acts to the contrary notwithstanding.

II.—After the passing of this Act it shall not be lawful to raise any existing building, or to erect a building upon the site of any existing or previously existing building and exceeding it in height so that the height of such building measured from the level of the centre of the street immediately opposite the building up to the parapet or eaves of such building shall exceed the distance of the front wall of such building from the opposite side of the street, passage, or way immediately adjacent to such building, or in case two streets, passages or ways be adjacent, then the widest of them shall regulate the height of the said building.

III.—The Council may from time to time (subject to the approval of the Local Government Board) make, alter, and repeal by-laws as to the exercise of the powers conferred by the sections of this Act relating to the open spaces about buildings and the setting-back of buildings for the following purposes, viz:—

- (a) To provide for the mode of procedure.
- (b) To relax or adapt the said sections in their application to special or exceptional cases.
- (c) To exempt wholly or in part from the operations of the said sections any areas, streets, or parts of streets."

Mr. Beacroft moved the following amendment:—

"That the following be substituted for Clause I.—'That the operation of section 6 of the Metropolitan Building Acts (Amendment) Act, 1878 (which prohibits the erection of houses at a less distance than 20 ft. from the centre of the road save with the consent of the Council) be extended so as to apply to all dwelling-houses on sites occupied by buildings before or after the date of that Act, viz., 1878, and that accordingly the proviso to that section which exempts and occupies by buildings within two years of the date mentioned be repealed.'"

Mr. Beacroft said he was sorry to place himself in antagonism to the Building Act Committee, but his work on the Housing Committee had led him to form the very decided conclusion that the proposal of the Building Act Committee could only lead to the perpetuation of new slums, destined to be removed at an enormous cost hereafter.

The Rev. Fleming Williams seconded the amendment, which, after a long and interesting discussion, was carried by the narrow majority of 2 votes—47 members voting for the amendment, and 45 against.

As it was felt that the adoption of the amendment seriously affected the whole of the proposals of the Committee, the matter was referred back to the Committee for further consideration.

Improvement Schemes Shunted.—The Improvement Committee recommended that in the next session the Council should apply for powers to carry out the Holborn and Strand scheme, with the stipulation that it should not be proceeded with unless satisfactory provisions were made for defraying its cost.

An amendment to postpone application to Parliament pending "the provision of some new source of revenue" was agreed to; but Mr. Westcott then moved to refer the matter back for further consideration, and the debate on this motion stood adjourned.

The Proposed Acquisition of the Parliament-street Site for a New County Hall and Offices.—When the Council reached the report of the Establishment Committee recommending the acquisition of the Parliament-street site for the new County Hall, Mr. Benn, M.P., in the name of the General Purposes Committee, moved that, as the information it contained was too meagre, it be referred back with an instruction to the committee "to report further on this and other sites."

The amendment was agreed to unanimously; and after transacting other business, the Council adjourned.

COMPETITIONS.

PIERHEAD BATHS, LIVERPOOL.—At a special meeting of the Baths Committee of the Liverpool City Council, on the 9th inst., it was decided to request the Finance Committee to invite competitive designs for a building not exceeding in cost 20,000l. for the Pierhead Baths.

MURAL TABLET, TRURO CATHEDRAL.—On the 27th ult., the Bishop of Truro unveiled a mural tablet which has been erected in Truro Cathedral to the memory of the late Professor John Couch Adams, of Cambridge. The tablet was designed by Mr. J. L. Pearson, R.A., the architect of Truro Cathedral, and has been executed by Mr. W. Juleff, sculptor. It is in the Jacobean style, and is composed of a slab of dark grey marble, on which the inscription is cut in gilded letters set in a framework of alabaster, the corners being composed of yellow Siena marble. It has been placed in the north transept.

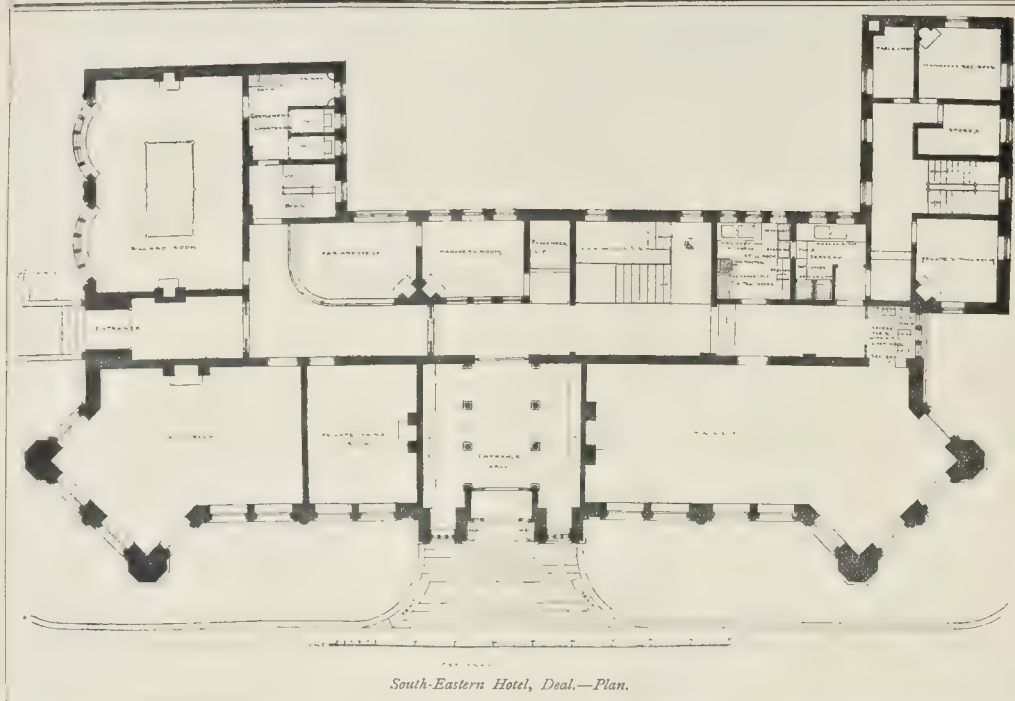
ARCHITECTURAL SOCIETIES.

GLASGOW ARCHITECTURAL ASSOCIATION.—The usual monthly meeting of this Association was held on the 6th inst., when a paper was read by Mr. John Rogerson, A.R.I.B.A., on "Woods." Dealing chiefly with the pine series, an account was given of the different varieties, their qualities and defects, with a comparison between log and deal timber in reference to their use in building. Touching briefly on a few of the less important timbers, Kauri pine was noticed as having come largely into use recently, and as being very suitable for some purposes, although perhaps not adapted for joiners' work generally. The discussion was opened by Mr. Chas. Gourlay, A.R.I.B.A., and at the close a hearty vote of thanks was awarded the lecturer.

ENGINEERING SOCIETIES.

THE JUNIOR ENGINEERING SOCIETY.—At a recent visit of this Society, another inspection was made of the Tower Bridge works, through the kindness of the engineer, Mr. J. Wolfe Barry, M.Inst.C.E., a party of upwards of eighty being present. Arrangements for their reception were kindly made by the resident engineer, Mr. E. W. Crittwell, M.Inst.C.E. Since the Society's visit to the works in the month of July last, it was noticed that the suspension-chains had been completed, and the suspension-rods, together with the greater part of the shore-spans, erected. The lifting spans have been experimentally rotated, and the rack quadrant and machinery for working the lifting spans are being adjusted. The masonry of the abutments had been completed, and that of the towers is advancing towards completion. The erection of the steam pumping engines and boilers on the south approach was finished, the pressure-pipes in connexion with the hydraulic-engines in the piers were being laid, and the paving of the approaches was proceeding. For the facilities extended in connexion with the occasion, the thanks of the members were expressed by the chairman, Mr. S. Boulding, M.I.Mech.E.

ELECTRIC LIGHTING STATION AT BOSTON, U.S.—The *Electrical Engineer* of New York gives a full description of the new Central Station at Boston, designed for an ultimate capacity of 25,000-h.p., and six hundred thousand 16-candle-power lamps connected. The present design is for a capacity of 11,250 h.p., and the plant comprises six 1,500 h.p. steam dynamos, three 750-h.p. steam dynamos, and fifteen 325-h.p. boilers, having collectively an evaporating capacity of 146,000 lbs. of water per hour. The company was started in 1886, and began operations with a small station laid out for one thousand six hundred lamps. In the following year a second station was built and equipped with twenty 150-h.p. engines and forty dynamos, which plant was, however, destroyed by fire in 1888. The interruption of the service lasted only twenty hours, spare plant being sent on by express train from Schenectady. Another station was started in the same year with twelve engines and twenty-four dynamos. In 1890 the company determined to lay down the very large station described, and with a view to embody in this all the modern improvements, sent their engineer, Mr. Edgar, on a tour of inspection to Europe in 1891. The result of his investigations was to decide for vertical, triple-expansion engines, and for a site on the water front, even at the sacrifice of being at some distance from the electrical centre of distribution. The site selected is the historic spot where, in 1773, the tea was thrown overboard by the Boston citizens, and it covers 100,000 sq. ft., of which area about one-fifth is now built over. Part of the space is reserved for a coal-store holding 5,000 tons, and two derricks are provided for hoisting the coal from the vessels which come alongside. The foundations are all piled. The boilers are of the Babcock-Wilcox type, 24 ft. long each, with 42-in. steam drums. The headers were imported from Glasgow, it having been found impossible to procure them in America strong enough for the pressure of 225 lbs., at which it was decided to work the plant. The smaller engines are of the vertical, triple-expansion, and condensing types, cylinders 104 in., 231 in., and 284 in. diameter, with 20 in. stroke; speed, 120 revolutions per minute. They are guaranteed to work with 15 lb. of steam per h.p. per hour. Each engine drives its own condenser, and a dynamo on either end of the crank-shaft, capable of giving an output of 1,333 amperes at 160 volts. The dynamos are connected on the three-wire system. They are of the multi-polar type, and the field casting is adjustable vertically so as to allow for wear in the bearings. Weight of each field, 14½ tons; weight of armature close on five tons.



South-Eastern Hotel, Deal.—Plan.

Illustrations.

FRIEZE; "HOLY WOMEN OF THE NEW TESTAMENT."

THIS is a portion of the frieze painted by Mr. Westlake in the church of the Annunciation at Chislehurst. Another portion of the frieze, "Holy Women of the Old Testament," was illustrated in the *Builder* for September 3, 1892, when we gave some description of the work. The portion illustrated in the present issue forms about one-fourth of the New Testament frieze on the south side of the chancel. The figures represented are the Madonna and Child (in the centre), and St. Anna, St. Elizabeth, St. Mary Magdalene, and two other Maries of the New Testament.

The drawing is hung in the Royal Academy; not with the Architecture, but in the Black and White room.

SOUTH-EASTERN HOTEL, DEAL.

THE site for this hotel has been chosen so that the building will be detached, and from two of its fronts there is no interruption to a view of the sea. The principal front is approached from a wide street and esplanade extending from Deal Castle to the Pier, about two miles long.

The building consists of basement, ground floor, first and second floors, and attics. Fire-proof floors are to be used in three of the stories. The basement contains the kitchens, scullery, pastry-rooms, room for cooking vegetables, pantries, larders, room for uncooked meat, fish, &c., wine and beer cellars, two large boilers for heating and cooking purposes, a billiard-room, card-room, bar, lavatories, and w.c.'s. The ground floor has a deeply-recessed porch, and a large hall filled with lounges, and which will serve as a smoke-room. A wide corridor extends the entire length of the building. The dining-room is on the right hand, with a canted end, designed to give a view of the shipping in the Downs; in connexion with this room is a servery, still-room, and service-room, and lifts from the basement. On the left of the entrance is a private dining-room, a large room for the golf club, having a canted end similar to the one in the dining-room, giving a commanding view of the sea and Deal Castle. There is a large billiard-room, a bar, and office, lavatories, and w.c.'s, with a staircase to the bedrooms over.

Immediately opposite to the principal entrance is the manager's room, a lift, the principal staircase, and reached from the half landing are a lavatory and w.c.'s for ladies.

The wing in Ranelagh-road has two private sitting-rooms, stores, linen-room heated with hot water, a staircase to basement, and rooms on the upper floors.

The first floor contains a large drawing-room and balcony, six large private sitting-rooms, and nine large bedrooms, a ladies' bath-room; there are also a bath-room and w.c.'s for gentlemen. The second floor contains nineteen bedrooms with ladies' w.c., and bath-room, and w.c.'s and bath-room for gentlemen. The attic floor contains fourteen good bedrooms. The servants' bedrooms are in the wing next Ranelagh-road. Especial attention has been given to the lighting, heating, ventilation, and sanitary arrangements. There are linen-rooms on each floor fitted with hot-water pipes for airing the linen. There are also housemaids' closets for each bedroom floor, with hot and cold water laid on. The materials for the facings are red bricks, with Ancaster stone freely used for dressings, &c.

The South-Eastern Railway has given the scheme its active support. Three of the Directors and Sir Myles Fenton, the General Manager, are upon the Directorate.

Messrs. James Brooks & Son have been engaged as the architects to the Hotel Company. The drawing is exhibited at the Royal Academy.

THE CATHEDRAL HOTEL, COLOGNE.

THE new "Cathedral Hotel" at Cologne, takes the place of an old hostelry of the same name and great repute, standing, as its name implies, in the vicinity of the Cathedral. The new hotel has been built for the old proprietors, Messrs. Metz; the architects being Messrs. Kayser & von Grossheim of Berlin.

This very extensive block contains some two hundred bed and sitting rooms, besides the general reception-rooms, dining-rooms, a banquet-hall with separate entrance, a restaurant and a large number of shops. The plans which we give explain themselves,* but it may be mentioned that their actual plotting has to some extent been dependent on certain regulations of the Cologne Fire Police, who look more to the careful distribution of staircases and exits to this class of

* That the plans are given without a scale is no fault of ours; they were sent to us without that necessary accompaniment.

building, that to the adoption of any special fire-resisting materials or mode of construction.

The rather cramped principal entrance has been made as convenient as possible by the aid of lifts and secondary staircases. The large and wide balconies to the reception-rooms on the first floor form a good feature, and the access to them, from the sides of the projecting wings, is well managed.

The exterior design, owing to the proximity of the building to the Cathedral, was required to be submitted to and approved by a Committee of the Prussian Academy of Works. This fact renders the building more especially an example of what is the approved style of contemporary architecture for this class of building in Germany, the architects being a well-known Berlin firm; and as such we give it for the information of our readers, without expressing any opinion upon it ourselves.

HOUSE, WOODSIDE, STANMORE.

THE house occupies a beautiful site of one acre, well wooded. The materials are red brick and tile; the contractor is Mr. Seth Grist, of Aylesbury, the plumbing and engineering work being well carried out by Messrs. Wontner-Smith, Gray & Co. The drawing is at present hung in the Royal Academy exhibition. The architect is Mr. Arnold Mitchell.

HOUSE, CHALGROVE, HARROW-ON-THE HILL.

THIS is an attempt to treat picturesquely the plain square plan of a small house in which economy is the first consideration. Red brick, yellow plaster, and red tiles give colour to the front, the overhanging cornice producing a strong line of shadow at the eaves level. Five bedrooms, bath, lumber and small sitting-room are planned over. Messrs. Turner & Son, Limited, of Watford, are the builders. Mr. Arnold Mitchell is the architect.

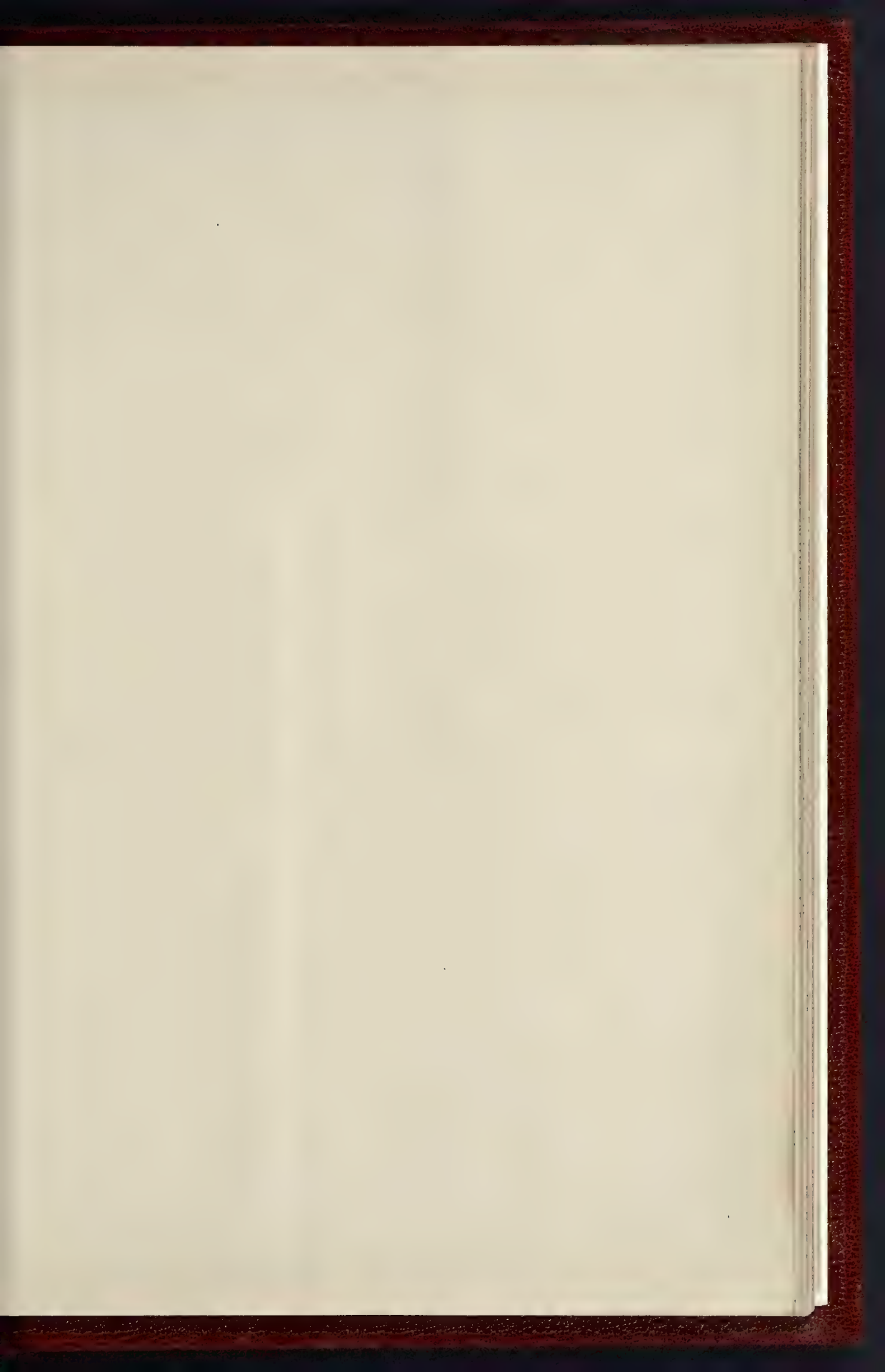
INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS:

MEETINGS AT HARROGATE AND BURY ST. EDMUNDS.

THE concluding portion of the paper* read at the Yorkshire District Meeting at Harrogate, on the 3rd inst., by Mr. B. Stead, the Borough Engineer, on "Municipal Work in Harrogate," was as follows:—

The principal spring in the town is the old

* See last week's *Builder*, p. 446.



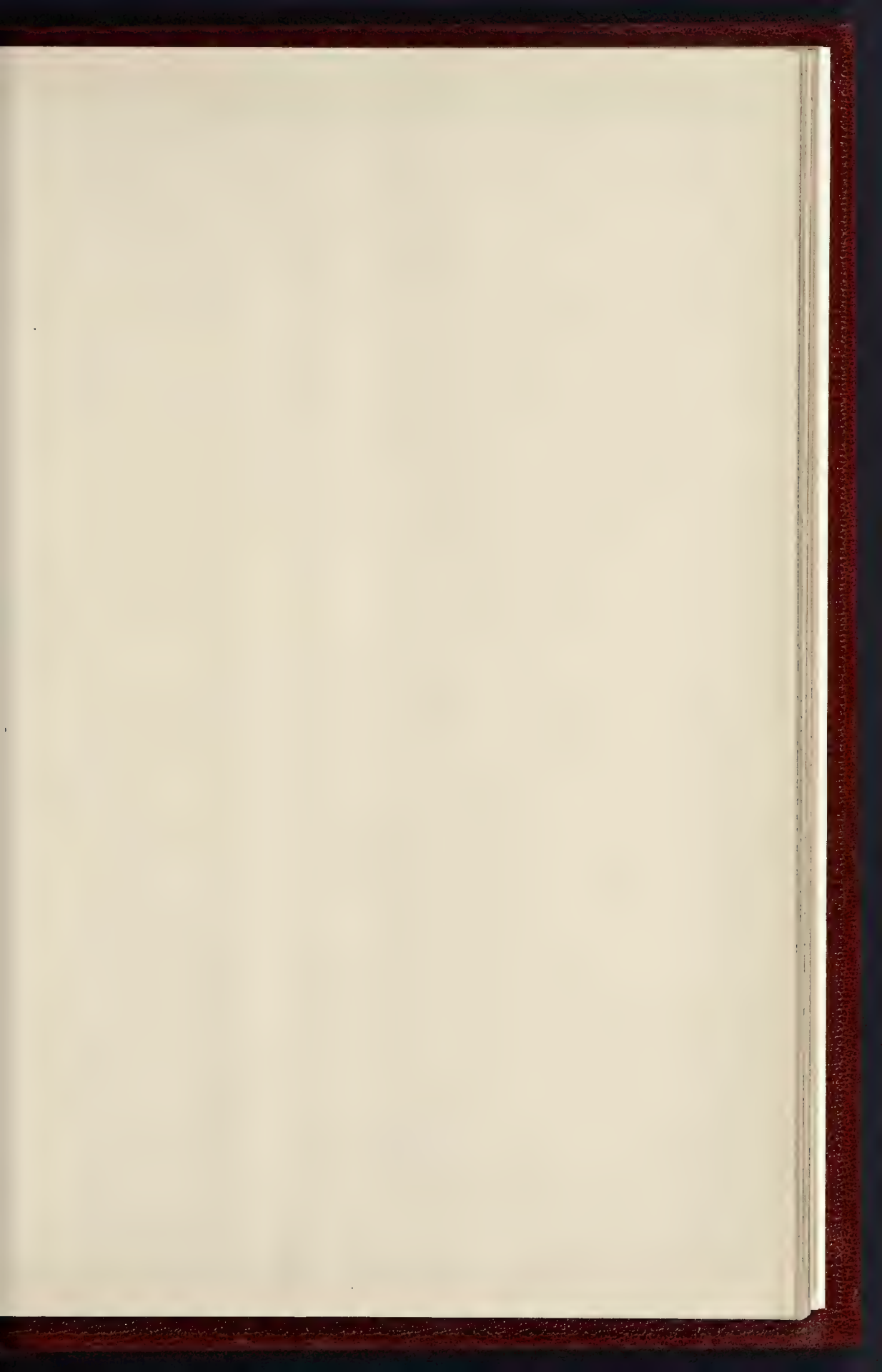


THE NEW 'CATHEDRAL' HOTEL, COLOGNE



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THE BUILDER, JUNE 17 1893

HOUSE, 'CHALGROVE'.

DESIGNED BY THE ARCHT.

MR. J. H. STANTON, N.E.C.





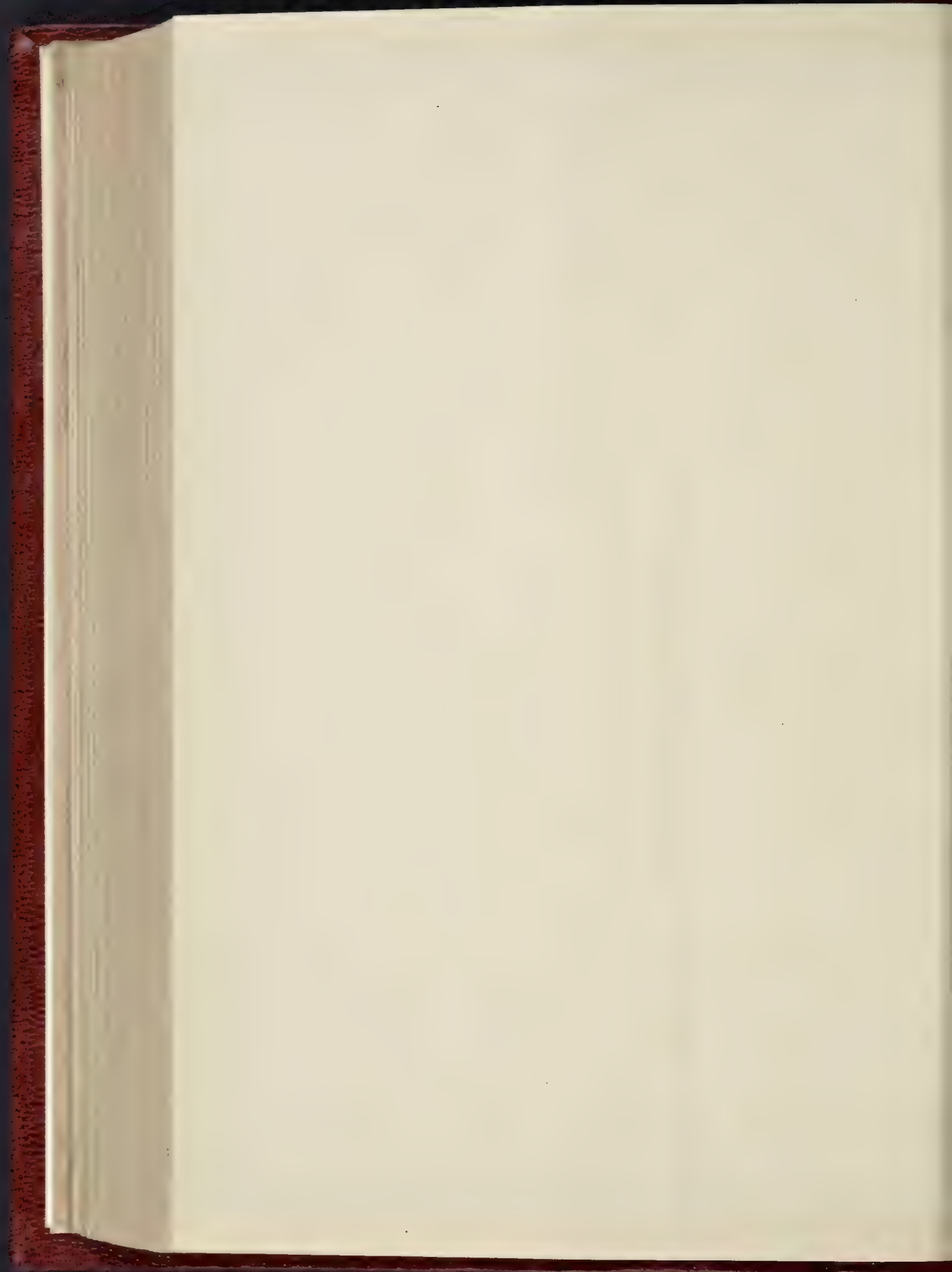


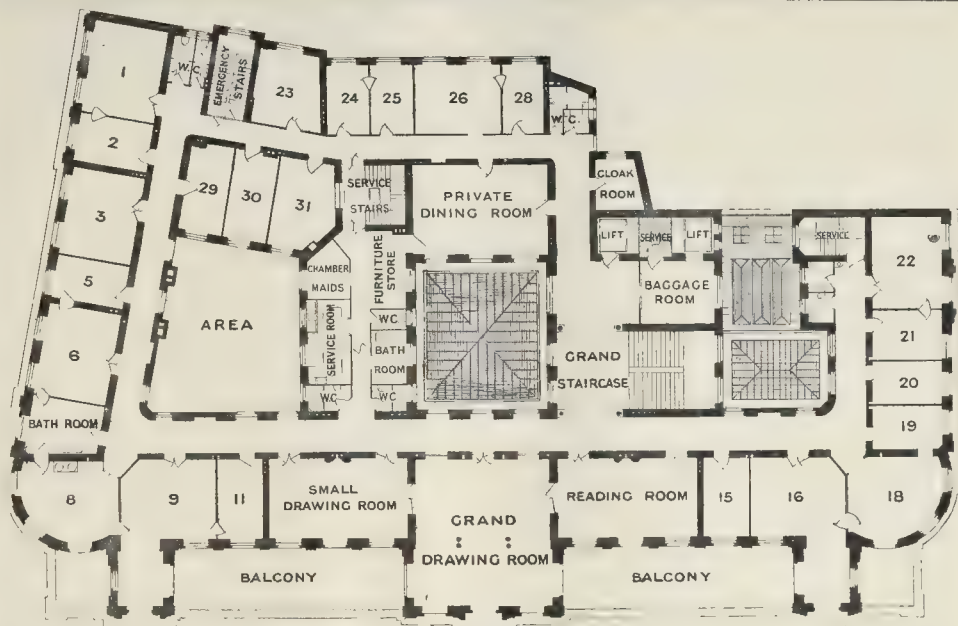
Royal Academy Exhibition, 1893

SOUTH-EASTERN HOTEL, DEAL. VIEW FROM THE STREET.

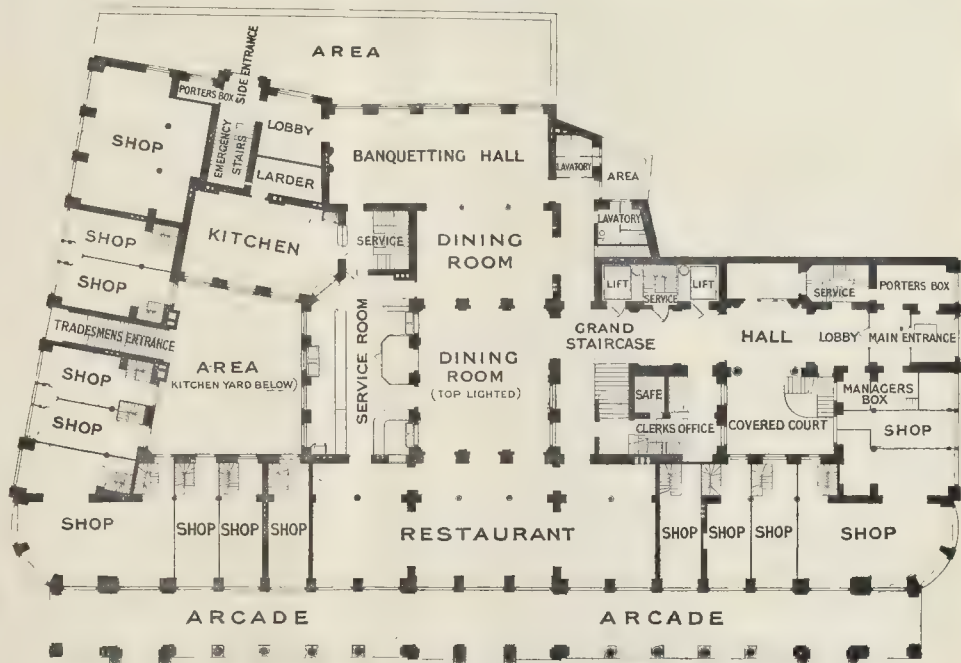


PHO. O. LITHO. SERIAL 12 & CO. A. & EAST HARDING STREET, LONDON, E.C.





First Floor Plan.



Ground Floor Plan.

Cathedral Hotel, Cologne. Plans.

Sulphur Well, situate in Low Harrogate, near the entrance to the Valley Gardens. The handsome pump room (known as the Royal Pump Room) erected over this spring from the designs of the late Mr. I. T. Shutt, architect, in the year 1842, affords shelter for those drinking the water, and members will during the day have an opportunity of tasting what is admitted to be the

strongest sulphur water in the world. In addition to the Royal Pump Room there is a small one in the Montpellier Grounds, where sulphur water is served, and also the water from a spring called the Kissingen Spring, from its resemblance to the noted spring of that name in Germany. In the Bog's Field will also be found a small pump room where the magnesia water is served,

and in High Harrogate two others, named respectively St. John's Well and Tewit Well.

At one time the lower portion of the town in some parts was liable to floods in times of very violent storms, owing to some of the natural water-courses having been covered over and not being of sufficient capacity. To remedy this state of things both the late Surveyor and

myself have reconstructed portions of these culverts, and a few words respecting my part of the work may not be out of place. The length from Ripon-road, near the Spa concert-rooms grounds, to St. Mary's Church, measuring about 550 yds., had evidently been built at various times, and by different persons, as it was of all shapes and sizes, and mostly built in a very rough manner. The new culvert is of horse-shoe shape, 4 ft. wide and 4 ft. 6 in. high in the lower part, reduced to 4 ft. in the upper portions. The invert is formed with Portland cement concrete 6 to 1, the side walls are of masonry, and the arching of the two rims of radiated bricks, the whole being built in Portland cement mortar, and the extrados of the arch being coated with tar $\frac{3}{4}$ -in. thick. Considerable difficulties were experienced in carrying out the works, both in connexion with the portions passing under existing buildings, and on account of the close proximity of several very valuable springs in the Montpellier estate; but these difficulties have all been overcome, and the work is now practically finished.

The open asphalt system has been in vogue in Harrogate during the past, but the Corporation are endeavouring as far as possible to replace the asphalt by movable galvanized iron dust-bins with covers. Formerly the removal of domestic refuse was left to individual householders, but last year the work was undertaken by the Corporation, and the work let by contract, with fairly satisfactory results so far. The contractors are left to make their own provision for the disposal of the material, but they are allowed to deposit what portion they think fit upon a low-lying piece of land on the irrigation farm, which is expected to be sufficient for this purpose for some years.

In former times most of the valuable water from the various springs was allowed to run to waste for want of proper storage, but this has been remedied by the building of twelve underground tanks, each capable of containing about 30,000 gallons, into which the water flows by gravitation.

These tanks were built from the designs of the late Borough Surveyor, Mr. Harry, and members inspecting them will find that they have been carried out in a thoroughly substantial manner. These tanks are practically air-tight, and in order to prevent the deterioration of the sulphur water by exposure to the air, wooden floating covers, formed of narrow boards connected with indiarubber cord, are placed in each one, thereby assuring the conservation of the water in the best possible manner.

In addition to the irrigation farm, bathing establishments, pump rooms, and sulphur water reservoirs already named, the Corporation are the owners of the Valley Pleasure Grounds, Covered Market, and Town Hall, Theatre, and of various other properties adjoining; while they have taken on lease a limestone quarry at Pateley Bridge, and a siding for stone-breaking purposes at Stonefall. Land has also been purchased for the erection of a Town Hall, but this matter is in abeyance at present.

The Water Supply of Harrogate.

Mr. E. W. Dixon, Water Engineer, then read a paper on the water supply of Harrogate. Having described the situation and natural beauties of Harrogate, he remarked that all these attractions must have been deprived of much of their influence had it not been for another circumstance of a very commonplace character, nevertheless, one which is not merely auxiliary to health and pleasure, but actually essential to life itself—the provision of a plentiful supply of pure water. Of this indispensable element the wells, for which it is so famed, rendered Harrogate thirty years ago all but destitute, the wells and springs being so impregnated with extraneous and noxious ingredients as to make water in them quite unfit for domestic use. But for the introduction into it of pure water, Harrogate, with all its renown, would never have attracted more than the scantiest population, and its visitors would have been merely like pilgrims to a holy well, sojourners for a day, or encamping on the common near to the Spa Wells, as they are said to have done at a date not very far back in the history of the place. Harrogate is furnished with a water-supply by a private company by gravitation works from the moorlands of a millstone grit formation situate from four to six miles due west of the town. The first step for providing a supply was an Act of Parliament obtained by the present company in 1846, several small springs being utilised in the vicinity of the Cold Bath-road and Harlow Moor, and stored in three open reser-

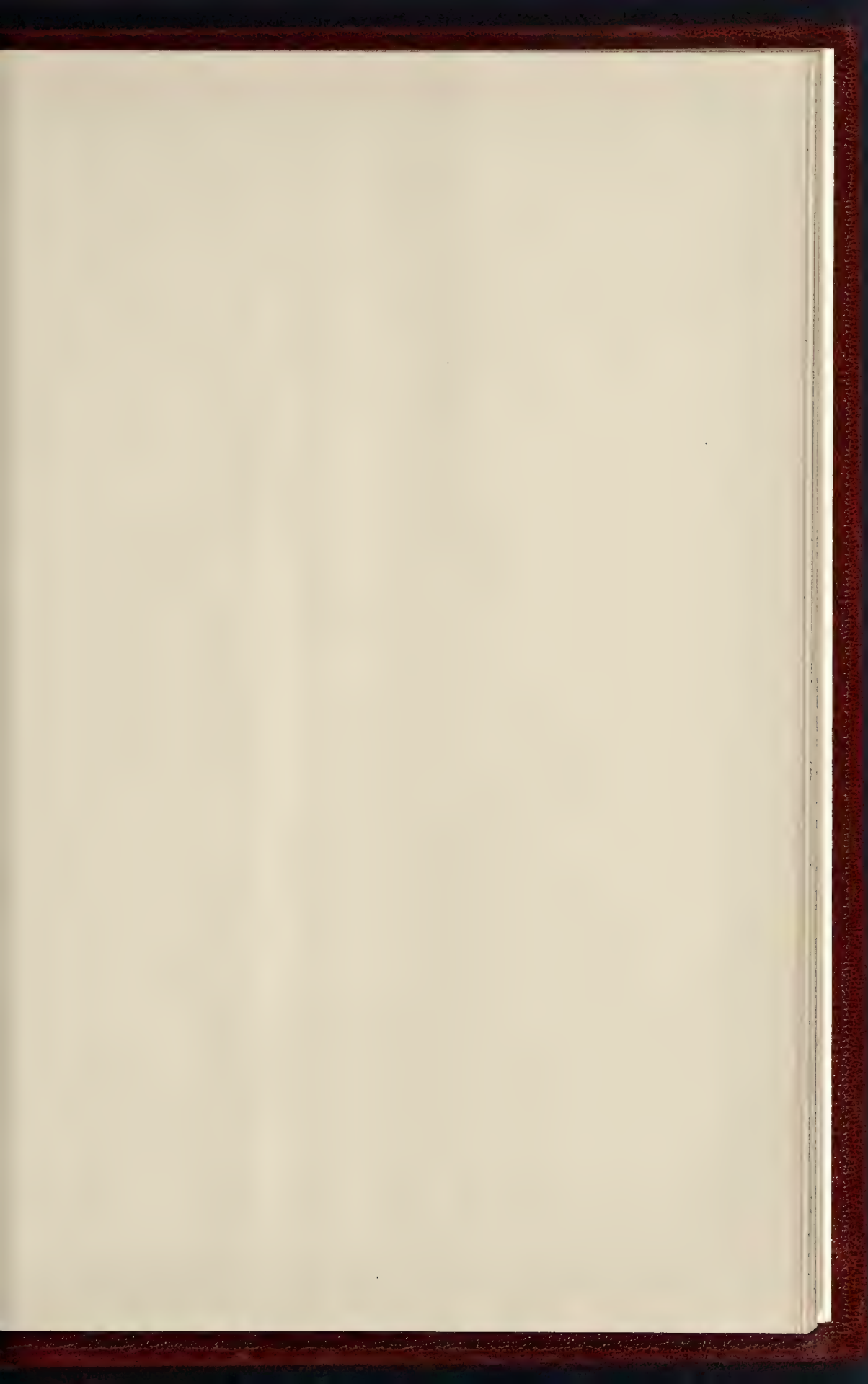
voirs for further distribution. Owing to the then scanty population of the town these early works were necessarily projected on a very limited scale. After fifteen years the number of consumers had only reached 336. About 1861, and the introduction of an improved railway system through the neighbourhood, the demand for an increased supply became more urgent, and it was soon discovered that these existing springs were totally inadequate to furnish a supply of water sufficient for domestic use. With a rapidly increasing population more extended and reliable works became necessary, and at the close of 1861 the company acquired powers to construct gravitation works for obtaining a more adequate supply. In 1868 a second Act of Parliament was obtained for extending the works, and at this date the first engineering works of any magnitude were commenced. From 1861 down to the present time the growth of Harrogate had been at a rate considerably in excess of anything that could have been originally anticipated. From a mere village, deriving its supply from two or three small springs, it had developed into one of the most important watering-places, the present average population supplied being 24,000 persons, with a consumption equivalent to 230,000,000 gallons per annum. This in itself was sufficient to explain the corresponding extension that had taken place in the works to provide so important a town with a plentiful and satisfactory supply of water.

The following table illustrates the growth of the consumption:—

Date.	No. of Customers.	Average Population (including visitors).	Consumption in gallons per annum.
1861 . . .	336 . . .	— . . .	— . . .
1871 . . .	1,513 . . .	7,800 . . .	— . . .
1881 . . .	2,564 . . .	11,000 . . .	109,000,000 . . .
1891 . . .	2,660 . . .	13,500 . . .	118,000,000 . . .
1892 . . .	3,557 . . .	23,000 . . .	225,000,000 . . .

The first reservoir constructed in connexion with the gravitation scheme was the Ten-Acre Reservoir, so called for its water area when full. It was formed from impounding an important tributary of the Oak Beck, rising in Haverah Park. The reservoir receives its supply from a drainage area of about 330 acres; and from the nature and cleanliness of the watershed the quality of the water is excellent. Its maximum depth is 35 ft. 6 in. with a capacity of 36,000,000 gallons, the top water level being 610 ft. above Ordnance datum and over 200 ft. above the central portion of Harrogate. The formation of this reservoir was attended with considerable difficulties. To secure a satisfactory foundation for the main puddle wall the excavation had to be carried to a depth of over 40 ft. on the north side of the valley, the north slopes being also further protected with sheet piling. The main embankment extends due north and south, and is 700 ft. long with a central height of 42 ft., the batters being 2½ to 1 inside and 2 to 1 outside. The supply to Harrogate is drawn through a single 12-in. cast-iron socket outlet main passing through the centre of the embankment. Two years ago a valve shaft and outlet heading were added to this reservoir in order to give improved facilities for working the outlet valve from time to time, and for affording readier access thereto when necessary. The valve shaft is constructed in the inner slope, and 21 ft. from the centre of the embankment. It contains one 12-in. sluice valve, worked by 1½-in. steel valve rods with indicating capstan. It is upwards of 50 ft. deep, circular, 4 ft. inside diameter, and constructed in Portland cement concrete, 5 to 1, with a 9-in. lining of blue Staffordshire brickwork, and surrounded with 2 ft. of clay puddle. Stages are provided at every 10 ft. in depth with wrought-iron ladders and brackets. The top portion of the shaft is in rusticated ashlar masonry, set in cement. The outlet heading is 5 ft. 6 in. by 4 ft. inside dimensions, the side walls and invert being cement concrete, 5 to 1, with brick arching. Like the valve shaft, this work was carried out two years ago by driving a heading under the embankment for further facility in inspecting the outlet pipes and also for a freer vent for the discharge of a natural spring known to exist under the outer slope. This reservoir is provided with a stream diversion on the south side for passing away the flood water when unfit for storage. It has also a large sand-filter bed for removing any suspended matter. By this means they were able to keep the water in satisfactory order, requiring very little after treatment. The mean rainfall for the past ten years is 25·91 in., which may be taken as about the average for the whole watershed area. To work in connexion with the Ten-

Acre Reservoir, the Harlow Hill service reservoir was constructed on the Otley-road, near to Harlow Hill at an elevation of 545 ft. above Ordnance datum. It contains 14,000,000 gallons, and is formed by half excavators and embankment with slopes of 2½ to 1 inside and 2 to 1 out—the slopes being protected with stone pitching. This reservoir is connected with the Ten-Acre by means of 9-in. and 7-in. cast-iron piping, the daily supply being 200,000 and 300,000 gallons. The water here undergoes a further process of sand filtration through 4 ft. 6 in. of sand and gravel, and is finally passed into the highest district of the supply, constituting what is known as the high-water supply. In 1875 it was found necessary to obtain additional storage, and the Beaver Dyke Reservoir was projected to operate in connexion with the existing service reservoirs on the Irongate Bridge-road. The Beaver Dyke Beck was then impounded at a point some 200 or 300 yards above its junction with the Scargill Brook, about six miles west of Harrogate. The Beaver Dyke Reservoir has an area, when full, of 23 acres, and contains nearly 120,000,000 gallons at 43 ft. deep. It receives the surface-water of 700 acres of moor and pasture land, an area which can be further increased when necessary. The top water-level is 559 ft. above Ordnance datum, and, consequently, about 160 ft. above the town of Harrogate. The early works at this reservoir comprised very little beyond earthwork, the embankment having been raised from time to time as additional storage was required. The raising of the embankment to its full height, the construction of a valve tower, overflow weir, bridge, bywash and other works, have been in progress during the past two years, and are now in an advanced stage towards completion and ready to be brought into use during the coming autumn and winter. The embankment is 50 ft. high at its centre, with a total length of 660 ft., the slopes being 3 to 1 inside and 2 to 1 out. The inside is protected for 30 ft. vertical depth with 18 in. rough stone pitching, the top portion being coursed block pitching, 12 in. deep, set on 12 in. of shingle. A 9-in. cast-iron main, 7,100 yards long connects this reservoir with the Irongate service reservoirs, where the supply undergoes natural filtration through sand beds. Two filter beds are at present in operation at the service reservoirs, part only of the intended scheme of filtration. They are constructed entirely in Portland cement concrete, mixed 6 to 1 in the following proportions:—4 parts broken stone, 2 parts clean river sand, and 1 part cement. Each bed has an area of about 430 square yards, being 64 ft. long by 60 ft. wide, and 6 ft. 6 in. in depth. Six 2-in. copper ventilating pipes are provided to each bed, communicating with the main and cross channels. The water is delivered into each bed by means of 10-in. and 7-in. cast-iron pipes, terminating in fountains fixed in the centre. The outlets and overflows are also in iron-piping, fitted with sluices and wash-outs for cleaning purposes. The filtering medium is composed of sand and gravel, 4 ft. 6 in. in thickness, placed in regular courses of the following depths:—2 ft. fine sand, 6 in. coarse sand, size of peas, 6 in. fine gravel, size of beans, 6 in. of coarse gravel, size of apples, and 12 in. of large stones. The water is allowed to stand 12 in. deep over the sand during the process of filtration. The quantity dealt with at the reservoirs varies from 400,000 to 600,000 gallons per day, and after being filtered, is passed into the open service reservoirs, having a joint capacity of about 7,000,000 gallons. On an average each bed runs about seven to ten days before the top 2 in. or 3 in. of sand has to be removed. A thorough washing of the sand up to 6 in. or 9 in. deep takes place every two or three months, and the whole depth of sand is removed and cleaned once or twice per annum as found necessary. The water is drawn from these service reservoirs into the town by means of automatic syphon outlets carried over the north embankment and provided with charging chambers and indicating gear for controlling the sluices fixed on the inside slopes. In connexion with these works, which constitute the low pressure supply, from 40,000 to 60,000 gallons of water per day is derived from a spring situate in Haverah Park at an elevation 500 ft. above Ordnance datum. A constant supply is maintained in the town under pressure varying from 20 lb. to 100 lb. per square inch through a circulating system of piping over forty miles in length from 3 in. to 15 in. in diameter. Trunk mains are only used as carriers, the house connexions being made to service pipes laid down in each street with stop-valves, and where practicable with





Royal Academy Exhibition, 1893

"HOLY WOMEN OF THE NEW TESTAMENT"



OF A FRIEZE BY MR N H J WESTLAKE

separate wash-outs. By this principle, any disturbance in the supply is confined to a very limited area. Main valves are fixed at convenient points for dividing the town into districts, a system useful for the detection of waste of water. All fittings used in connexion with the supply are approved and tested to 300 lbs. per square inch by the company, and a code of rules and regulations, together with a list of authorised plumbers, is in operation.

In the discussion which followed these papers, Mr. Allison, City Engineer of Manchester, said he noticed that Mr. Stead remarked in his paper that this was more advantageous, and worked better, to pass the crude sewage over the land, instead of putting it into precipitation tanks, and taking some of the solid matter out of it. He presumed that Mr. Stead meant by this that he was able to realise more material value out of the sewage in this way for farming purposes. He was very pleased to hear that Harrogate had no more loss upon their annual working than £1,500. It showed that the farm must be well managed for the loss to be so small. Mr. Stead's description of tar paving must be of very great interest to the members, and when incorporated in their proceedings would be of very great use to them. This tar macadam saved the public from the very great annoyance they had to suffer with ordinary macadam from mud in winter and dust in summer. With reference to Mr. Dixon's paper he expressed his surprise that they had only 26 in. of rainfall, and said their visit to the waterworks would be of great interest to them, as it was not often they had opportunities of seeing reservoirs in course of construction.

Mr. Hall (Cheltenham) said he had been round Harrogate, and must congratulate Mr. Stead upon the excellent appearance of his tar macadam roads as compared with ordinary macadam. He found with reference to tar macadam that some engineers succeeded and some failed. He had made some inquiries into this, and he wished to point out what he believed was the real cause of the failure. Some gasworks were using a new system of distillation, with the result that they obtained a tar which appeared to be the same, and which did not show a material difference upon analysis, but the grouping of the constituents was different, and it was practically so different that a satisfactory tar paving could not be made with it. He had tried the two kinds of tar under precisely the same conditions, and the one had been satisfactory and the other a complete failure.

Mr. Hall (South Shields) also congratulated Harrogate upon its excellent roads, and said it would be interesting if Mr. Stead could give them some information as to how long they lasted without renewal.

Mr. Brown (West Hartlepool) said he did not agree with the mode of procedure given by Mr. Stead for the making of tar macadam. He did not believe in the burning of the material and then allowing it to lie in the open air to absorb moisture. He thought it better to have a covered shed to exhaust the moisture from the tar, and then mix the materials without burning. He had tried both ways, and found it gave better results to avoid the fire.

Mr. Stead, in reply, said that the life of tar macadam depended very much upon the traffic, and he had collected no statistics; but he might say it had a very long life—six or seven years—under fairly heavy traffic. As to the firing of the material, the object undoubtedly was to get rid of the moisture, and when the work was done in the open air the weather interfered with that to a great extent. He quite agreed it would be better if it could be done under cover, but the question was whether the result would justify going to the initial expense of buildings.

The President then proposed a vote of thanks to Mr. Stead and Mr. Dixon for the valuable papers they had given to the Association—which was accorded unanimously, and suitably acknowledged by the authors of the papers.

Visit.

The members then visited the Corporation sewage farm, being conveyed there in brakes provided by members of the Corporation. The farm appeared in excellent condition, and the effluent from the land was remarkably clear, and was much praised by the members. On return to Harrogate the members were entertained by the Mayor (Mr. J. Simpson) at luncheon at the Prospect Hotel. After luncheon,

The President proposed the health of the Mayor, which was heartily honoured.

The Mayor suitably responded.

The Deputy Mayor next proposed the health of

the President and members of the Incorporated Association of Municipal and County Engineers, to which Mr. Cartwright responded.

The members subsequently drove to the Beaver Dyke Reservoir of the Harrogate Waterworks, and also inspected Bog's Field, Wells, Royal Pump-room, and Sulphur Water Reservoirs.

In connexion with the Harrogate meeting, an opportunity was afforded to members to visit the works of Messrs. William Ingham & Sons (Leeds Fireclay Company), Wortley, where Hassall's double-lined pipes are being manufactured. The visit was a most interesting one, although few members of the Association were able to avail themselves of the opportunity of seeing the complete process of manufacture of these well-known patent-jointed pipes. The members were shown the whole of the processes of manufacture, from the grinding of the clay to the completed pipe, with specimens from 2 in. to 24 in. in diameter. Some 2,000 yards of the 24-in. pipes are now being made at the Wortley Works for the sewerage of Saint Anne's-on-the-Sea, and are being laid in running sand. The pipe—the socket and barrel of which are made in one piece—are fitted with single-lined and double-lined joints, and the specimen lengths fitted in the works showed the efficiency of the Hassall joint. Members of the Association who are using the joint remarked at the time of the visit that the perfect joint made with the Hassall pipe allows a considerable saving to be effected in cost of laying, in consequence of the perfect invert, and the ease with which the joint can be fitted and completed. Mr. W. Spinks, of Leeds, made arrangements for the visit.

MEETING AT BURY ST. EDMUNDS.

An Eastern Counties District meeting of the Association was held at Bury St. Edmunds on Saturday last, June 10. The members, to the number of about forty-five, were received in the Town Hall by the Mayor, who cordially welcomed the visitors, and then vacated the chair in favour of the President of the Association (Mr. J. Cartwright, Borough Engineer of Bury).

The President having in fitting terms acknowledged the Mayor's welcome, the business of the meeting was proceeded with.

Mr. J. W. Cockrill, A.R.I.B.A., Borough Surveyor of Great Yarmouth, was unanimously elected Honorary District Secretary, in the room of Mr. E. Buckham, Borough Surveyor of Ipswich, who tendered his resignation owing to pressure of work. On the motion of Mr. Walshaw (Peterborough), seconded by Colonel Jones, V.C., a cordial vote of thanks was given to Mr. Buckham for his services as Honorary District Secretary, which have extended over a period of several years. Mr. Buckham, in acknowledging the compliment, said that his interest in the Association would not cease with his retirement, although he was obliged to claim release from the secretarial work of the district.

Sanitary Work in Bury St. Edmunds.

Mr. J. Campbell Smith, Borough Engineer and Surveyor of Bury St. Edmunds, then read the following paper:—

History, &c.—Before proceeding to the subject proper of this paper it may be interesting to note that Bury St. Edmunds was a town of considerable importance in the days of the Saxon Hierarchy, and enjoyed special privileges under the Charters dated 1120, 1364, and 1447. It was incorporated in 1608, the municipal body consisting of an Alderman, Recorder, twelve capital Burgesses and twenty-four Councilors. Under the Municipal Corporations Act, 1835, the Corporation was reconstituted, and now consists of a Mayor, six Aldermen, eighteen Councillors, and Recorder.

The area of the borough is 2,934 acres, of which about 750 are covered with streets and buildings. There are 22 miles of dedicated roads and streets. The rateable value is £57,094, and the population in 1891 was 16,630.

Sanitarily considered the town has great natural advantages. It is built on rising ground, with a gravelly soil overlying a chalk subsoil, and these aids to effective drainage have doubtless contributed much towards securing its well merited reputation as a healthy town.

It will be convenient to divide the subject proper of this paper under three heads, viz., Water Supply, Sewerage, and General Sanitation.

Water Supply.—The water-works pumping station and service tanks are situated at nearly the highest part of the district. They were established in the year 1859 for the purpose of street watering, but with praiseworthy foresight the promoters provided mains of sufficient capacity to meet

the demands of water-works for all purposes. The domestic water supply at that time was derived from deep wells, many not altogether free from pollution. The manifold advantages of a supply from the town mains to dwelling houses soon became manifest, and the increasing demand necessitated extensions in 1870, and again in 1881, and there are now 2,387 premises supplied, representing, with that used for trade purposes, a consumption of about 300,000 gallons per diem. The charge for domestic purposes is based on a graduated scale, representing a rate of from 3 to 6 per cent. on the gross assessment. An additional charge of 10s. is made for each w.c., and trades are supplied by special arrangement.

The supply is obtained from three wells, 5 ft., 6 ft., and 10 ft. diameter respectively, sunk to a depth of 91 ft. 6 in. in the chalk measures, augmented by headings driven horizontally from the bottom of the larger well, and a 6-in. boring, 51 ft. deep. All surface contamination has been successfully excluded, and frequent analysis has proved the water, though hard, to be of exceptional purity.

The engines are three in number, one of 20 h.-p., and a pair of 8 h.-p. each. The larger engine is of the horizontal non-condensing expansive type, with 15-in. steam jacketed cylinder and 18-in. stroke. The smaller are of the ordinary type of horizontal high-pressure engines, and although not altogether economical in work, serve in cases of necessity as an efficient auxiliary plant. The larger engine will doubtless be duplicated at no distant date.

Each engine is geared to a set of treble throw-pumps, 6 in., 8 in., and 12 in. diameter, arranged to deliver into either of the two service tanks, which have a capacity of 70,000 and 30,000 gallons respectively, and are elevated 25 ft. 9 in. and 22 ft. 9 in. above the engine-house floor.

There are two boilers, each 19 ft. by 5 ft. 6 in., with single flues, and four Galloway tubes. The working steam pressure is 50 lbs. per square inch.

The rising main from the 12-in. pumps is in duplicate, forming a stand-pipe 20 ft. above the tanks, giving an additional head of 40 ft. when increased pressure is desirable.

The supply is constant, and for distribution purposes the town is divided into two districts served through separate 8-in. mains, so arranged that in cases of emergency one main can temporarily supply the entire district. Fire hydrants are liberally provided in convenient places, and are utilised for street watering and sewer flushing.

A quarterly inspection of private fittings has proved most beneficial as a check on waste and mis-use.

The entire cost of the works, including mains, has been 12,652l. 8s. 5d., and the net revenue, after deducting all payments for interest, sinking fund, and working expenses, is 673l. 9s. 11d. per annum.

Sewerage.—In many towns the underground works have in the past been but too often disregarded, until circumstances have forcibly and often unpleasantly brought their importance to the notice of the local authority.

Such has not been the case in Bury St. Edmunds, as the question of re-sewering the town has been before the Corporation for many years, and portions of the most urgent sewerage works have been executed piecemeal, but laid out systematically to blend with and form part of a comprehensive scheme.

Until comparatively recent years all domestic drainage of the district discharged into cesspools, having no connexion with the existing drains, which already had been constructed for surface water only. By degrees, however, house connexions were insidiously introduced into these crudely constructed drains, until at length the discharge at the outfalls became so polluted that some mode of treatment was essential, and after lengthy deliberation irrigation was decided upon.

The local authority acquired land in 1862, at the north end of the town, and laid a main intercepting sewer, severing the outfalls from the rivers and ditches. This land remained in use until October, 1885, when the new farm at West Stow was acquired. From that time house connexions have steadily proceeded, and at the present time it is estimated that over two-thirds of the dwellings in the district are connected with the sewerage system. The greater part of the original drainage consists of brick culverts from 9 in. to 18 in. diameter, laid at from 18 in. to 2 ft. below the road level, and the difficulty of obtaining adequate fall for house drainage has forcibly impressed the local authority from time to time with the necessity of re-sewering

the town. This took a tangible form when the Council instructed the author in November, 1890, to make a complete survey of the entire sewerage system and report thereon, and later, on receipt of his report, an order was made to make application for the necessary borrowing powers. The inquiry was duly held before General Crozier, and the scheme sanctioned without material modification.

This sanitary work is the most extensive that has been undertaken by the authority for some years, and a short description may be interesting if not instructive.

In designing the works the town has been divided into ten drainage areas, each with an independent outfall into the main sewer. By this arrangement large and abnormally deep sewers will be avoided.

The entire work when completed will consist of 916 yards of 15-in., 2,380 yards of 12-in., and 8,810 yards of 9-in. pipes, laid at such a depth as to readily drain the basements of dwellings. The gradients generally will be good, and in all cases where a velocity of 150 ft. per minute cannot be ensured, automatic flushing tanks will be provided.

The pipes in all cases will be laid in straight lines, man-holes and lamp-holes being provided alternately at intervals of about 100 yards, but deviations, either in direction or inclination, and junctions with lateral sewers, will determine the position of a great number.

The head of each sewer will terminate with a man-hole, fitted with an iron frame and timber flushing-disc, serving the purposes of a flushing tank of 350 gallons capacity. These tanks will be charged from a convenient fire hydrant, but there will in no case be a direct communication between the sewer and the water main.

The important question of ventilation was one which received special attention at the hands of the sewerage committee, and after careful deliberation a system of shaft ventilation was finally decided upon in preference to surface ventilation.

The ventilation shafts will be of cast-iron, with specially-constructed sockets to ensure perfect jointing, and of varying section, according to the individual fancy of persons interested. They will be placed in the most unobtrusive positions, as near as possible at intervals of 100 yards, and each alternate shaft will be fitted at its head with an induce or down-cast cow, by which means constant circulation of air is anticipated.

All existing house drains will be carefully inspected before connexion with the new sewers, and any found to be defective will be regarded as a common nuisance and dealt with accordingly.

The existing sewers will be retained for surface water drainage, discharging into the rivers.

The new sewerage works now in hand are being executed by a special drainage staff, without the intervention of a contractor.

None but high-class materials will be used in the work. The pipes generally will be selected stoneware socket pipes, jointed with tarred gaskin and Portland cement fillet, but in bad and difficult ground Hassall's patent joints will be used, and in one part of the work these pipes will be laid 5 ft. below the line of saturation, and the author regrets that he could not arrange to have this section in hand at the present time.

Before passing to the outfall works, which were opened in October, 1885, it may be stated that the flow of sewage is about 550,000 gallons per diem.

The main outfall sewer, for a distance of about 3½ miles, is egg-shaped, 2 ft. 6 in. by 1 ft. 8 in. It is built of 24-in. brickwork laid in cement and surrounded by Portland cement concrete, and has a uniform gradient of 1 in 642 for its entire length. The end of the brick culvert connects with a 24-in. mild steel pipe, which conveys the sewage for a further distance of about 1½ miles across the marshy land to the outfall works at West Stow. The sewage passes through a screening chamber, where the heavy deposit is collected in a sludge-box, and a fixed screen removes all the larger floating matter. This is the only treatment to which it is subjected, and from the screening chamber, it passes direct either to the pump-well for delivery to the high level, or by gravitation for distribution on the low level.

The storm water is not distributed over the irrigation areas, but is discharged by an overflow weir into a roughing tank, which intercepts road detritus, and an artificial filter-bed removes floating matter, after which the practically pure effluent is discharged through a bed of osier willows into the catchment ditch. The author has found this treatment all-sufficient for the highly diluted sewage flow during heavy rains.

The pumping plant consists of a pair of

Tangye's direct-acting 8 h.-p. vertical engines and centrifugal pumps, calculated to deliver 550 gallons per minute. The boilers, which are in duplicate, are of the Galloway type.

The farm consists of 64½ acres of light sandy soil, originally forming part of the adjoining heath, and of this, 22 acres are under treatment as a low-level gravitation area, and 11 acres of high-level, upon which the sewage is pumped. The luxurious growth of the various crops, as compared with the stunted vegetation of the heath, is unquestionable evidence of the value of town sewage as a fertilizer. The soil is of a peculiarly deceptive nature, and impresses most persons with its apparent suitability for dealing with large quantities of liquid. Under treatment, however, the saturated sand became almost impervious, but close under-drainage combined with constant cultivation has quite altered its character, and the soil each year exhibits a marked improvement.

A section of the land is always laid down with rye grass, and on other parts, mangold, swedes, and prickly comfrey are grown, and the osier-bed yields a fair return each year. Good crops are produced, but lucrative prices cannot be expected at so great a distance from town or rail.

The total working expenses of the farm for the past year amounted to 4037. 18s. 10d., and the sale of produce realised 1937. 19s. 5d.

Considering the large volume of liquid dealt with on a limited area, and the satisfactory effluent, the farm, as a sewage disposal works, may be considered successful.

The main sewer and the outfall works and farm were designed and carried out by Mr. W. T. E. Fosbery, Warwick, and the subsequent drainage and extension works were executed under the direction of the Borough Engineer.

The total cost of the entire scheme was as follows:—

	£	s.	d.
Purchase of land	3,924	17	5
Main sewer and contract works	26,535	2	5
Engines and pumps	840	1	0
Laying out farm and draining	3,334	16	6
Wayleave, compensation, and legal expenses	3,059	15	10
Engineering expenses and supervision	1,844	5	4
Miscellaneous items	97	10	1
	£20,436	8	10

General Sanitation.—With respect to the permanent sanitary works of the town, the officers having charge of the department are materially assisted by excellent sanitary regulations and bye-laws, which are so assiduously enforced that the general sanitary condition of the town is such that the rarely occurring cases of zymotic disease can seldom be traced to local causes. The Council have adopted the Compulsory Notification of Diseases Act, and all cases of infectious disease occurring in premises where isolation is impossible, are removed to the Sanitary Hospital. This building is now undergoing extensions and alterations, and when completed will provide accommodation for fifteen patients in nine separate wards; also quarters for the permanent matron and caretaker.

The collection of house refuse is carried out on what is known as the D system, which has been in operation for some years with marked success. There are no ash-pits, and consequently accumulations of offensive and dangerous refuse are rarely reported. The work is performed by contract at a cost of 170*l.* per annum, the contractor undertaking to provide a tip on an approved site without the limits of the inhabited borough. There is, however, every probability that the Corporation will eventually make provision for the disposal of town refuse.

[We will conclude our report of the Bury St. Edmunds meeting in our next.]

Correspondence.

To the Editor of THE BUILDER.

COTTINGHAM'S COLLECTION—THE FONT OF ARMAGH.

SIR,—In reply to Mr. Drew's letter I beg to say that having examined H. Shaw's "Descriptive Memoir and Catalogue" (1,453 items) and Foster & Son's sale catalogue (2,205 lots), printed in 1850 and 1851 respectively, I fail to find a specific mention of the Armagh font. I find in both "214-5-6. Two figures playing on musical instruments: from the screen at Armagh Cathedral. Three ditto. Two Norman, and a beautiful Early English, stone capitals, from Armagh Cathedral." Also, "1,269. A portion of an octagonal shaft, with cinque-foil headed

panels surmounted by crocketed canopies resting on animals, and a clustered shaft with foliated capitals." "1,511 [sale-catalogue] a model to scale, from admeasurement, of one-half of the nave of the Cathedral at Armagh, Ireland": and several "models of fonts."

In respect of many of the objects the catalogues do not say whether they are original or otherwise; though in most of these instances it is clear that a cast or copy is intended, as the original is known to be *in situ*. Numerous specimens are described too vaguely for identification.

It seems that whereas N. J. Cottingham had commissioned Christie & Manson, in or before 1850, to sell L. J. Cottingham's collection in its entirety, the actual sale was made at auction on eleven days in November, 1851, by Foster & Son, of 54, Pall Mall, which is now the address of Messrs. Foster, auctioneers.

June 10, 1893.

W. E. D.-M.

ASYLUM COMPETITIONS.

SIR,—In your "Notes" of last week your correspondent, whose views you endorse, does not quite fairly state the case when he gives only some of the results of asylum competitions.

In the first place, he quotes five recent competitions in which Mr. Howell, as assessor, places Messrs. Giles & Gough, or myself, first; but I think he could have given other instances when Mr. Howell, as assessor, placed other architects first.

Secondly, he instances three somewhat remote competitions when other assessors have given the first prize to other architects, stating also that we both took part in them. This, so far as I am concerned, is scarcely correct. In one of the competitions I took no part, and in another I submitted a design and was awarded a premium; but, further than this, he utterly ignores a number of other asylum competitions—among others, Gloucester County, Kent, Nottingham Borough, and Claybury, all of which were won by either Messrs. Giles & Gough or myself, without Mr. Howell as assessor.

The preamble thus disproved, I am prepared to go some way with your correspondent and admit that there is danger of getting into too narrow a groove when following the lead of one man, and of sacrificing originality which *might* be of progressive advantage. The temptation to win by playing into the hands of the assessor is subversive of originality of thought, and while in asylum planning there are a good many barriers which the architect cannot overstep without making a mistake, he may too slavishly follow precedent to the exclusion of ideas tending towards useful progress.

I would not, however, go so far as your correspondent and view the assessors merely for the sake of change. Asylum architecture is a special study, and necessitates a knowledge of the various phases of lunacy, and the habits and treatment of the insane, before any real success can be attained; and this can only be acquired after years of patient study and frequent intercourse with those who have the charge of such patients, and therefore comparatively few architects are qualified to act as assessors in such competitions. Mr. Howell, by his long experience as consulting architect of the Lunacy Commissioners, as well as in the erection of asylums, is pre-eminently fitted for this post, and it is not too much to say that his awards have been happier in their results than some others made by less experienced assessors.

In my opinion, however, the best tribunal for such a purpose is a committee of experts comprising architects and medical men who have had experience in the working of asylums; and in more than one instance in my knowledge very good results have been arrived at under such conditions.

The danger of appointing an architect as assessor, whose qualifications are general rather than special, is well illustrated in your own criticisms of last Friday on the Staffordshire Asylum designs. You refer to the position of the entrance and official block in Messrs. Giles & Gough's design as a praiseworthy feature, and you correspondingly condemn the northern approach and entrance in my plan.

In an architectural sense you may be right; it is more convenient to separate the entrances for visitors, and goods, and, as in a dwelling house, to have a front door and a back; but in asylum planning this is a mistake, and I am supported in this view by the Lunacy Commissioners themselves, as also by the great majority of asylum superintendents; and this prominent feature is, in my opinion, the one blot on what would otherwise be a very good design. The reason for this is that the south front of the building should be devoted entirely to the patients, who should be kept as quiet as possible, able to read roads approach used by visitors and others kept as much as possible out of view. Visitors coming and going excite the patients by arousing a hope that they are about to be released, and this naturally tends to retard recovery.

In some cases the formation of the site, or other reasons, make such an arrangement impossible, but here it is not so; everything is in favour of an approach on the north rather than on the south side, and while the dual approach on the one side is undoubtedly the more difficult problem, it has been

solved with more or less success by two-thirds of the thirty-one competitors.

I agree with you in your praise of the designs generally, which I consider show unusual ability; and while myself a disappointed competitor, I am willing to admit that, with the exception referred to, Mr. Howell has performed a difficult task in a way which should satisfy your correspondent.

GEORGE T. HINE.

SOIL-PIPES AND WASTE-PIPES.

SIR,—On pp. 451-52 Mr. Bernard Dicksee tells us *inter alia* that the water-trap on a short waste-pipe is not "only unnecessary but also objectionable as spoiling the force of the discharge and holding foul water." Now this is dead against the teaching of the valuable experiments made by Dr. Neil Carmichael as to the value of the water-trap. He showed that although the water in the trap was foul and full of microbes, yet it fully protected the substance beyond the trap for weeks or months, but so soon as the water in the trap was emptied then putrefaction began.

A waste-pipe, although only x ft., 2 ft., or 3 ft. long or so, soon gets offensive to the air of an apartment if dirty or soapy water is run through it and no trap is on to prevent the air blowing into the apartment through it. Such a waste-pipe would simply be a manufacturer of sore throats and possibly of diphtheria. It is a very unsanitary practice and should not be allowed.

W. P. BUCHAN.

* * We entirely agree with Mr. Buchan. Mr. Dicksee's remark escaped our notice, or we should not have let it pass without a protest.—ED.

SIR,—There are two sides to every question, and the side of experience does not teach me to agree with Mr. Bernard Dicksee's conclusions. To reduce the size of drain-pipes and soil-pipes to the smallest efficient dimensions, is one of the best things that can happen in every building; but to fix that size at 3 in. is, I think, a mistake. It would be all right if in actual practice we could ensure nothing being put down the closets except water, but in the majority of cases they are used as slop closets, and then there is paper, sometimes stiff brown paper, pieces of sponge, furr from the floor-cloth, froth and soapy-water, dirt rinsed from the bottom of the housewife's pail, and not very long ago I took out a good-sized piece of the floor-cloth itself. My experience is that these stoppages occur at the necessary bends and junctions, and through bad plumbing. Where a plumber has soldered in a junction-pipe, and where it is difficult to get your hand, will invariably be found rough; here the stoppage begins; and it is fair to take these things into account and allow a safe margin of dimension to meet them.

Much more does my experience disagree with Mr. Dicksee's conclusion with regard to wastes from lavatories, &c. Many years ago I had to overlook the fixing of a great number of lavatories and baths in a large public school, which were fixed on his theory, viz. that the outlet of the receptacle should be greater in area than the waste-pipe, and I had the mortification of having to pull them all out; the basins were continually being stopped. The leading mistake made by Mr. Dicksee is in assuming that even lavatory basins have nothing to pass but pure water; to watch the performances of students at a public school or college, the clerks and the inevitable office boy in public offices, as well as the charwoman and caretaker, and even his own housemaid, will convince him to the contrary.

Clerks of works have for the most part part to do as they are directed, but when I have been able to exercise my own opinion, I have arranged that the waste-pipe shall be larger by $\frac{1}{2}$ in. or $\frac{3}{4}$ in. as the case may require, than the outlet, and I know from facts where this was done—and done very largely twenty years ago—no plumber has ever been wanted to unstop them.

GEO. DALTON.

The Student's Column.

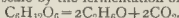
CHEMISTRY.—XXIV.

ALCOHOLS.

THE two most important alcohols are methyl alcohol or wood spirits and ethyl alcohol or spirits of wine. Methyl alcohol or wood spirits, CH_3O , is obtained with many other compounds when wood is distilled. Wood is distilled for making charcoal and for the pyroigneous acid (containing the wood spirits) which distils over. Acetic acid, and sometimes vinegar, is manufactured from crude pyroigneous acid. Crude wood spirits possess a disagreeable taste and odour. Pure wood spirits much resembles common alcohol, i.e., ethyl alcohol, in taste and smell, and all its other properties. It is an intoxicating liquid. When ignited, it burns with a non-luminous blue flame.

Aldehydes are compounds intermediate in composition between the alcohols and the acids formed by the oxidation of the alcohols. They differ from the alcohols from which they are formed in containing two atoms less hydrogen. Thus methyl alcohol, CH_3O , forms methyl aldehyde, CH_2O . By further oxidation, acids are produced; thus methyl aldehyde, CH_2O , is converted by oxidation into formic acid, CH_2O_2 .

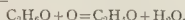
Ethyl Alcohol, $\text{C}_2\text{H}_5\text{O}$, is commonly known as spirits of wine or ordinary alcohol. It is prepared on a large scale by the fermentation of sugar.



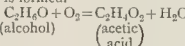
Grape Sugar Alcohol

If cane sugar is used, it is changed by fermentation into grape sugar before the final fermentation into alcohol can be effected. Fermentation is produced by minute but living organisms, which are known as *ferments*. To commence the fermentation of sugar, it is usual to add brewers' "yeast" to the sugar solution. Yeast is itself a living vegetable ferment. The alcohol is separated from the other portions of the fermented liquid by repeated distillation. Absolute alcohol contains about 5 per cent. of water. It is the purest that is sold as an article of commerce. Proof spirit contains 57 per cent. by volume of pure alcohol, or 49.24 per cent. by weight. Brandy, whisky, gin, and rum contain from 38 to 60 per cent. of alcohol by volume; sherry and port, 18 to 23; hock and claret, 10 to 13; and beer, 2 to 6.

Methylated Spirit consists of about 90 per cent. of ordinary alcohol (containing about 90 per cent. true alcohol), mixed with about 10 per cent. of some other inflammable but nauseous spirit in order to make it undrinkable. As little or no duty is charged on methylated spirit, this precaution is necessary to prevent its being used for drinking purposes. Chloral, CCl_3COH , is produced by passing chlorine into alcohol for a considerable length of time; it is a heavy, colourless, poisonous liquid, which is much used in medicine for producing sleep. Chloral hydrate is a solid crystalline substance produced by adding water to chloral. Chloroform, CHCl_3 , is prepared by the action of bleaching powder upon alcohol. Chloroform is also a heavy colourless liquid, which like chloral is employed for producing insensibility in patients, and causes death if inhaled in sufficient quantity. Iodoform, CHI_3 , which is much used by surgeons, especially in ointment, is obtained by the action of alcohol upon iodine in the presence of an alkali. The aldehyde formed by the partial oxidation of alcohol is termed ethyl aldehyde—



By the complete oxidation of ordinary alcohol acetic acid is formed.



Vinegar is an impure, very dilute solution of acetic acid. It is manufactured on a large scale by passing some alcoholic fluid, such as beer or weak wine, downwards through shavings or wicker work, through which an upward current of air is passing. The atmospheric oxygen converts the alcohol in the liquid into acetic acid. Pure acetic acid is a colourless liquid; the brown colour of vinegar is caused by the colouring matter from the wood in the cask in which it is stored, or by the addition of a small quantity of burnt sugar.

The strongest pure acetic acid, when cooled below 60° F., solidifies to a colourless crystalline mass resembling ice in appearance. Such acid is termed "glacial" acetic acid. Acetic acid attacks many metals to form acetates. Sugar of lead, or lead acetate, is formed when acetic acid acts upon lead. Copper acetate, or verdigris, is formed by the action of acetic acid upon copper. When an acetate is heated with strong sulphuric acid an odour resembling that of vinegar is evolved, due to the liberation of acetic acid.

Ether, Sulphuric Ether, or Ethyl Ether, $\text{C}_2\text{H}_5\text{O}$, is prepared by distilling concentrated sulphuric acid with an excess of ordinary alcohol. Methyl Ether may be obtained in a similar manner by substituting wood spirits for ordinary alcohol.

Oxalic Acid $\text{C}_2\text{H}_2\text{O}_4$ occurs in many plants, sometimes in the free state, sometimes as oxalate of lime, and sometimes as an acid potassium or sodium oxalate. Oxalic acid is obtained on a large scale from oxalate of potassium or sodium manufactured by the action of caustic soda and potash solution upon pine sawdust. Oxalic acid crystallises in colourless prisms. It is exceedingly poisonous.

Tartaric Acid, $\text{C}_4\text{H}_4\text{O}_6$, exists in grape juice as acid potassium tartrate. It also occurs in many

other fruits. The impure acid potassium tartrate known as "argol" or impure "cream of tartar" is deposited when the sugar solution containing it is converted into alcohol in the manufacture of wine. The "argol" is insoluble in alcohol. The tartaric acid in the "argol" is then converted into insoluble calcium tartrate by dissolving it in boiling water and adding chalk. Finally, the calcium tartrate is decomposed by the action of sulphuric acid. The clear solution of tartaric acid is evaporated. Large, colourless crystals of the acid are thus obtained.

Rochelle Salt is a neutral sodium potassium tartrate. It is prepared by mixing cream of tartar with a boiling solution of carbonate of soda and allowing the solution to cool. As the solution cools, the salt crystallises out.

Citric Acid, $\text{C}_6\text{H}_8\text{O}_7$, occurs abundantly in oranges and lemons, associated with tartaric, oxalic, and malic acids. It is also found in the juice of a great number of other fruits. It is usually manufactured from lemon juice. Colourless crystals of acetic acid may be obtained by evaporating the clear acid solution.

Glycerin, $\text{C}_3\text{H}_5\text{O}_3$, is a constituent of most fats and fixed oils. When these fats are boiled for a considerable time with caustic potash or soda solution, the stearic glyceride is decomposed, and glycerin and sodium or potassium stearate (soap) is formed. Soap is soluble in ordinary water but insoluble in salt water. Common salt is therefore added to the vessels in which the soap is manufactured in order to solidify it. The soap floats on the top, while the glycerin remains in the solution. Large quantities of glycerin are thus obtained as a bye-product in soap manufacture. It is mostly used for the manufacture of nitroglycerin.

Nitroglycerin, $\text{C}_3\text{H}_5(\text{NO}_3)_3$, is prepared by cautiously stirring glycerin into a cold mixture of concentrated sulphuric and nitric acids. After standing for a short time this mixture is very cautiously poured into water. Nitroglycerin then separates out into oily looking drops, and is well washed in order to free it of all traces of acid. Nitroglycerin is an odourless, colourless liquid. When subjected to a sudden blow or suddenly heated it explodes with great violence. Dynamite is manufactured by mixing nitroglycerin with "Kieselguhr." Kieselguhr is an earth consisting of minute shells of minute silica. It is not gritty, but absorbs nitroglycerin and remains in the form of a soft powder. Dynamite, like glycerin, explodes under a blow, and similarly may be burnt without explosion by the application of a lighted match.

The class of organic compounds termed Carbohydrates are so called because, in addition to carbon, they contain twice as many atoms of hydrogen as of oxygen, i.e., they contain hydrogen and oxygen in the proportion in which they form water. They are divided into three important groups—(1) Glucoses, (2) Saccharoses, (3) Amyloses or starches.

(1) Glucose.—Grape Sugar, Glucose, or Dextrose, $\text{C}_6\text{H}_{12}\text{O}_6$, is the sugar which occurs in fruit. It is much less sweet than cane sugar. It may be prepared by boiling starch for some time with dilute sulphuric acid, the acid solution produced being neutralised with chalk, and the neutral sugar solution evaporated. Levulose greatly resembles grape sugar, with which it occurs in honey and in many fruits.

(2) Saccharoses.—Cane Sugar ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) is obtained from the juice of the sugar-cane, the beet-root, and the sugar maple. Milk Sugar or Lactose is prepared by evaporating whey. Maltose is the sugar which is the product of the action of diastase upon starch.

(3) Starch ($\text{C}_6\text{H}_{10}\text{O}_5$) occurs in nearly every plant. Certain tubers, such as the potato, consist principally of starch, while many grains, such as rice, maize, and wheat, also contain a very large percentage of it. The starch granules in different plants vary to such an extent as to render their identification easy by means of the microscope. Starch is insoluble in cold water. When a solution of iodine and potassium iodide is added to a cold solution containing starch, a deep blue colour is produced.

Dextrin, or British Gum, has the same composition as starch ($\text{C}_6\text{H}_{10}\text{O}_5$). Compounds which possess different physical properties, and yet have the same percentage composition, are said to be isomeric. British gum is prepared on a large scale by heating starch, either by itself or after moistening it with hydrochloric or nitric acid. In the latter case it is only necessary to heat the starch to about 250°F. to convert it into gum. Dextrine is a yellowish white powder, very soluble in water, but insoluble in alcohol.

Gum Arabic consists chiefly of arabic acid,

which has the same percentage composition as starch. Gum arabic is yielded by several species of acacia. *Cellulose* ($C_6H_{10}O_5$) also has the same percentage composition as starch. It is the chief constituent of the cells and woody fibres of plants. Cotton wool, cotton, and linen are nearly pure forms of cellulose. Pure cellulose is white, and insoluble in water, alcohol, and most of the common solvents, but soluble in an ammoniacal solution of cupric oxide. *Gum cotton* or *pyroxylon* is made by soaking cotton-wool in a mixture of one part of strong nitric and three parts concentrated sulphuric acid, and finally washing and carefully drying it. If dilute acids are employed instead of concentrated acids, a somewhat different compound is formed, which, unlike gun-cotton, is soluble in a mixture of ether and alcohol, and then forms the *collodion* of commerce. When this solution is allowed to evaporate, a transparent skin is formed; hence collodion is useful for covering wounds. Collodion is also employed for photographic purposes.

Derivatives of the Benzene Series.—In this group of compounds occurs *Carbolic Acid* or *Phenol* (C_6H_5O). Benzene itself is a hydrocarbon obtained from coal tar, and has the formula C_6H_6 . Carbolic Acid is manufactured from a portion of the *heavy oil*, obtained by the distillation of coal tar. That part of the oil which distils over between 300 deg. and 400 deg. Fahr., is treated with caustic soda solution. The phenol dissolves in the soda. The alkaline solution of the phenol is then drawn off and treated with hydrochloric acid. The crude phenol which then separates out is purified by distillation.

The *creosotic liquor*, commonly termed *creosote*, which is so largely used for preserving timber, is the heavy oil obtained by the distillation of coal tar. According to Sir F. Abel, it should be that portion of the distillate which comes over between the temperature of about 350 deg. Fahr. and that of 760 deg. Fahr. Also, "the liquor must be free from admixture with any oil or other substance not obtainable from such distillate. It shall contain not less than 20 nor more than 30 per cent. of constituents that do not distil over at a temperature approaching 600 deg. Fahr." "The creosoting liquor must become completely fluid when raised to a temperature of 100 deg. Fahr. and exhibit no signs of any deposit on cooling down to a temperature of 90 deg. Fahr. The specific gravity of the liquid must not be less than 1.035 and not more than 1.065 at a temperature of 90 deg. Fahr. as compared with water at 60 deg. Fahr." It must also yield not less than 9 per cent. of crude tar acids. Creosoting liquor is usually of a blackish-brown colour.

Pure phenol, or carbolic acid, crystallises in colourless needle-shaped crystals at ordinary atmospheric temperatures, but the presence in it of a little water prevents it from solidifying. Carbolic acid possesses a very characteristic odour. It is very poisonous, but is a valuable disinfectant.

Picric acid solidifies in bright yellow crystals, which possess a bitter taste and are slightly soluble in water, but dissolve readily in alcohol. Picric acid is produced by the action of strong nitric acid upon carbolic acid. Although intensely poisonous, picric acid is sometimes employed as a dye for silk.

The Alkaloids. The alkaloids are compounds composed of nitrogen, hydrogen, carbon, and, in some cases, oxygen; they are found in various plants. Some are useful medicines, others intense poisons. *Quinine* is the most valuable alkaloid. It is obtained from the outer bark of the *Cinchona*, which is often called Peruvian bark. *Nicotine* is a very poisonous oily-brown liquid which is found in tobacco. *Morphine* and *narcotine* are alkaloids obtained from opium. The two intensely poisonous alkaloids, *strychnine* and *brucine*, are obtained from the seeds of *nuxvomica*, and from the "St. Ignatius bean."

The branch of chemistry which deals with the compounds termed *albuminoids* and *proteids* which form the basis of animal structure is called *physiological chemistry*. No attempt will be made to study it here, but under this branch of chemistry falls the consideration of *gelatin*. Gelatin does not exist in the animal tissues, but is formed by the action of boiling water upon hoofs, hides, skin, bones, and animal horny matter.

Isinglass is the purest form of gelatin, and is obtained from the bladders and membranes of fish.

Glue is a coarse gelatin prepared from waste pieces of animal skins and hoofs. Much glue is obtained from ox hides. It is said that the older the animal the stronger is the glue obtained.

Size is a gelatin manufactured from the skins

and membranes of various animals. Glue is first obtained, but size is made from the glue by covering it with water and allowing it to stand till melted. More water is then added to it. Hence size may be regarded as a gelatinous mixture of glue and water.

The following table gives the chemical names

Common Name.	Chemical Name.	Formula.
Agate, Amethyst, Carnelian, Chalcedony, Flint, Jasper, Onyx, Opal, Sand, Quartz, Sandstone	Silica	SiO_2
Alabaster, Selenite, Plaster of Paris, Gypsum	Calcium sulphate	$CaSO_4$ + water
Alum	Potash alum	$AlK(SO_4)_3 + 12H_2O$
Alcohol or spirits of wine	Ammonia alum	$Al(NH_4)_2SO_4 + 12H_2O$
Ammonia or spirits of hartshorn	Ethyl alcohol	C_2H_5O
Asbestos, Talc, Meerschaum	Ammonium hydrate	NH_4OH
Steatite, Soapstone	Magnesium silicate	—
Blue vitriol	Cupric sulphate	$CuSO_4 + 5H_2O$
Borax	Sodium borate	$Na_2B_4O_7$
Carbolic acid	Phenol	C_6H_5O
Chalk, Limestone, Marble	Calcium carbonate	$CaCO_3$
Iceland spar	Calcium fluoride	CaF_2
Derbyshire spar or Fluor spar	Carbon	C
Diamond, Graphite, Charcoal	Alumina	Al_2O_3
Lampblack	Aluminium silicate	—
Emer, Ruby, Sapphire	Glycerin	$C_3H_5O_3$
Fuller's earth, Slate, Pumice stone	Ferrous sulphate	$FeSO_4 + 7H_2O$
Glycerin	Barium sulphate	$BaSO_4$
Green vitriol or <i>Copperas</i>	Calcium oxide	CaO
Heavy spar	Calcium hydrate	CaH_2O_2
Lime (quick)	Potassium nitrate	KNO_3
" (slaked)	Oil of turpentine	$C_{10}H_{16}$
Nitre or saltpetre	Sulphuric acid	H_2SO_4
Oil of turpentine	Sodium chloride	$NaCl$
Oil of vitriol	Sodium carbonate	$Na_2CO_3 + 10H_2O$
Salt (common)	Zinc	Zn
Soda (washing)	Hydrochloric acid	HCl
Spelter	Lead acetate	$Pb(C_2H_3O_2)_2$
Spirits of salt, or Muriatic acid	<i>The following compounds are used as Pigments.</i>	
Sugar of lead	Carbon (impure)	C.
Black	Lamp black, Ivory black, Mineral black, Black lead, etc.	Silicate of aluminium and sodium with sodium sulphide
Blue	Ultramarine	Silicate of potassium and cobalt
Blue	Cobalt blue	Ferric ferrocyanide
Blue	Prussian blue	Blue malachite
Blue	Mountain blue	Indigo-blue or Indigotin
Blue	Indigo blue	Iron oxides
Brown	Vandyke brown	Iron ores containing manganese
Brown	Raw and Burnt umbers	Manganese dioxide
Brown	Manganese brown	Copper arsenite
Green	Scheele's green	Chronic oxide
Green	Chrome green	Copper oxychloride
Green	Brunswick green	Aceto-arsenite of copper
Green	Emerald green	Lead oxides
Red	Red lead	Ferric oxide
Red	Red ochre	Mercuric sulphide
Red	Vermilion	Asenic disulphide
Red	Realgar	Basic lead carbonate
White	White lead	Zinc oxide
White	Chinese white	Bismuth oxychloride
White	Pearl white	Barium sulphate
White	Permanent white	Tin binoxide
White	Tin white	Asenic Trisulphide
Yellow	King's yellow	Clay coloured by ferric hydrate
Yellow	Yellow ochre	Lead chromate
Yellow	Chrome yellow	Tin bisulphide
Yellow	Mosaic gold	—

GENERAL BUILDING NEWS.

PROPOSED NEW BUILDINGS ON THE CASTLE HILL, EDINBURGH.—The *Scotsman* reports that at a sitting of the Edinburgh Dean of Guild Court, Prof. Patrick Geddes was granted authority to erect two blocks of buildings, one to the east of Ramsay Lodge, and the other between Ramsay Lodge and the house in Ramsay Gardens, and also to make alterations on Ramsay Lodge. This pile of new buildings, designed by Messrs. Sydney Mitchell & Wilson, architects, will occupy one of the most prominent sites in Edinburgh, looking northwards as it does over Princes'-street and westwards over the slopes of the Castle Hill. The westmost portion of the block will contain houses in flats. These houses will consist of a large entrance hall, drawing-room, dining-room, study, and four bedrooms, besides kitchen and other servants' accommodation. The eastern portion of the block—which includes Ramsay Lodge—is to be used as a students' home or University settlement. It will contain dining and recreation halls and numerous rooms for students. The buildings are designed outwardly in a varied and picturesque style. At the extremely north-west corner is a circular tower, measuring 8 ft., constructed of a pale red sandstone. It is divided by moulded string courses into four unequal stages. The windows in it are few until the top is reached, where there is a range of them separated by stone pilasters. Abutting on this tower to the eastward is a gable, which, beginning

and form of many materials likely to be met with by the builder, but it should be remembered that all commercial substances contain impurities in varying quantities which cannot be shown in the table and that the presence of a very small proportion of a foreign body may entirely change the characteristics and value of the substance:—

in stone at the ground, projects forward at the second story, and is carried up with ranges of windows between wooden pillars. Next this comes a plain wall pierced irregularly with windows, and covered with rough cast. Next, again, comes the octagonal bay of Ramsay Lodge, now raised in height a story, and crowned with an open balcony and high-pitched roof. This is succeeded by another gable carried up in stone through four stories, and then continued in rough cast. In this portion of the building is the recreation hall, which is marked externally by four bold two-light mullioned windows, which run in height through two stories. In the upper portion of this gable is a corbelled-out oriel. It is intended finally to make some changes on the roofs of the houses in Ramsay Gardens, so as to bring them into harmony with the new buildings. The southern and western fronts are treated in the same spirit as the north front. Of the east front there is little to be seen, as the houses in Ramsay Gardens abut on it.—At the same Court authority was granted Mr. William Wilson to take down certain buildings at Riddell's Court, Lawnmarket, and to build on the site a double tenement of dwelling-houses. These buildings are to be erected from designs by Mr. S. Henbest Capper.

NEW MUNICIPAL BUILDINGS AT RICHMOND.—The new Municipal Buildings for Richmond, erected on a site given to the town by Sir J. Whittaker Ellis, the first Mayor of the Borough, were opened by H. R. H. the Duke of York on Saturday last. The building is in the Elizabethan Renaissance style, the three fronts being faced with red bricks, with Bath

stone strings, cornices, &c. The treatment is a grouped pilastered design, carried by a rusticated base, carving being introduced and massed to give additional effect. The architect is Mr. W. J. Ansell. The accommodation includes a council chamber, committee room, a room for the receipt of calls, rooms, and office for the Corporation officials. The principal staircase is approached from a central hall opposite the main entrance, and is of Devonshire marble in two colours. A clock projects from the Hill-street front, and has ding-dong chimes and a large bell striking the hours. The total cost, including the roadway from Hill-street to the river, and the laying out of the pleasure-grounds, will be about 24,000*l*.

CONSECRATION OF ST. PETER'S CHURCH, UPTON CROSS, ESSEX.—The new permanent church of St. Peter, Upton Cross, was consecrated on the 3rd inst. by the Bishop of St. Alban's. The site for the church is in Upton-lane, facing West Ham Park. The new edifice is in the Early English style. It is constructed of stock bricks relieved with bands and arches of red bricks and stone dressings, and the arches of the nave are supported by stone columns. The chancel screen is formed of three brick arches and carried on black Irish marble columns. The cost of the portion already built is about 4,500*l*. The new edifice is in the Early English style. It is constructed of stock bricks relieved with bands and arches of red bricks and stone dressings, and the arches of the nave are supported by stone columns. The chancel screen is formed of three brick arches and carried on black Irish marble columns. The cost of the portion already built is about 4,500*l*. The new edifice is in the Early English style. It is constructed of stock bricks relieved with bands and arches of red bricks and stone dressings, and the arches of the nave are supported by stone columns. The chancel screen is formed of three brick arches and carried on black Irish marble columns. The cost of the portion already built is about 4,500*l*.

BYFLEET HALL, BYFLEET, SURREY. was opened on the 7th inst., by the Hon. Louis Egerton and the Bishop of Winchester as the St. Nicholas Home for the aged children in connexion with the Church of England Society for providing Homes for Waifs and Strays). The alterations have been carried out under the direction of Mr. A. W. Tribe, architect, of London.

NEW HOTEL, DARLINGTON.—On the 1st inst. the King's Head Hotel, Darlington, which has been related to a castle, including fittings of over 50,000*l*, was opened. The style is Renaissance, with English and Italian characteristics and details. The length of the main front is 150 ft., and the height 70 ft. from the level of the pavement. The basement extends over the entire area of the building, and furnishes cellar accommodation, store rooms, larders, &c., and a chamber in which is fixed the appliances for a special hot water service for the whole of the baths and lavatories. Four lifts are used from this level to the top of the building. On the ground floor, and entering the hotel by the main entrance, are the porch, vestibule, and hall. The whole of the floor of these parts, as well as the corridors, are laid with marble mosaic pavement. A central feature in the hall is the office. To the east of the hall are situated a grill room and a buffet, and east of these a smoke room. On the north of the hall is the manager's private office, north staircase, and the front bar, with a smoke room in rear. At the south of the building is a luggage room, large general lavatory, and shop for carrying on the wholesale department. The principal landing on the first floor is separated from the staircase and main corridor by two ranges of arcading. On the east of this landing is a banquet hall or ball room, the decorations of which are white and gold. Crossing the main landing westwards the coffee room and ladies' drawing-room are reached. To the south of these rooms are two sitting-rooms and a smoke-room, and to the north a commercial room, with writing-room adjoining. At the northeast corner is situated a billiard-room. On the second floor are the principal sitting-rooms and bed-rooms, lavatories, bath-rooms, &c. The north staircase leads to the third floor, which is devoted to bed-rooms, lavatories, and bath-rooms. In the east block of this floor are placed the kitchen and offices, which are fire proof. In connexion with these offices are the servants' hall, bed-rooms, bath-room, and lavatory for the accommodation of the servants. Stock-rooms are in course of erection adjoining the hotel on the north; and land has recently been purchased for the erection of laundries. The drainage has been carried out by the Corporation of Darlington. The stabling consists of six loose boxes and twenty-nine stalls; with harness and saddle rooms, lock-up coach-houses, large washing box, and other conveniences. The whole of the building and decorations have been carried out under the supervision of Mr. Walter Hoskins, Messrs. Mackenzie Bros., of Darlington, being the principal contractors. The grand staircase and woodwork have been executed by Mr. R. T. Snaith, Darlington; plumbing work by Mr. Emmerson Smith, Darlington; decorations by Messrs. Laidler & Robson, Newcastle; bar fittings by Messrs. Yates & Co., Birmingham; painting by Messrs. W. H. and W. Hoskins, Darlington. The architect was Mr. G. Gordon Hoskins, of Darlington.

PROPOSED LUNATIC ASYLUM, SUNDERLAND.—At the usual fortnightly meeting of the Sunderland Town Council held in the Town Hall on the 28th inst., the Visiting Committee of the Borough Lunatic Asylum reported that they had accepted the tender of Mr. Joseph Howe, of West Hartlepool, for the superstructure at the Borough Lunatic Asylum at Ryhope, for 61,240*l*., subject to the approval required by the Lunacy Acts. Six tenders were received, the highest amounting to 70,641*l*. Alder-

man Shadforth, replying to several questions, said approximately they expected that the ventilation would cost between 6,000*l*. and 7,000*l*., electric lighting 4,000*l*., and the heating 3,000*l*.,—or a total of 83,000*l*. The motion was agreed to.

WESLEYAN CHURCH, LISCARD, CHESHIRE.—On the 3rd inst. the foundation-stones of a new Wesleyan church and school were laid in Manor-road, Liscard. The new church and school will seat 430 people, and is to cost 3,500*l*. Mr. Ernest Goodacre is the architect, and Mr. Bellis, of Liscard, the contractor.

PROPOSED PUBLIC BATHS, FREE LIBRARY, &c., DEWSBURY.—Major-General Crozier held an inquiry at the Town Hall, Dewsbury, on the 1st inst., relative to an application made by the Corporation for sanction to borrow 20,000*l*. for new public baths and free library, and 4,750*l*. on street improvements. There was no opposition to the first scheme.

PROPOSED HOSPITAL, DORCHESTER.—The Dorchester Town Council have decided to erect a Hospital for Infectious Diseases on a site which has been purchased from the Duchy of Cornwall within a mile of the town, and to apply to the Local Government Board for sanction to borrow 1,200*l*. to carry out the works forthwith from the designs submitted by Mr. G. J. Hunt, the Borough Engineer and Surveyor.

SCHOOL BUILDINGS, SHEFFIELD.—On the 5th inst. new Board Schools, situated at the end of Sharrow Vale-road, Sheffield, were opened by Sir Henry Stephenson. The present building is for 360 boys, and sufficient ground has been taken to build separate schools for girls and infants in the future. The boundary round the whole of the land has been built in this first contract. A large schoolroom is provided, with four class-rooms, so arranged as to be capable of being thrown together. Mr. C. J. Innocent, of Sheffield, is the architect, and the contractors are Messrs. George Longden & Son, Newcastle. Mr. Hatfield has done the asphalted playgrounds, and Mr. Cartwright has acted as clerk of the works. The contract is 5,924*l*. 10*s*.

NEW PREMISES, SCOTTISH TEMPERANCE LEAGUE, GLASGOW.—The block of buildings situated at Hope-street, Glasgow, which has been occupied as the premises of the Scottish Temperance League, is about to be taken down and new building of five stories erected in its place. The building will be built of Dumfriesshire red stone, and the design is in the Renaissance style. The Temperance League are to occupy the basement, the ground, and the first floors. The second and third floors will be let as offices, and the attic floor is to be fitted up as artists' studios. The architect is Mr. W. Forrest Salmon, of Glasgow. The measurers are Messrs. Douglas, Hunter, & Whiston; and the contractors are:—Mason work, Messrs. Shaw & Campbell; Wright work, Mr. William Lightbody; plumber work, Mr. James Raeside; roof the work, Mr. William Feikie; floor, &c., work, Messrs. Galbraith & Winton; plaster work, Mr. William Tonner.

MASONIC HALL, TREDEGAR.—The foundation-stone of the new Masonic-hall, Tredegar, was laid on the 8th inst. The hall will be of red brick and terra-cotta, and is the design of Messrs. James & Morgan, of Cardiff. The first floor of the building will be devoted to Masonic purposes, while the lower floor will be occupied by a post-office. Mr. Edward Morgan, of Tredegar, has secured the contract, while Mr. Louis Marshall is clerk of the works.

SANITARY AND ENGINEERING NEWS.

REJECTION OF THE COVENTRY SEWAGE SCHEME.—The House of Commons last week threw out the Provisional Order of the Local Government Board for creating a sewage farm in the Avon Valley for Coventry. The Avon Valley plan of disposing of the sewage was the work of Mr. Mansergh, C.E. **DUNDEE WATER SUPPLY.**—For several weeks past complaints have been prevalent in Dundee in regard to the quality of the water supplied to the city, it being found to have a fishy taste and smell. It was known that in Clath reservoir there were a considerable number of perch, and the officials were accordingly ordered to have the reservoir cleaned and repaired. The reservoir was accordingly cut off, and Dundee supplied direct from Lintrathen Loch. When the water was taken out of the reservoir an extraordinary state of matters was revealed. In addition to myriads of perch which were swimming about, the bottom of the reservoir was covered with one solid mass of dead and decayed fish and spawn, several tons of this matter being carted away. It is believed that a considerable quantity of the matter had been sucked through the reservoir screens, and found its way into the pipes, and that this had principally caused the water to be tainted. —*Scotsman*.

STAINED GLASS AND DECORATION.

WINDOWS, HILLHEAD CHURCH, GLASGOW.—This church is one which is well suited for the exhibition of painted or stained glass. The general plan is a rectangle about 90 ft. long by 55 ft. wide, with a seven-sided east end. The principal entrance is in the west front, over which is a large circular or rose window. The sides contain five bays, in each of which are three-light windows about 19 ft. high

to the springing, that is independent of the traceried heads; but the windows in the seven-sided east end are two-light ones, and its length is about 32 ft. A scheme for memorial glass in these seven windows was prepared by the minister, the Rev. Mr. Strong; the three on the north side to represent our Lord in His human relations; and the three on the south to illustrate His personality and character, and both leading up to the centre one in the east end, representing His claim to a divine kingship. The commencement of this series has now been realised by the centre window, and one on each side adjoining, being completed and put in. The one on the north side is by Morris & Co., from cartoons by Mr. Burne-Jones. "Suffer little children to come unto Me." The south side one is by Cottier & Co., when "He set his face steadfastly to go to Jerusalem," and two of His disciples wish to call down fire on those who would not receive Him (Luke ix., 51). While the central window represents Him before Pilate, when He asks, "Art thou a king, then?" and the reply, "To this end I am born. My kingdom is not of this world," and this one is by Shirigley & Hunt, of Lancaster and London. The work has been carried out under the direction of Messrs. Campbell Douglas & Morrison, of Glasgow, the church having been designed by Mr. Douglas's firm originally.

FOREIGN AND COLONIAL.

FRANCE.—By a decree of the President, M. Paul Dubois, sculptor, has been confirmed for five years in his duties of Director of the Ecole Nationale des Beaux-Arts. The Government has approved of the erection, on a public place of Asnières, of a monument to the memory of Durand Claye, the eminent engineer.—M. Mercie has just completed a copy of the "Moses" of Michelangelo, which has been commissioned by M. Osiris, who intends it for the decoration of his own tomb in one of the cathedrals of France.—The jury of painting of the Salon des Champs Elysées has awarded the Marie Bashkirtseff prize to Mdlle. Laura de Roux, daughter of M. Hector le Roux, the painter.—The collection of the Ecole des Beaux-Arts has been enriched by the presentation of a fine album of eighty-eight paintings, sketches, water-colours, &c., by M. Bailly, the former president of the Société des Artistes Français. There is talk of raising a statue to Watteau in the little town of Nogent-sur-Marne, where he is buried.—An exhibition of portraits of writers and journalists of the day has been opened at the Georges Petit Gallery.—A monument to the soldiers who fell in the Franco-German war has been erected at Neuilly-sur-Seine. The railway company "de l'Ouest" has replaced the iron bridge which formerly crossed the Seine at Maisons, near Paris, by a built masonry bridge.—Last Sunday took place the official opening of two new lines of railway, that from Verneuil l'Etang to Marles, by Chaumes, and that from Albertville to Montiers; the former forming a part of the "l'Est" railway system, the latter a part of the Paris-Lyons-Mediterranean system. This last line will serve the bathing establishments of Brides and Salins.—The seventh exhibition of the Société des Amis des Arts of Seine and Marne will be held in the palace at Fontainebleau from the 1st of August to the 1st of October.—To-morrow (Sunday) will take place at Dôle (Jura) the official inauguration of the monument to Jules Grévy, formerly President of the Republic. We have already described the monument, the work of M. Falguère.—A committee has been formed to raise, on the Place de l'Hôtel de Ville at Clermont (Oise), a monument to the memory of Cassini de Thury, author of the first large map of France.—There is talk of a monument to the poet Théodore de Banville on a public place in Moulins (Allier), the town in which he was born.—M. Charles Bailly, sculptor, has just finished the model of the statue of General Dupoix, commissioned by the Department of Fine Arts, and to be erected in the garden of the new Hôtel de la Préfecture du Rhône.—M. Paul-Franz Marcon, Joint Inspector-General of Monuments Historiques, has just been appointed to the post at the Cluny Museum left vacant by the death of the late M. Darcel.—M. Felix Guillemin, architect, has died at Avesnes (Nord) at the age of sixty-seven. He was an eminent architect, occupied specially on scholastic buildings. He was a man of great technical knowledge and one of the principal contributors to the *Revue Générale de l'Architecture*; he wrote also (under a pseudonym) in the *Semaine des Constructeurs*. He was a member of the Union Syndicale des Architectes Français.—The death is also announced of M. Gilardoni, the oldest of French tile manufacturers, inventor of the "Tuile à Emboîtement" for which he took out a patent in 1841. M. Gilardoni, who was Chevalier of the Legion of Honour, died at Altkirk (haute Alsace) at the age of eighty-seven.

MISCELLANEOUS.

THE LAND REGISTRY.—The Land Registry removed last week from No. 13, Staple Inn into the old Bankruptcy Offices at No. 33, and their former quarters at No. 34, Lincoln's Inn Fields, sharing the former house with the Official Assignees in Bankruptcy Department. In April

[illegible]

ELPHINSTON Survey. Accepted for the building of a new residence, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

ROTHAMPTON.—Accepted for the erection of business premises, house, stable, &c., at Water-ane, Rotherham, for the Messrs. Rotherham, Son & Nephew. Mr. H. L. Tacon, architect, Rotherham. Quantity by the architect—£700 0 0

SOUTHALL (Middlesex).—For new garage, High Tambo, Southall. Mr. John T. Lee, architect, 28, Great James street, Bedford-row, W.C. £1,000 0 0

SWINDON.—For erecting two cottages, Wroughton, Swindon, for Mr. F. W. Pavy. Mr. W. H. Read, architect, Corn Exchange, Swindon—
J. Williams £450 0 0
Wiltshire 400 0 0
Accepted.

SWINDON.—For erecting stable, &c., at Wroughton, Swindon, for Mr. F. W. Pavy. Mr. W. H. Read, architect—
J. Williams £200 0 0
Wiltshire 200 0 0
Accepted.

SWINDON.—For rebuilding "The Swan Inn," Wroughton, Swindon, for Messrs. Bowly. Mr. W. H. Read, architect, Corn Exchange, Swindon—
J. Williams £500 0 0
Wiltshire 500 0 0
Accepted.

SWINDON.—For alterations at the "Black Horse" Inn, Wroughton, Swindon, for Messrs. Bowly. Mr. W. H. Read, architect, Corn Exchange, Swindon—
J. Williams £100 0 0
Wiltshire 100 0 0
Accepted.

SWINDON.—Accepted for stabling, consulting-room, greenhouse, &c., at 39, Marlboro road, Swindon. Mr. W. H. Read, architect, Swindon—
J. Williams £750 0 0

WALSALL.—Accepted for the supply of 1,100 yards cast-iron railing and coping for the cemetery, Ryecroft, for the Corporation. Mr. R. H. Middleton, Borough Surveyor, Bridge-street, Walsall—
Grafton Foundry Co., Birmingham £4 4 6

WATFORD.—For the construction of drainage works under the river (1,100 yards), for the Local Board. Mr. D. Waterhouse, Engineer, 11, High-street, Watford—
A. J. Gally £200 0 0
F. Dupont 800 0 0
J. Neave 700 0 0
Accepted.

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Sculpture at the Royal Academy: Panels for the Municipal Council Chamber, Bath.—Mr. F. E. Schenck, Sculptor	Two Single-Page Ink-Photo's.
Residence, Newport, Rhode Island.—Mr. R. Morris Hunt, Architect	Double-Page Ink-Photo.
Designs for Friezes.—By Mr. Arthur L. Gwatkin	Double-Page Ink-Photo.
New Church, Staines.—Mr. G. H. Fellowes Prynne, F.R.I.B.A., Architect	Two Single-Page Photo-Litho's.

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Sculpture at the Royal Academy.



THE exhibition of sculpture at the Royal Academy has been generally considered to be below the usual level of interest this year; but though a detailed study of the works exhibited may not enable one to reverse this judgment, it will show that there is more of interest in the collection than appears at first sight.

Perhaps the proportion of absolutely commonplace work may be less than is usually the case. On the other hand there is nothing among the more conspicuous productions of the year which rises to the highest level of interest. Against this verdict we may have quoted the "Bellona," of M. Gerôme, exhibited in the Salon at Paris last year, and which occupies the position in the Lecture Room generally assigned to the principal work of the year. That this is a most notable production of modern sculpture cannot be denied. In its combination of different materials—ivory for the exposed portions of the figure with bronze for the costume, the latter heightened by gilding and silvering, it is an audacious experiment which must arrest the attention of every visitor, even if the figure itself were less striking in design and expression. But this figure of the Goddess of War, with the sword brandished aloft in her naked arm, and her mouth wide open as if in a battle-scream—an idea intensified in the repetition of the action by the open-mouthed snake which rears its head beside her—leaves us, at least, no room for complaint as to want of energy, and the drapery is grandly treated. Yet for all this we can only regard the thing as a brilliant mistake. The employment of different materials, which have to be artificially joined together to produce this piecemeal figure with the ivory head and hands and feet affixed to the bronze, beneath which this ivory body is to appear as if continued, at once destroys the monumental effect of a statue as a creation hewn out of one solid block. The realistic treatment of the face, with the glass eyes and the colour in the opened mouth, is painfully at variance with that expression of an abstract

ideal which should be the object of high-class sculpture, and moreover only serves to call attention to the entire unfitness of ivory for the realistic representation which is aimed at. Independently of this, the wide-open mouth is a violent and distorting action quite out of place in sculpture, at least as it has been regarded in all the greatest schools of sculpture hitherto. The whole impresses us as a disagreeable, violent, and *outré* piece of work, carried out no doubt with consummate skill, but entirely unworthy of the best traditions of a great art, and we cannot but regret that English critics should have been found to bolster up this unfortunate experiment of a great painter in an art for which he does not seem to possess the true sentiment and sympathy. In France the work met with little approbation; that it should have received so much praise as it has in the English press only shows how superficial and unsettled are our canons of criticism in this island.

In the Octagon hall the place of honour is occupied by Mr. Fehr's "Rescue of Andromeda," a new and very spirited treatment of the ancient legend. The sculptor has grappled courageously with a very difficult and intricate grouping of the figures. Andromeda has been overturned by the dragon from her usual erect position, and is lying half sheltered for the moment beneath a projecting ledge of rock, over which the dragon has clambered, but turns his head to meet the assault of Perseus, who stands on his back and stretches forward the head of Medusa over him to meet his upward gaze. The moment is critical: in an instant more the dragon will be fossilised, but in the meantime there is danger to Andromeda, whose face is also upturned and only accidentally sheltered by the dragon's wing from the freezing gaze of the gorgon head. The attitude of the three, Perseus, dragon, and victim, has been most carefully worked into a composition which, intricate as it is, nevertheless impresses itself on the spectator as natural and probable under the circumstances, and the three elements of the group are very well united into one composition. It is something to have given a new sculptural reading of a subject which might be supposed to have been worn threadbare; and the work only just misses being a really great one perhaps by being a little too ingenious and complicated in arrangement.

Among the other works in the Octagon the most interesting is the late Mr. Woolner's bronze statue "The Housemaid," a work which is simplicity itself in idea and action, an everyday subject translated into sculptural form. It is simply the kneeling figure of a woman engaged in the humble operation of washing the steps, and clad in ordinary dress. The skill and artistic feeling with which this costume is treated so as to present a certain sculptural breadth and dignity without departing from reality, is truly admirable; even the housemaid's cap, such a one as a housemaid might really wear, seems to fall naturally into harmony with the whole composition. There is no attempt to idealise the face or figure, yet it is perfectly dignified in character, and a work of sculpture of a high order, because it represents essential and typical characteristics without descending to that kind of sensational realism which we see, for instance, in modern Italian works dealing with a similar class of subject: and as an illustration of the proper limitations of sculpture in dealing with subjects from real life there is no work of the year which is more instructive.

Among the other prominent works in the Octagon are two or three large monumental statues; Mr. Wade's "Sir John MacDonald," Mr. Bruce Joy's "John Bright," a model of the statue executed for Birmingham, Mr. Birch's "Lord Beaconsfield," and Mr. Lawson's "Burns." The statue of Bright is at a disadvantage in appearing in white plaster along with the three bronze (or bronzed) works, and the sculptor has more-over been saddled with what seems to us the insurmountable difficulty of rendering John Bright sculpturally interesting or effective: it is a life-like "hustings" figure, and the expression of the face has been very carefully studied, and that is all that can be said. What the same sculptor can make out of a more fortunate subject is shown in his admirable marble bust of Lord Salisbury, executed for the City of London. The more effective personality of Sir John MacDonald renders his statue *pro tanto* superior to that of Bright. Burns should be the most interesting subject of all the portrait statues exhibited; we gave an illustration of the work, and of the admirable pedestal designed for it, in the *Builder* of Sept. 10, 1892. It may be questioned however

whether even this, the best of the four full-length monumental statues, does not rather serve to illustrate the superiority of the process adopted by some of the best French sculptors, and by Mr. Gilbert in his Fawcett monument in Westminster Abbey, of confining the representation of the person commemorated to the head only, and filling up the composition with allegorical figures. We thus not only get rid of the difficulty of modern costume in sculpture, but of the other difficulty, in the case of a personage not within living memory, as to what was his actual gait and manner and corporal proportion, for which we can often have no reliable data. Thus in the case of Burns we have data enough as to his countenance, but little as to his manner and general appearance. We should doubt this statue representing him correctly; it is too refined and courtly in pose for the man who describes himself as "hammering on his ploughman shanks" in entering Lord D. 's house. It is very probable that he looked a good deal less refined than this, and the value of a portrait statue is a good deal discounted when we have no means of knowing whether it is a faithful representation of the man. The system of a bust or medallion combined with a symbolical group gives far better opportunity and more freedom to the sculptor. Mr. Birch's "Beaconsfield" is a good portrait statue, and the most has been made of the cloak as a means of broad effect.

Among the other works in the Octagon Mr. Adrian Jones's life-size mare and foal, "Maternal Care," the mare prepared to kick at a dog which has alarmed the foal, is a fine and vigorous work, especially in the treatment of the hind quarters of the mare; there is a grand power and energy in the action of the animal. Mr. Christie's "Tiger Basking" (small size) is admirable in the general pose of the creature, but the head suggests a cat rather than a tiger. Two studies of boy figures are noticeable. Mr. G. Cowell's "Ishmael" (in which surely the hands are too large) and Miss Henrietta Montalba's "Boy Catching a Crab," which looks like a kind of hint from Mr. Swan worked into sculpture. Here, on the other hand, it strikes us that the arms are rather small, but the figure is a very careful study in the main, the feet especially. Mr. Cauer's group entitled "Thirst" is energetic but rather brutal, nor can we imagine who would wish for such a subject in sculpture.

Of the works which occupy the centre floor in the Lecture Room we have already published two illustrations, Mr. Drury's "Circe," and Mr. Onslow Ford's "Applause." Of the others the most noteworthy, and perhaps the best work of the year, is Mr. Hamo Thornycroft's "Summer," a work conceived in accordance with the best ideal of sculpture. It is a nude female figure leaning against a pedestal on one elbow, and holding a palmetto fan, which forms a kind of background or nimbus to the head, which, slightly upturned towards the left, is seen in relief against the fan. The head is a very refined one, and looks equally well whether viewed in profile or in front; the figure too from every point of view is harmonious in its lines, but the lower limbs appear a little stiffly modelled; this defect alone prevents it from having a claim to be classed as a perfect work of art. Mr. Lucchesi's "Oblivion" is a pretty though rather weak female figure, in which we cannot realise any direct relation to the title. It seems meant to express some idea which does not seem to be fully conveyed, and almost suggests the conclusion that it has been named after, and not before, its execution. Mr. G. Frampton exhibits the bronze of his manly and vigorous group entitled "The Children of the Wolf," in other words, the rescuing of Romulus and Remus by a peasant of noble form and countenance. The remaining work among the life-size figures is Mr. W. Goscombe John's "Girl Binding her Hair," a nude figure stooping a little forward to finish braiding the end of the long tress of hair which is brought over her

shoulder and held out before her. This is an admirable example of the simple and unaffected representation of nature in sculpture; though wanting in the higher interest which attaches to an ideal subject, it is excellent of its kind, and is the best modelled figure in the room.

Of the works ranged round or on the walls, three claim special notice. One of these is the fine ideal bust by Mr. Frampton, called "Mysteriarch;" a solemn winged head with drooping hair, the bust clothed with drapery of a severe type of line; a small gorgon and snake ornament is seen on the bosom, and the head is relieved against a circle partially gilded and the surface modelled in undulating lines. The bust rests on a simply designed architectural pedestal. The effect of it lies in the solemn and sphinx-like expression of the face, and the manner in which all the subsidiary details are harmonised with the design of the head and bust, so as to render the work a whole both in a decorative and intellectual sense. Two other works in the room have a specially architectural as well as sculptural interest, the two large circular bas-reliefs by Mr. Schenck, called respectively "The Elements," and "Industry, Commerce, and Agriculture," which are illustrated in the present number (see lithograph), and are intended for the ceiling of the council chamber in the new municipal buildings at Bath. Although the one includes four symbols and the other only three, the sculptor has cleverly contrived to obtain the necessary symmetry of composition for two adjoining bays of the ceiling by representing Earth among the "Elements" by the time-honoured symbol of the winged globe, treating the other three elements only as figures, balancing the figures of Industry, Commerce, and Agriculture in the other panel. The groups, as will be seen, are very well designed to fill the space, and the separate figures are expressive and spirited. We confess that we should have liked the panels better as wall than as ceiling decorations; in the latter capacity they have the defect of being too decidedly "this side up," so to speak, and must, therefore, as ceiling panels, look decidedly upside down from some parts of the room. This is a difficulty inherent, to some extent, in the use of the figure in ceiling decorations, but it may be evaded to some extent by a more all-round arrangement of the design than is the case here, where the figures are all standing on a distinctly emphasised base.

Of the various works arranged round the wall of the lecture-room we can only select a few for special mention, and it must be admitted that there are a good many which hardly present any quality to keep them in the memory. Among the busts we observe that the fancy still prevails for modelling busts of old, wrinkled, and ugly heads, which are only repulsive when treated in sculpture. In this class of work is a bronze head by Mr. Toft, "In the Sere and Yellow Leaf" (1,694); "Fourscore and Four," by Mr. Kellock Brown (1,700); "Study of a Head," by Mr. C. J. Allen (1,715); "An Old Friend," by Miss Marion Ledger (1,744); all clever, all repulsive and unpleasant to look at. We cannot help getting old and wrinkled, but we do not see that it is the business of sculpture to chronicle so disagreeable a fact in nature. Among other heads Mr. Brock's bronze bust of Sir F. Leighton is conspicuous, and perhaps somewhat too much marked by a kind of super-magnificent *bravura* of style and character. Mr. Williamson's marble bust of Lord Coleridge, the head rising out of a perfectly bare block of marble, is fine and monumental looking; and among other portrait busts which have distinct character may be mentioned Miss Steintal's "Mrs. W. E. Forster," Mr. Rollins's "Mr. Bertram Priestman," Mr. Bruce Joy's "Archbishop of Canterbury," Mr. Conrad Dressler's "Mdlle. Jeanne Douste," and a head by Miss Beatrice Angle (1,731), which may or may not be a portrait, but is an expressive and vigorous work. Mr. Lucchesi's marble bust of a girl's head, "With Modest Eyes Down-

cast," is a finely modelled head with a great deal of beauty.

The two bronze doors for the Adelphi Bank, designed by Mr. Caröe, with figures and bas-reliefs by Mr. Stirling Lee, form an interesting piece of work, and illustrate that uniting of the forces of architect and sculptor which is common in France, but not often realised in England. The doors, a drawing of which, with their architectural framework, was published in the *Builder* for Dec. 10, 1892, show a series of small deep niches on either side in the upper portion, in which are figures standing free, and arranged in couples having historic relation, and symbolical of brotherly love (in reference to the name, "Adelphi," of the Bank)—Achilles and Patroclus, Roland and Oliver, David and Jonathan, Castor and Pollux; with a bas-relief panel between each couple illustrating a point in their joint history. This sculptural treatment is all grouped in the upper half of the door, the lower part being treated plainly. The whole effect is very good and completely suitable to bronze treatment, and this revived use of door decoration to convey a meaning by the aid of sculptural accessories we hope may be a precedent for making use of other opportunities in a similar spirit.

Mr. Mullins's bronze "Memorial Tablet to Dr. Woolridge," a bas-relief kneeling figure grouped with a well-designed scutcheon, is a very good example of this class of work; there is a fine freedom of line about it. Among other examples of decorative design is a clever and spirited design for a newspaper cutter in bronze, by Mr. W. R. Colton; a curved scimitar-like blade, pointed at both ends like a thin crescent moon; near one end a nude figure attached to the blade appears to inspect a paper doubled and loosely stuck on the end of it. There is something of the fancy of the Renaissance about the design, also the same fault which such articles in Renaissance art often show, viz., that the figure is used as a handle for grasping, an inconvenient handle as well as unsuitable aesthetically, but it is clever nevertheless. Miss Rose le Quesne's little group of dancing girls in very low relief, a mantel-piece design, shows that the artist has an original manner and fancy of her own. Miss Amy C. Brewster's "Salamanders," a relief design in bronze, is also very clever and spirited. M. Havenhand's mirror-back in repoussé silver, "Andromache Sorrowing over the loss of Hector," is not very original perhaps, but has the merit of good design and good taste. Miss Honora Rigby's design for a wall fountain may be regarded, we presume, as a sketch model rather than a finished design; it shows Ionic pilasters supporting an entablature, with a sculpture subject between them, and a scalloped basin below; it is capable of being worked out into a very good thing, but the architectural details will want a little refining.

Among the small works of purely sculptural character may be also mentioned Mr. Natorp's low relief medallion head "Bitter-Sweet," Mr. Shannan's pretty group "The Hunter and the Wood Nymph"; a spirited small nude figure, "Vanity," by Miss Charlotte Hunton; and a coloured wax miniature bas-relief of "St. George" by Miss Ella Casella, in which the gorgeous raiment suits well with the process with which this artist's name is identified, but which in a general way we are not very partial to.

ELECTRIC LIGHT AT RUGBY SCHOOL.—Plant is being laid down at Rugby School to light the school buildings, the Art Museum, the Sanatorium and Gymnasium, and all the boarding houses with electricity. The dynamos will be propelled by a two horse-power gas engine of special type, using Dowson's gas, which will be manufactured on the premises. Altogether 15,000 incandescent lamps will be lighted, and as the installation will supply only nine or ten large consumers with known and definite requirements it will be possible to generate the electricity at a cheaper rate than usual, viz., at 4d. or 4½d. per Board of Trade unit.

A THESAURUS OF ARCHITECTURAL DRAWINGS.



WE have before referred incidentally to the immense enterprise proposed to be undertaken by Baron de Geymüller, of the publication of a large collection of phototypes from original and hitherto unpublished architectural drawings existing in the various museums and public and private libraries of Europe. Since then, Baron de Geymüller has been gradually getting his project into definite form, and we have now before us a prospectus describing the objects and nature of the undertaking more in detail, and the conditions under which it is possible to carry it out, together with some specimens of the style of plates which it is proposed to produce.

As every one who is acquainted with architectural literature must be aware, Baron de Geymüller, who was originally educated as an architect, has for many years devoted himself especially to the study of the original drawings of eminent architects, more especially those of the Renaissance period in Italy and France. During a period of thirty years past he has personally examined fifty or sixty thousand unpublished drawings in different collections in Europe. His researches in this field have enabled him already to throw new light on various pages in the history of Renaissance architecture. In his volume on "Les Du Cerceau" he gave us a great deal of new and important information on this family of architects, whose works, extending over a period of about a century, had for a long time, in defiance of the limits of natural life, been popularly attributed to one person only of the name. His studies on "Leonardo da Vinci as Architect," "Les Projets Primitifs pour la Basilique de Saint-Pierre de Rome," "Documents Inédits sur les Thèmes d'Agrippa," illustrated by reproductions from original drawings and sketches, have each in turn thrown new light on the subjects dealt with, and demonstrated the value of this study of original drawings of architecture. These works have been successively noticed at length in our columns as they appeared; and their author's last essay of the kind, on "The School of Bramante," read as a paper at a meeting of the Institute of British Architects in 1891, will be fresh in the memory of many of our readers.

Baron de Geymüller is now desirous to provide for the collection and multiplication by the aid of photography of a large selection from the existing unpublished architectural drawings in Europe, with the double object of preserving a record of drawings, many of which are in a perishing or perishable condition, and which, once lost, are lost for ever, and of bringing these original documents of architecture within the convenient reach of architectural students in all parts of the world. This cannot be achieved however to the extent of publishing a large edition of such a work, and enabling a number of private persons to purchase copies. The proposed scheme is far too vast and too costly to give any hope of that. But what Baron de Geymüller proposes is to issue by subscription an edition limited to thirty copies, which can be subscribed for and purchased by the principal great public museums and libraries in Europe, Australia, and America, so that in all parts of the civilised world, where there are students of architecture, there may be a copy of this collection available in the principal educational centre of the country.

It is estimated that the subscription cost of producing each copy will be 1,000*l.*, the payment of which, and the production of the book, will be spread over five years; the work will be proceeded with as soon as twenty subscriptions have been obtained, and the ultimate issue of the complete work will be strictly limited to thirty copies. It is provided however that at the close of the publication it should be open to the editor to

consider the advisability of publishing separately a special class of the illustrations, or of issuing separately a selection of two or three hundred plates for the use of schools of art, &c., so as to extend the usefulness of the collection in some degree without impairing the special value attaching to the whole unbroken publication. It is only necessary to add—or perhaps it ought hardly to be necessary—that this proposed publication is in no sense a commercial speculation; it is the scheme of a lover of architecture for the benefit of the whole architectural community, and the subscription is merely calculated as what will be absolutely necessary to defray the cost of publication. In case of the death or prolonged illness of the editor, his permanent agents for the work (Messrs. Gruninger and Von der Mühl, notaries, of Basle) are authorised to endeavour to find among his friends in London, Paris, Vienna, Berlin, or Florence a successor qualified to carry on the undertaking.

The precise number of drawings to be published is not finally determined, but it will amount to several thousand, a careful selection being made of the most valuable and interesting among the many thousand original drawings in existence. They will be classed in the first instance according to schools, and then into further divisions lettered A, B, and C. Division A will include drawings giving information on Roman and Mediaeval monuments of importance. Division B will include drawings from the beginning of the Renaissance to the end of the eighteenth century, subdivided into several groups, such as "Monuments no longer existing"; "Monographs of Monuments of special importance in the History of the Styles" (Vatican, Louvre, Pitti Palace, &c.); "Designs which have exercised peculiar influence" (competition drawings for St. Peter's, Florence Duomo, for instance); "Monographs of the Great Masters"; and several other sub-divisions. Division C will include representations of buildings in the backgrounds of paintings, &c., and of still existing models for celebrated buildings.

Among the advantages to be derived from such a publication the editor classes, as already observed, the preservation of the original compositions—"in fifty or a hundred years hence it may be too late"; the increased importance given to numerous drawings dispersed over Europe, by juxtaposition and comparison; the creation of new sources of information and suggestions for architects; the giving a picture of the development and evolution of architectural thought during the period leading up to the present day; the affording of information for the preservation and restoration of historic monuments, &c. Such are some of the advantages which are claimed as likely to arise from this scheme, and it can hardly be said that they are over-estimated.

The specimen plates which have been forwarded to us serve to give an idea of the nature of some of the drawings which would be included in the work. Sheet No. 1-3 contains an example of the architectural backgrounds to paintings, from a painting by "An Unknown Umbro-Tuscan Master," from the collection of M. E. Foulc of Paris. This is a picture, apparently a Marriage of the Virgin, showing an unusually curious and elaborate example of the kind of architectural scenery, in perspective section, which the early Renaissance painters were so fond of adding to their representations of sacred subjects. It exhibits a most singular mixture of Gothic and Classic feeling; large trefoiled arches springing from thin wooden shafts with capitals of a Gothic type, circular arches in the rear springing from fluted pilasters with Classic capitals, a flat timber roof (in section) over the trefoiled arches, and a dome of Renaissance type seen on each side in the rear. Further back on either hand is seen part of a façade of more Renaissance type, with an arcade below and an attic with small coupled columns above. Nothing could be more curious than the whole composition, in which we seem to see

Renaissance architecture actually in process of growing. The same sheet contains two original designs by Bramante, of the class which M. de Geymüller calls "amusing architecture," the meaning of which might be better rendered perhaps by calling them "architectural fantasies," things which one could not suppose to have been intended for execution, but which are merely the pencil-play of a clever architectural artist, unless indeed we might suppose them to be suggestions for temporary architectural scenery for a *fête*. These are from the Soane Museum. Sheet 4-5 is labelled "Early studies for the monument to Gaston de Foix (?)" and contains two drawings by Agostino Busto, called "Il Bambaja," from the collections respectively of the Louvre and of the Duc d'Aumale; designs in which the idea of a monument framed in Classic architecture, with columns standing boldly out on projecting pedestals, and with sculpture introduced at every available point, is suggested with a boldness and richness that is redolent of the spirit of the Renaissance. Sheet 6-8 contains Salomon de Brosse's plan for the Protestant temple at Charenton, destroyed in 1685, and the facsimile of the signature of the builder, in the sumptuous decorative handwriting characteristic of the period. A fine frontispiece of a title-page for a book on the Orders appears on the same sheet, "Faite par Gille Salué," and dated 1662. These are from the collection of M. Destailleur, the eminent French architect. Sheet 9-11, from the same collection, gives three sheets of a very curious collection of sketches for spires in the Renaissance style, "Compositions for a Treatise on Architectural Spires," attributed to Rubens, for Peter Paul was also among the prophets in regard to architecture. Sheet 12-14 consists of drawings for a treatise on Cupolas, by the same hand, whether that of Rubens or not. Sheet 15, from M. Destailleur's collection, is a bold and fantastic drawing by G. M. Oppenordt (1672-1742) for part of a façade for a proposed "Théâtre Lirique et Harmonique" for Paris; a thing terrible in taste, according to our ideas (it would not shock French architects so much), but showing vigour enough in fancy and execution. No. 16, the last of the specimens, brings us back to more Classic sobrieties of architecture, being a geometrical elevation of the design by Pierre Contant d'Ivry (1698-1777) for the Hôtel de Ville for Paris; this is from the Destailleur collection, and is labelled "original drawing for the engraving of 1767." The centre is finely treated; the whole stands on a plateau with powerfully rusticated retaining walls; flights of steps lead up to the plateau, from which again a great flight of steps on each hand leads up to the sides of the central portico, above which is a cupola of rather ugly outline. The main portion of the front is stopped by a pavilion with a cupola at each end, a columnar order being carried along the recessed portions of the front, and repeated by a pilaster order on the pavilions. The weak point of the design is in the end wings, which are somewhat mean in effect and badly joined on to the centre. But in the main this is a very dignified design. The front of the rusticated retaining wall of the plateau is decorated by niches from which fountains discharge.

Taking these few examples as a mere bit cut out of the collection which M. de Geymüller promises us, one cannot but share his enthusiasm for a scheme which would bring within general reach of architectural students several thousands of architectural drawings of such interest as these, and which may be the means moreover of preserving to future generations drawings which it may be difficult to preserve in their original state for any great length of time. We hope that the scheme may find sufficient support to be carried out; and if so, surely there ought to be an effort made to secure one subscription copy for the Library of the Institute of British Architects. We are aware that it would hardly be possible to do

this out of the official funds of the Institute. But it would surely be possible to get up a subscription for five years among the members of the Institute, perhaps with the additional assistance of some who are not members (for even those who are opposed to the general views of the Institute admit the value of its library), to secure for the representative architectural library of the kingdom a copy of a collection which would be of such permanent value and interest. Architecture is not a very wealthy profession; still there are a limited number of members of the Institute who could afford a pretty liberal subscription for such a purpose, and a large number who could afford to assist with a more moderate sum, and we hope the Council of the Institute will take this into consideration. If the scheme is to be carried out, the Institute of British Architects ought not to allow itself to be left outside of it. One hundred subscriptions of 2*l.* a year for five years, or one hundred donations of 10*l.*, would do it. That ought surely to be possible.

NOTES.

THE issue raised by the new investigation of the Metropolitan Water Commission, to which we referred last week, whatever bearing it may have upon the report of the Commission as to the continued use of the waters of the Thames and the Lea, has a special interest for sanitarians and all concerned in water supplies taken from polluted rivers. The question is whether Dr. Barry is mistaken in attributing to the water of the river Tees the epidemic prevalence of enteric fever which occurred in several towns situated in the valley in the summer and autumn of 1890. There are two waterworks by which the water of the Tees is distributed to the districts in which the fever prevailed. The Stockton and Middlesbrough Water Board supply the entire urban districts of Middlesbrough, Stockton-on-Tees, and South Stockton, portions of the urban districts of Normanby, Ormesby, Eston, and Kirkcaldham, and portions of the rural districts of Stockton, Guisborough, Stokesley, and Darlington. The Darlington Waterworks supply the whole urban district and a portion of the rural district of Darlington. The manager of the Stockton and Middlesbrough Water Board, Mr. D. D. Wilson, boldly disputes the conclusion of Dr. Barry, that the evidence establishes the connexion between the water supply and the epidemic, and avers that local outbreaks are accounted for by local insanitary conditions, which also favoured the "spreading" of the disease. The controversy between the official inspector and the local manager depends upon a mass of evidence, as to times and places, numbers and averages, as difficult to sift as any the Commission has taken. The first report of Dr. Barry was published as part of the Annual Report of the Medical Officer to the Local Government Board for 1890-91. This was called an "Interim" Report, and it is the only report as yet in the hands of the public. The final report has been delayed by the preparation of plates to illustrate it, and the annual report of which it forms part, has only just been presented to Parliament. But this final report is that of which the Commission takes cognizance, to the ignoring of the interim report, from which we quoted last week. Early proofs of this final report were forwarded confidentially to the Commission by the Local Government Board, and a copy must have been furnished to Mr. Wilson to enable him to prepare his reply and refutation. It was in elucidation of these, which were voluminous and elaborate, that he was examined on Tuesday and Wednesday; and next week Dr. Barry is to have the opportunity of vindicating his reports against the criticisms of Mr. Wilson. Except so far as Mr. Wilson quoted Dr. Barry's final report for the purpose of replying to it, it was a

private document; but it is not suggested that it differs from the interim report except in circumstantial details. Mr. Wilson was a good witness, and came well out of severe cross-examination on the case he presented, which, at first blush, seems a strong one. If it should be held that he has exculpated Tees water, or cast doubt upon its share in originating the epidemic, doubts may be entertained as to which water has been wrongly condemned in other cases. Mr. Wilson's description of the rapid clogging of the filters by flood-water, which is specially indicted in this case, seemed almost to justify the suspicions he had tried to remove, by indicating such exceptional impurity that the water ought not to have been taken at all, if it could have been dispensed with by drawing on an adequate storage.

WE have elsewhere given some particulars as to the New Asylum at Claybury, which was formally opened or inaugurated by a concourse and speech-making last Saturday in the Recreation Hall. We published a view and plan of the Asylum, as intended, in the *Builder* for Nov. 23, 1889; the design then given has not been materially altered. There is of course little to be said about such a building in the architectural sense; it was not intended, nor was it possible, that much could be spent on architectural effect; and Mr. Martineau's reflections as to the effect which the building might have on the asylum planners of a past generation, could they see it—whether they would take it for a royal palace, &c.—may be regarded as a very typical specimen of a chairman-of-committee's eloquence. The recreation hall, which is the only part of the interior in which architectural effect could be considered, is a good room, not troubled with too much refinement in the architectural detail or in the colour of the decorative glass in the windows, which might have been better; the lower part of it is well treated with a sumptuous oak wainscoting and a decorative stoneware ventilating frieze over it. As a matter of taste and appearance, we should have preferred not to see the oak varnished, but cleanliness and sanitary considerations are no doubt on the side of the varnish. In all the other portions of the building the architectural treatment seems just what it should be for a building which had to be finished in a plain and inexpensive manner, and the day-rooms for the patients are really charming rooms. A walk through a great asylum like this, while the rooms are empty, enables one the better to appreciate the advantages of the *échelon* system of plan, as we enter one block after another and find each day-room extending out into the sunlight quite clear of the last block. We do not know why the nurses' rooms are given plate glass while the patients are given small panes; we presume the plate glass is considered preferable and only denied to the patients from risk of breakage. In our opinion the result is that the patients have the best of it, and that their rooms are far more homelike and comfortable-looking than those of the nurses. A large audience assembled to hear the speeches, and considering how commonly the architect is entirely passed over and forgotten on these occasions, it was gratifying to hear from one of the speakers that the committee had only one feeling towards their architect—"that of entire satisfaction from first to last"—a sentiment which was cordially applauded.

A PLAINTIFF, a tenant, has at length succeeded in winning an action brought against his landlord for a breach of warranty and false representation as to the sanitary condition of a house. A common jury, in the case of *Jordan v. Morley*, has given the plaintiff 60*l.* damages, which may perhaps pay out-of-pocket expenses which were caused by the illness of the inhabitants

of the house. But the fact that in this particular case the plaintiff has succeeded in proving to the satisfaction of a jury that there has been a false representation, and that the drains, instead of being in good condition, were full of black slime, and emitted foul smells, should not encourage would-be tenants to do without a preliminary survey of the drains before entering into a contract of tenancy. We have over and over again said that no prudent man will rely solely on the representation of a landlord. This very case is a warning, because to obtain a sum by way of compensation, after an expensive and troublesome lawsuit, cannot make up for the annoyance and trouble caused both by illness and pecuniary losses, which might have been entirely avoided by a short survey by a competent and honest builder before the house was entered and the contract made. Besides, it does not follow that the next common jury which has to try a similar case on similar facts would arrive at the same conclusion. A preliminary investigation is therefore the only safe course.

AT the joint meeting of the Manchester and Salford Sanitary Association and the Ladies' Health Society, held in Manchester Town Hall on the 15th inst., a paper was read by Dr. W. H. Barr, the Medical Officer of Health for the Town of Bury, on "The Relative Purity of Air in Schools and Cotton Factories." Great outbreaks have repeatedly been made respecting the vitiated air of weaving-sheds and spinning-mills, and have resulted in legislation which has proved beneficial alike to employers and employed. Dr. Barr set himself the task of comparing the much-abused workshops with schools and class-rooms, and, at the meeting last week, he presented the result of his investigations in tabular form. The figures showed that the air in the worst class-room contained three times as much carbonic-acid as that in the worst weaving-shed. This is a somewhat startling fact, although a little consideration might have revealed its probability; for each child in a school or class-room has a floor space of only 10 or 12 square feet, while each worker in a weaving-shed has probably not less than ten times that area. Of course more dust would be present in the weaving-sheds than in the schools. Dr. Barr was of opinion that, since much improvement had been effected in cotton factories by the Cotton Cloths Act which came into force in 1891, so in like manner even better results might be anticipated from a somewhat similar measure applied to schools. After some discussion, a resolution was adopted instructing the Council of the Association to communicate with Mr. Ackland, with a view to some general action being taken in the matter. We do not see that any further legislation is needed on the subject, as the Inspectors of Schools have already power to condemn any existing schools which they consider to be sanitariously imperfect, and the Architect to the Education Department can refuse to pass any plans for new schools, which do not show suitable means of ventilation. What is wanted is a standard in each case: for new schools, a minimum area of inlets as well as suitable outlets should be specified, and, for existing schools, a minimum amount of impurity after so many hours' occupation should be stated. Architects and Inspectors would then have something definite to guide them. The appointment of a few properly qualified inspectors for the special purpose of testing the sanitary condition of schools would be of great service. We trust that Dr. Barr's paper will result in some effective steps being taken for the improvement of school-ventilation.

WE give a sketch of St. John's Gate, Clerkenwell, which is to be reopened to-day (Saturday), by the Prince of



Wales, after repair and restoration. We gave some information about it in a Note in our last issue (page 463).

IN America the artificial heating and ventilation of large buildings, or as they are there called, halls of audience, has been the subject of many writings, books, articles and pamphlets; but we do not always find that the results are as satisfactory as the amount of writing would lead us to expect. We fear that in some respects our Transatlantic cousins are on the wrong track, and this has especially been forced on our notice by reading in a pamphlet recently received arguments in favour of ventilating large rooms by admitting fresh air at the top and extracting at the bottom. As an illustration of this method, which we have in this journal uniformly condemned, we find quoted the Carnegie Music Hall in New York, in which it is stated that an equable temperature is maintained under any external atmospheric conditions. Our experience of the temperature of the topmost seats in that hall, on the occasion of a sacred concert when the house was crammed full, was not pleasant. The atmosphere was both unbearably hot and unhealthy close, although we should have been the recipient of the freshest incoming air. The thermometer outside the building was in the neighbourhood of zero, and our insular constitution found the American fresh heated

air inside quite overpowering. There can be little doubt that the absurdly high temperature of American buildings and conveyances in winter is a chief cause of the abnormal amount of pneumonia from which the people suffer.

ON Saturday the 17th inst., the Junior Engineering Society visited the central station of the London Electric Supply Corporation at Deptford, and were conducted over the works by Mr. C. S. V. Brown, one of the engineers-in-charge, who courteously explained the details of the machinery and the general arrangements of the station. The opening of the Deptford station, which is one of the largest in the world, and will, when complete, be by far the largest, dates from the end of 1889; but work may be said to have practically begun, on anything like the present scale, in February, 1891, after the fire at the Grosvenor Gallery Station made it advisable to remove the plant there to Deptford. The most recent additions to the plant are a 300 h.-p. alternator, now in use, with Thüry exciter run on the same shaft, and another similar machine shortly to be set up. Since these, like the machines removed from the Grosvenor Gallery Station, are 2,500 volt machines, it is necessary by means of step-up transformers to raise the potential to 10,000 volts, at which pressure the current is transmitted to London. Other alternators at the station generate currents

at 10,000 volts, which is transmitted direct by the mains. For some years the steam-engines used at the station were non-condensing, but, recently, condensing plant has been added, for which the proximity to the river is a great convenience. The boilers are provided with Green's economisers for heating the feed-water, and steam is conveyed from them to the engines by a multi-tubular steam pipe, patented by M. Ferranti, consisting of seven 3½-in. solid drawn copper pipes, which, being free from any brazing or soldering are able to withstand the high boiler pressure of 200 lbs. to the square inch. Since these have been introduced there has been no trouble from leakage or explosion of steam; before that, besides minor troubles, it chanced once that an "elbow" was blown out. All the machines are capable of being run in parallel and are so run at least twice daily. The forced draught engines under the boiler house are only used in cases of fog or other sudden emergency. Since the station has been fully described before in the *Builder* some two years back, on the occasion of a similar visit, we have considered it unnecessary to give any detailed description of the 10,000 volt alternators, the boilers, engines, and other matters interesting to see, but tedious to recount.

THE annual report of the Borough Surveyor of Richmond (Mr. Lovegrove) shows that the improvement of the sanitary condition of the district is still in progress. The question of the ventilation of the sewers is unsettled, owing to the fact that the Gas Company in March last withdrew the supply of gas to the Keeling-Holman sewer gas destructors, on the ground that there was danger of an explosion from gas getting into the sewers from leaking mains and thence being drawn into the furnace. It might perhaps be replied that it rested with the Gas Company to see that their mains did not leak. In regard to drainage, nearly three hundred houses have been connected to the public sewers, and the report notes the fact that the connexion to the sewer has been made in each case by the Town Council's own workmen, so as to ensure uniform and satisfactory workmanship at this important point in the drainage system. A plan of the premises, showing the proposed house drain, is now required to accompany each notice of connexion, so that in this way a complete record of the house drainage of the district is being obtained. The testing of all new drains with water commenced in October last, in place of mere examination of the joints, an additional expenditure which is quite justified by the importance of its object. The additional bye-laws as to buildings and new streets were finally approved in February last. These bye-laws provide additional powers in respect of height of rooms, concreting of sites of buildings, quality of concrete and mortar, strength of timbers in roofs and floors, corrugated iron buildings, and position of and access to dust-bins.

IT was announced last week that the Islington Vestry had decided to contribute 6,500*l.* towards the rebuilding of Highgate Archway, the Middlesex and London County Councils give 12,000*l.* and 6,500*l.* apiece, and the Ecclesiastical Commissioners 1,000*l.*, the total cost being computed at 27,000*l.* The reconstruction of this viaduct, which rises to 65 ft. above the Archway-road, was contemplated in 1888, when Mr. T. de Courcy Meade, Surveyor to the Hornsey Local Board, prepared two sets of alternative plans for a new bridge of brick and stone. The viaduct carries the road to Hornsey over a cutting that was eventually made to relieve the ascent for the Great North road up Highgate Hill. In 1809 Robert Vazie propounded a scheme for driving a tunnel 24 ft. by 18 ft. and 1,075 ft. long, through the hill, but Rennie's proposal to shorten the tunnel

to about 760 ft. by two open cuttings was adopted. After 390 ft. of tunnelling had been bored, the works fell in (April, 1812), so an open cutting throughout was finally decided upon, to be crossed at Hornsey-lane by the present archway, which is built in two stories, as it were, the lower being 36 ft. high and 18 ft. wide, and has (we read) its main and three minor arches turned underground just as they are above. It cost, together with the approaches, nearly 104,000*l.*; the tolls for the road beneath were abolished in 1876, in terms of 24 & 25 Vict., c. 28 (Holyhead Road Relief Act, 1861), for a composition of 9,000*l.* We fear, if one of the designs formerly shown to us is to be carried out, that there is little chance of the new archway having even the degree of architectural dignity and character which belongs to the existing one.

AT their meeting on the 8th inst., the Common Council resolved to purchase a site in Basinghall-street for an extension of the City of London Court, built 1887-8, after the designs of Mr. Andrew Murray, and of which we published the ground-floor plan and elevation on December 24, 1887. They also agreed to expend about 6,300*l.* upon the erection of a gas-meter testing office, a gas-examiner's office, and police stables, in lieu of the premises in the City Green-yard which serve for those purposes. The entrance into the yard—above which is inscribed:

"THE
CITY GREEN YARD
1771."

is on the east side of Whitecross-street, opposite the site of the door of the debtors' prison, built in 1813-5, after the designs of W. Montague, City Surveyor, and now replaced by the Midland Railway Company's Depot. A small court on the right hand, by the police stables, is formed by the two blocks and a high blank wall of "Gresham's Almshouses" (at present vacant) which were built for the eight poor men upon Sir Thomas Gresham's foundation who had been lodged at (old) Gresham College, when the latter was pulled down in pursuance of 8 Geo. III. A few years ago the almshouses were removed to new buildings at Brixton. The further end of the yard is occupied by a house for the civic state-coach and by the Lord Mayor's stables. The coach is generally believed to have been built in 1757, and painted by Cipriani and Catton; though some say that in 1762 the Corporation purchased the disused royal state-coach and employed Dance to restore its painted panels. In his "Curiosities of London," Timbs quotes a statement of J. H. Burn to the effect that Whitecross and Wood streets were the last to surrender their sign-boards, retaining them until 1773; that is, for seven years after the general removal.

OUR attention has been drawn to a cheap and apparently effective form of level specially suitable for architects and builders by reason of its simplicity. The telescope is adjusted by one screw only instead of the three to which we are accustomed and which are provocative too often of bad temper and loss of time, while the bubble tube is placed beneath the telescope and a pierced reflector within enables the user to see that the level is true whilst taking a reading. This level is made by Herr Georg Baten-schön, o. Bahrenfeld, near Hamburg.

AT the Cutler's Hall, Warwick Lane, E.C., an exhibition is being held by Messrs. Cassell & Co. of drawings in black and white, a large proportion of which have already appeared in some of their numerous illustrated periodicals. Amongst them are a good number of drawings of architectural interest. The largest and most successful of these is Mr. Joseph Pennell's picturesque drawing of the Vicar's Close and Chain Gate

at Wells, a bird's-eye view taken from the roof of the cathedral, and giving a capital idea of the relative positions of the various buildings of this well-known group. This drawing we believe has already appeared in the *Magazine of Art*, in illustration of a paper on Wells, but, as is unavoidable, the drawing loses considerably in the reproduction. Mr. Herbert Railton and Mr. Holland Tringham contribute a large number of drawings, chiefly in London. The most noticeable drawings of the former artist are:—Two or three views of the old Emanuel Hospital, James-street, Westminster; the quadrangle of Somerset House; Whitehall Gardens; Buckingham Palace; the entrance to Cawdor Castle, Dublin Castle, and Naworth Castle; and a charming pen-and-ink drawing of the Castle of Falaise. Amongst Mr. Tringham's drawings are some good ones of Westminster School and New Palace Yard, Westminster. Mr. J. Fulleylove has some drawings of Temple Newsam and Knowle House, Sevenoaks, the latter a general view from the south-east, showing well the picturesque gables and chapel of this interesting building. Besides there are a large number of drawings of figures and land and sea scenes by various well-known artists. Foremost among them are Mr. W. L. Wyllie's "Shivering Land Bell Buoy" (1909), a "Wreck on the Goodwins" and "Jennetree Point." Mr. Arthur Lemon's drawings illustrating the story of the "Centaur," and some exquisite drawings by Mr. William Hatherell, chiefly abroad.

THE committee for the restoration of St. Mary Magdalen parish church, Great Hampden, have entrusted the work to Mr. J. Oldrid Scott, architect, whose estimate for a complete reparation amounts to 1,963*l.* In our "Notes" of August 11, 1888, we gave a brief account of the brasses in this church which commemorate members of the Hampden family, with the monumental tablet that Lord Trevor, afterwards Viscount Hampden, erected *circa* 1754, in memory of John Hampden, the patriot. A sum of 200*l.* already subscribed, will, it is stated, defray the cost of re-instating the exterior of the chancel which stands in need of speedy repair.

THE erection of modern office buildings has been carried to a higher pitch of development in America even than here, and the elements that command financial success are closely studied, and in our New York contemporary, the *Architectural Record*, of the 30th ultimo, are discussed under the heads: (a) Ease of access; (b) good light; (c) good service; (d) pleasing environment and approaches; (e) the maximum of rentable area consistent with true economy; (f) ease of rearrangement to suit tenants; (g) minimum of cost consistent with true economy. We are pleased to note that the provision of a little sun in each office during part of the day is advocated. Heating and ventilation and electric lighting are to be provided by the landlord for all offices, and lifts or "elevators" are, of course, a *sine quâ non*. Naturally the number of lifts depends upon the number of stories and the number of offices on a floor, as well as upon the speed of working. In no case should a person have to wait longer than forty seconds for a lift-car. This sounds like quick work; but we have found that this desideratum is often obtained in American office buildings.

SOCIETY OF ARTS.—The Annual Conversation of the Society of Arts is announced to take place on Friday evening, June 30, at the Imperial Institute, South Kensington. The bands of the Scots Guards and the Royal Artillery will perform a selection of illuminated, and the Galleries of the Institute, containing the Colonial and Indian collections, will be open for inspection.

PHOTOGRAPHIC APPARATUS.—As some architects like to take their own photographs, we may draw attention to the catalogue of photographic apparatus which includes among other things various notions for rendering photographic apparatus conveniently portable.

ROYAL INSTITUTE OF BRITISH ARCHITECTS:

PRESENTATION OF THE ROYAL GOLD MEDAL.

THE closing meeting of Session 1892-93 of the Royal Institute of British Architects was held on Monday evening last at Conduit-street. The meeting was preceded by a reception in the Lower Galleries, and at half-past eight the members and visitors (including a large number of ladies) adjourned to the meeting-room, where the President, Mr. J. Macvicar Anderson, took the chair.

After the transaction of some formal business, Mr. W. Emerson, Hon. Sec., read translations of the following letters:—

"Paris, 15 juin 1893.
MONSIEUR LE PRÉSIDENT.—En vous accusant réception du diplôme qui me confère le titre de membre honoraire correspondant de l'Institut Royal des Architectes Britanniques, je viens en même temps vous prier d'accepter pour vous-même et de transmettre à vos collègues l'expression de ma plus vive gratitude.

La distinction si rare et si enviée que l'Institut Royal m'a accordée est faite pour m'honorer au plus haut point; j'en suis d'autant plus touché et plus fier que cette marque de sympathie est donnée à celui qui ne peut revendiquer que le titre d'archéologue par des artistes éminents, par des créateurs, qui affirment ainsi la solidarité entre l'art et la science.

Je n'oublierai pas, d'un autre côté, qu'en m'agrégeant à une société si justement célèbre vous m'avez imposé des obligations: je m'estimerai très heureux de pouvoir prendre part aux travaux de l'Institut Royal et de justifier par mes efforts la confiance que vous m'avez fait l'honneur de me témoigner. Veuillez agréer, monsieur le Président, l'hommage de mes sentiments de haute considération.

EUGÈNE MUNTZ.

Monsieur le Président de l'Institut Royal des Architectes Britanniques.

"Paris, le 16 juin 1893.
MONSIEUR LE PRÉSIDENT ET TRÈS HONORÉ CONFRÈRE.—Je suis très reconnaissant de l'honneur que me font les membres de l'Institut Royal des Architectes Britanniques en m'invitant à assister à la remise à mon éminent confrère et ami, M. Hunt, de la médaille d'or de S.M. la Reine d'Angleterre, Impératrice des Indes. Cette suprême récompense vient couronner la vie laborieuse de l'artiste, et j'aurais été heureux de me joindre à mes confrères anglais en cette solennité pour porter la santé de Sa Majesté et de M. Hunt.

Par une coïncidence que je regrette, le lundi 19 a lieu l'ouverture du Congrès annuel des Architectes français, et j'ai pour devoir de présider cette première séance, ce qui me prive du plaisir d'être à la réunion de "Limmer's Hotel."

J'ai donné connaissance aujourd'hui à une assemblée générale des membres de notre Société centrale de la gracieuse invitation qui m'était faite, et mes confrères ont voté à l'unanimité des félicitations pour notre sociétaire M. Hunt, de vives acclamations en l'honneur de nos confrères de l'Institut Royal.

Veuillez, monsieur le Président et très honoré confrère, agréer l'expression de mes meilleurs sentiments confraternels.

Le Président de la Société Centrale des Architectes Français, Membre de l'Institut,

H. DAUMET.

Monsieur John Macvicar Anderson,
Président de l'Institut Royal des
Architectes Britanniques.

A letter was also read from M. Charles Garnier, architect of the Grand Opera, Paris, and a former Royal Gold Medallist of the Institute, regretting his inability to attend the meeting owing to indifferent health.

In addition, it was announced that a letter had been received from M. César Daly, of Paris (last year's recipient of the Royal Gold Medal) regretting his inability to attend owing to the illness of Madame Daly.

The President said that on such an occasion as the present it was of course gratifying to see present amongst them as many of the past Gold Medallists as possible. It was with sincere regret that they had received letters from M. Garnier, M. Daumet, and M. César Daly explaining their inability to be present, but he was pleased to see present on that occasion past Gold Medallists in the persons of Sir Henry Layard, Mr. Ewan Christian, Mr. Charles Barry, and last, though not least, Sir Arthur Blomfield.

The President, who on rising to make the presentation of the Royal Gold Medal was received with applause, said:—

Colleagues and Gentlemen,—For the third time it becomes my privilege, as your representative, to present the Gold Medal which Her Majesty the Queen graciously confers each year on such distinguished architect or man of science of any country as may have designed or executed a building of high merit, or produced a work tending to promote or facilitate the knowledge of

Architecture in the various branches of science connected therewith. Two years since I was permitted to be the medium of conferring this honour on an eminent English architect, whose name and works are alike appreciated and known by all in the realm of art—Sir Arthur Blomfield. Last year, no one who was present on the occasion can have forgotten the venerable Frenchman who accepted from my hands this gift of the Queen, or the striking address in which he testified his appreciation of the honour—an address which, as we were subsequently informed, had been perused with no ordinary interest by Her Majesty. It is gratifying to know that the prolonged and active life of Monsieur César Daly is still absorbed in the study of the art to which he has dedicated his powers, and enabling to find octogenarian energy of such exceptional vigour devoted to the pursuit of a cause so commendable, so irreproachable, and so well calculated to benefit society. I have thus experienced the happiness of presenting this Royal gift to an Englishman and to a foreigner; but when I regard the proceedings in which we are now engaged, I feel some difficulty in deciding what is the nationality of the recipient of the Royal Gold Medal in 1893; for the distinguished architect whom it is at once our pride and our privilege to be permitted to honour can scarcely be defined either as an Englishman or as a foreigner. He is no doubt an Englishman in the sense that he speaks the Anglo-Saxon language, but on the other hand he is not an Englishman in the sense that he was born, and finds a domicile, beyond the limits of the British Empire. He is no doubt a foreigner in the sense that the scene in which he has achieved celebrity is not British soil, but on the other hand he is not a foreigner in the sense that his nationality is so intimately linked to our own that we scarcely regard it as separate or distinct. What shall I say, then? If he is not an Englishman, and if he is not a foreigner, there is but one word in our vocabulary that will truly describe his nationality—he is an American. Thus, whatever interest may have been associated with any or all of the forty-five eminent men on whom this Medal has been conferred, it is obvious that the present occasion has no parallel, and is indeed unique; for we are about to do honour to a citizen of the great Western Republic, one whose name we are proud to enrol as one of our Royal Gold Medalists—not only on account of high personal and professional merit—but also because he is the first American whose name will appear in that roll-call of illustrious artists. That the selection should this year have fallen on one who has designed the principal building in the great Columbian Exposition which attracts the world's sight-seers to Chicago at the present moment, and which will hereafter associate the name of America with the most wondrous development that international exhibitions have ever reached, or are ever likely to attain, is to say the least, a singularly fortuitous coincidence. In honouring Mr. Hunt in recognition of his eminence, and of his works as an architect, we rejoice that we are thus able to pay a graceful tribute to the United States in the person of one of her most distinguished sons.

The art of a new country is necessarily devoid of the native inspiration and guidance to be found in the history of centuries, and in ancient monuments, which are the glory of older countries. In the case of America, the possession of boundless resources and of illimitable wealth—the rapid development of which almost appals us—without the accompaniment of the experience of the past to guide lavish indulgence, presents a condition which in respect of art is beset with temptation, and pregnant with danger, for without the restraining curb of necessity, broad and easy is the road from luxury to extravagance, from liberty to licence. In such circumstances, who will be so bold as to define or limit the influence exercised, for good or for evil, by the early masters of the arts in America? It cannot but be well, indeed, that the development of her architecture has been inspired by one possessing the refined taste, the educated judgment, and the cosmopolitan experience, of Richard Morris Hunt.

On the other side of the globe—even in these days of rapid intercommunication—men are born, rise to eminence, guide the interests of vast communities, reap great honours, and pass away, creating comparatively little stir in the popular imagination here at home. Hence, if the name of Mr. Hunt—although well known to us—is not a household word in England to the same extent as it is in America, it is not because his achievements are less renowned, or his works less important, than those of men whose names are more familiar to the public here, but simply because we are geographically separated by the

few thousand miles known as the Atlantic Ocean. I offer no apology therefore—unless it be to Mr. Hunt for referring in his presence to his life and work—if I venture to review some of the more prominent particulars of his career, which I feel sure cannot fail to be of interest to us all.

Mr. Richard Morris Hunt, born in Brattleborough, State of Vermont, in 1828, comes of an old New English family, and is the son of the late Honourable Jonathan Hunt, Member of Congress. On his father's death his mother removed to New Haven, and his education was commenced at French's school, and continued at the Boston High School and Latin School. In 1843—at the age, therefore, of 15 he accompanied his family to Europe, and entered a school at Geneva, commencing the study of architecture with Samuel Darier. From Geneva he went to Paris, and studied under Hector Lefuel entering the Ecole des Beaux-Arts in 1845. On leaving the Ecole he travelled through Europe, Asia Minor, and Egypt, and on his return to Paris in 1854 he received from the French Government the appointment of "Inspecteur aux Travaux" on the new buildings uniting the Tuileries to the Louvre. His master, Lefuel, having, during his absence, succeeded Visconti as architect, he was put in charge of the Pavillon de la Bibliothèque, opposite the Palais Royal, and had the honour of making, under Lefuel, all the studies and full-size drawings of that Pavillon.

Having thus stored his mind with a knowledge of some of the celebrated monuments of the Old World, and acquired practical experience, he returned to America in 1855—at the age of 27—and spent about six months in assisting the late Thomas U. Walter at the Capitol of Washington. He then, at New York, commenced the practice of his profession, to which he has enthusiastically devoted his powers throughout an exceptionally busy and distinguished career.

Shortly afterwards he took an active and a prominent part in founding the American Institute of Architects, a body which now has chapters in various parts of the United States. He succeeded R. M. Upjohn and Thomas U. Walter as President, and subsequently was elected President of the Institute under its reorganised constitution. He was also for several years President of the New York Chapter of the American Institute.

Soon after commencing his career in New York, Mr. Hunt opened an architectural atelier for students on the French system, thus demonstrating in a practical form the native energy of his mind, and the influence which his European studies had exercised. Many of the leading architects in America to-day—such men as Professor William R. Ware, George B. Post, Frank Furness, Henry van Brunt, Charles Gambrill, and others—were students in this atelier, and it is natural that Mr. Hunt should feel proud of the eminent position they have achieved, for who will venture to say how much they owe to the teaching and inspiration they received in the first American atelier!

In 1867 Mr. Hunt served as a Member of the Fine Arts Jury at the International Exposition in Paris; in 1876 he held the same office at the Centennial Exhibition in Philadelphia; and in this present year of grace he has served as a Member of the Fine Arts Jury of Selection, and as President of the Board of Architects, at the World's Columbian Exposition at Chicago.

In 1882 Mr. Hunt received from the French Government the decoration of the Legion of Honour, and was elected a Corresponding Member of the Institut de France in the following year. He is an Honorary Member of the Société Centrale des Architectes Français, and of the Architects and Engineers' Society of Vienna; and an Academician of St. Luke at Rome. He has been highly honoured by Harvard University, the oldest and foremost seat of learning in America, which conferred on him the degree of LL.D., the first ever conferred by that university on an artist. Lastly, we have ourselves the honour of claiming Mr. Hunt as one of our Honorary Corresponding Members; and, in anticipation of the more intimate relationship we are now about to assume, it may not be uninteresting to note the views which have been expressed on behalf of both the United States of America and of France with reference to Mr. Hunt's acceptance of the honour which we are now permitted to be the medium of conferring on him.

In reply to an invitation to be present on this occasion, His Excellency the American Ambassador in London has addressed to the Secretary of the Royal Institute the following letter:—

"Embassy of the United States, London,

June 14, 1893.

SIR,—Mr. Henry White, Secretary of this Embassy,

has acquainted me with the contents of your note to him of the 13th instant, in which, on behalf of the President and Council of the Royal Institute of British Architects, an expression of their desire is made that, as the Ambassador of the United States, I should be present on the occasion of the presentation of Her Majesty's Gold Medal for Architecture to Mr. Richard M. Hunt, of New York, in recognition of his executed works as an architect.

Nothing would be more gratifying to me personally—nothing more gratifying to the people of the United States than my presence as their representative on an occasion so honourable and of such just distinction to a citizen so eminent in the great profession he has so long adorned.

Of Mr. Hunt's professional skill as an architect, sustained, as it is, by his personal merits as a high character, there is in his own country a consensus of opinion; and to know that his renown has surpassed the limits of his native land, and has met the well-earned applause of the most competent critics of other nations, is a just cause of national pride, which I am sure will be felt when the announcement of the proposed honour to him shall become publicly known in America.

Under instructions of my Government, my first duty to Great Britain is the presentation of my credential letter to Her Majesty, and until this shall have been accomplished it would seem proper that I abstain from other acts of an official nature. Therefore, I have asked Mr. Henry White, the Secretary of this Embassy, to be present as a representative of the Government and people to whom honour is paid when it is bestowed so deservedly upon their distinguished compatriot Mr. Hunt, and I am, Sir, most respectfully, your obedient servant, T. F. BAYARD.

From France the President of the Société Centrale des Architectes Français thus addresses Mr. Hunt:—

"Paris, le 8 avril 1893.

MON CHER ET HONORÉ CONFRÈRE, — Le Bureau et le Conseil de la Société centrale des Architectes français m'ont chargé de vous adresser les vives félicitations de notre Société pour l'honneur si justement mérité, que vient de vous conférer l'Institut royal des Architectes français, en vous octroyant, cette année, la grande médaille d'or de la Reine d'Angleterre.

C'est, croyez-le bien, une profonde satisfaction pour nous de voir attribuer cette haute et rare distinction à un architecte que beaucoup d'entre nous ont connu, estimé et aimé comme condisciple à l'Ecole des Beaux-Arts à Paris et comme collaborateur d'un de nos maîtres les plus éminents, M. Lefuel.

Nous aimons à penser que c'est un peu l'architecture française qui vient d'être honorée en votre personne en même temps que l'architecture américaine.

En tout cas, c'est de grand cœur que je me fais l'interprète de félicitations, auxquelles je m'associe pleinement, envers un membre correspondant de la Société centrale des Architectes français, envers un artiste si vaillant et ses mérites ont valu le titre de correspondant de l'Académie des Beaux-Arts.

Veillez agréer, mon cher et honoré confrère, l'assurance de mes meilleurs sentiments confraternels.

Le Président de la Société centrale des Architectes français, Membre de l'Institut, H. DAUMET.

I have referred to these communications because it is pleasant to be thus assured that he whom we delight to honour is held in equally high regard by his compatriots alike in the United States, and in France. To describe in detail the work of an architect whose practice has been extensive and varied entails considerable labour, and it would seem to be superfluous in the present case. Mr. Hunt's principal works, most of which are of Classical design, are characterised by both vigour and purity in composition; and many of them are well known to some here this evening.

I have said enough to demonstrate, were demonstration required, that the recommendation of the name of Mr. Richard Morris Hunt, which we humbly submitted to Her Majesty, is not merely justified by the meritorious works and by the distinguished career of the man, but has been confirmed by the unanimous testimony of those who are best able to judge of his qualifications, both in Europe and in America.

Mr. Hunt, in presenting to you this Gold Medal, the gift of Her most Gracious Majesty Queen Victoria, I hand you what is the typical embodiment of the recognition by British architects of your distinguished and honourable career, and of the high architectural merit of your works. The fact that you have travelled some thousands of miles in order that you might personally receive this medal may be accepted as sufficient evidence of the high estimation in which you rightly regard the honour. It is, indeed, the highest which we are graciously permitted to offer to the most illustrious architects of the world, and we indulge the hope that our American brethren will recognise in this Royal gift, which we are privileged to present to their most eminent representative, the embodiment of the hearty good will, the sincere respect, and the ardent admiration with which they are regarded by the architects of the Old World.

Mr. Hunt, in replying, said it would be useless to say that he was not in a most embarrassed position. Nothing that he could say would fairly represent his feelings of gratification and gratitude and thankfulness to the Institute. He had been honoured with numerous decorations by different Institutes and Societies, but the present gift of Her Majesty the Queen had a peculiar charm about it: it was presented by one's own

confrères. He accepted it, and was proud of it—proud of it for his country; for in accepting it he accepted it not altogether as a personal distinction or a personal honour, but as an honour conferred upon the whole profession in the United States, in which light it was so regarded “on the other side.” Indeed, he would sub-divide the honour with France. The Société Centrale des Architectes Français claimed a part of the honour, and rightfully so, because to the École des Beaux-Arts of France he owed everything. In the letter which had been read from the Société Centrale allusion had been made to his collaboration with his old *patron* M. Lefuel, in the work at the Tuileries, and it might perhaps be of interest if he said a few words, by way of historical reminiscence, about the troubles and difficulties with which the architects for the completion of that work were met. He did not know that anybody now living knew the facts as he knew them. They all knew that the extensive works at the Tuileries and Louvre were commenced by Visconti, who made his designs for the work in the Empire style, like that of the Pavillon Marsan, facing the Rue de Rivoli. Although Visconti was a man of great merit, it was in his (the speaker's) opinion, a godsend to France that he was replaced by M. Lefuel, because Visconti's work was not fairly representative of French architecture. When M. Lefuel was asked to undertake the work he made it a condition of acceptance that he should have a *bureau des études*, and that the work should be carried out in the French style, taking as a guide the *petite façade* of the Louvre. But there were great difficulties in the way of the completion of certain portions of the works. Thousands of men were employed, whom it would not have been politic to dismiss, and everything had to be driven. The *épaulement* had to be carried up according to Visconti's designs, and while that was being carried up the *bureau des études* was engaged in working-out a totally different design. He merely alluded to this because there was one fault, he thought, in the Pavillon de la Bibliothèque, opposite the Palais Royal, namely, that the Ionic order on the second story was a little slim. The reason of that was that they could not get anything more out of it. What they wished to have there was the Ionic order of Philibert Delorme, which was that of the old Tuileries, but the *épaulement* having gone up in the shape in which it had gone, there was not sufficient stone left for the borders which Philibert Delorme would have introduced. The order was therefore a bit slim, though it was not the fault of M. Lefuel, who wanted to correct the defect by introducing marble bands such as Philibert Delorme used in the old Tuileries. But he was perhaps becoming too tedious with these historical points. Since he had known that he was to be the recipient of the Royal Gold Medal, he had felt, frankly, that he had been too much favoured as a follower of their profession. It was true that he had worked in it for now forty-nine years, but at the same time he had perhaps received too many compliments and decorations: he would, however, excuse the Institute for having been the medium of presenting him with the Gold Medal. But since he had to receive that honour and there was no honour that he should esteem more highly—he did not think that the time of its presentation could have been better selected than in the present quadricentenary of America, which was being celebrated in the large Exhibition buildings prepared for the “World's Fair” at Chicago. Did time permit, he should like to explain the *modus operandi* of the carrying out of those buildings. Generally speaking, all other nations proposing to hold a great exposition had “taken Time by the forelock,” but that was not the case in regard to the World's Fair. It was a long time before the site could be agreed upon. New York wanted the Exhibition, Washington wanted it, and Chicago wanted it, and finally it was given to Chicago within less than two years of the time fixed for the opening. As it was unquestionably the greatest exhibition that had ever been held, in point of area, at any rate, not much time had been lost. Almost the first question that arose was whether they should appoint an architect to design the whole of the buildings, whether the different buildings should be put out to limited or free competition, or whether the architects should be selected. The principle of selection was decided upon, and even if he had not been one of the architects selected, he should still have thought that the principle of selection was a wise one, for by selecting the architects for different sections of the work, a great deal of time was saved. Months would have been lost if the buildings had been put out

to competition. The Commission had the pluck to select architects from the different parts of the United States to carry out the various buildings, and the Commission had acted towards the architects in the most liberal spirit, being always anxious to do everything they could to get up an exhibition that should be worthy of the United States. If there was any fault to be found with the Exhibition buildings the architects, and not the Commission, were to blame. The selected architects were called upon to make sketches of their allotted buildings after consultation with each other. They were a board of ten architects, five of them so-called “foreign” architects—i.e., architects not practising in Chicago, being entrusted with the buildings on the great Plaza. When they met they discussed the question of materials, and were reminded that strictly speaking iron construction, glass, and tiles were the proper materials to be used for such buildings. But, they asked themselves, had that problem ever been satisfactorily solved? In his (the speaker's) personal opinion—and he was the chairman of the board of architects—it had not. He did not think that any of the Exhibitions or “World's Fairs” had had the monumental look about them that they should have had. But they asked themselves, if that problem could not be solved in the city of Paris, where they had the best artists and artisans in the world, where they had the work right under their hands, and where they had had a twofold or threefold experience in the matter, would it not be futile and useless for them, at distances of a thousand miles apart, and a thousand miles from their objective, to attempt to solve it? The Fair Grounds to be covered by the buildings were about 600 acres in extent. Would there not be hundreds of small, light, and fancy buildings spread all about the grounds? At any rate, they resolved to seize the opportunity and to give to the buildings something of a monumental aspect—the principal buildings, at any rate. They resolved to work in the Classic style, perfect freedom being given to each architect, except that, in order to prevent one man outweighing another, a module of 60 ft. as the height of the main cornice above the terrace was adopted, excluding towers, &c.; and they determined for the first time to introduce on a grand scale sculpture and painting, which in his opinion were absolute necessities in monumental architecture. To give his hearers an idea of the Administration Building*—the smallest yet the highest and most central of the World's Fair buildings, he would remind them that it covered an area of four acres; it was 280 ft. high, and the dome was only about 6 ft. less in diameter than that of St. Peter's at Rome. On that dome, which had been a great school for painters and sculptors, there were from sixty to eighty groups, with figures from 20 ft. to 30 ft. high. They looked upon that work as an object-lesson for the United States Government. In no country in the world was there so much money spent yearly upon public buildings as in the United States, and yet one man, the Supervising Architect to the Treasury Department, was called upon to build all the new post-offices, Custom-houses, and Court-houses of the United States, from Maine to California, besides attending to keeping all the old ones in repair! Every Congress voted millions of dollars annually for public buildings, and there were on the books of that architect a few months ago at least 300 buildings. They had been trying for several years to break up that system. For one public building in Detroit, Congress had eleven years ago appropriated 1,200,000 dol., and the works were still in the foundations! In regard to other buildings for which appropriations had been made, they had not even sharpened their pencils, or given the matter a second thought. But to return to Chicago. He should like to say that of all the forlorn places that could possibly have been, Jackson Park, the site of the Exhibition, was the most forlorn when he and his architectural *confrères* first saw it. A good portion of it—quite one-third—was under water, but advantage had been taken of that circumstance in the general laying-out of the Exhibition by the introduction of a new and beautiful feature in such exhibitions—that of water communications—an idea due to the genius of Frederick L. Olmstead and Harry Codman. On these waters visitors glided about in electric boats and launches. The earth dug out from these canals was made into terraces in front of the buildings. In conclusion, Mr. Hunt said he had again to thank the members of the Institute most sincerely, not only for himself but for

the profession at large in the United States, for the honour conferred upon him, and he should try to hold himself ready to do all that he could to prove himself worthy of the honour conferred. (Mr. Hunt, on resuming his seat, was warmly applauded.)

The President said that the meeting had already learnt, from the charming letter which he had read from Mr. Bayard, the Ambassador of the United States, the reason why he was absent that evening; but they were favoured with the presence of the Secretary of the Embassy in London, Mr. Henry White.

Mr. Henry White, Secretary of the United States Embassy, said that although he should have thought it superfluous after the letter which had been read from his chief to have trespassed even for one moment upon the time of the meeting, he felt he could not refrain from expressing the very great gratification and high appreciation which not only they of the Embassy, but almost everyone in the United States, could not fail to feel at the great honour done by Her Majesty the Queen, upon the recommendation of the Institute, to their distinguished countryman, Mr. Hunt. It would be superfluous, and indeed presumptuous, in one who had no technical knowledge on the subject, to attempt to refer to Mr. Hunt's valuable services to architecture in the States; but his name was associated in the mind of every American with all that is most progressive and beautiful in the architecture of their country.

Baron H. von Geymüller, Honorary and Corresponding Member of the Institute, said he wished to be permitted, as a Correspondent of the Institut de France and a *confrère* of Mr. Hunt come over from Paris for the present solemnity, to say a few words of the feelings of the Academy of Fine Arts on this occasion. Though he had received no mandate from the Académie des Beaux-Arts to represent the Institut de France at that meeting, he felt that there could be nothing unconstitutional whatever in his simply expressing, like a faithful document, what he knew to be the absolute truth, namely, the great sympathy of all the members of the Academy of Fine Arts who for many years had known Mr. Hunt personally, and the great satisfaction they felt at the high distinction conferred on him that night. Two days previously, at the regular meeting of the Academy of Fine Arts, having asked M. Charles Garnier and the Vice-President, M. Daumet, if they were coming over to the present solemnity, he gathered, from the way in which they expressed their regret at being prevented from doing so, how warm an interest they took in the great distinction conferred on Mr. Hunt by his English *confrères* in the name of the Queen. Personally, not only as a foreign *confrère* often residing at Paris, but still more as nephew of Count Delaborde, the Permanent Secretary of the Academy of Fine Arts, he (the speaker) was often able to be a witness of the great sympathy of the Academy for their American *confrère*. Fully aware of this sympathy, and having some time ago to write to Mr. Hunt on some personal affair, he asked M. Delaborde if he might send his compliments to Mr. Hunt. He warmly answered about as follows:—“Je crois bien, mais non seulement les miens, mais ceux de tous les Membres de l'Académie, car tout le monde l'aime beaucoup.” It was his personal impression that Mr. Hunt enjoyed at the Academy of Fine Arts a sort of popularity, if it might be permitted to him to apply that word to the feelings of an assembly considered to be composed of immortals. Might he be permitted to add a few words more? He believed the choice of this year's recipient of the Gold Medal to have been particularly happy, since the distinction fell on an artist of whom old Vasari would no doubt have written:—“Fù il primo che introdusse in America il buon disegno.” By doing so Mr. Hunt had become the Brunelleschi of the United States. The fact that the Old and the New Worlds were commemorating the fourth centenary of the discovery of America was particularly fortunate. Did that fact not proclaim that the highest conceptions of Art, of which the Academy of Fine Arts in France strove to hold up faithfully the immortal principles, were spreading over the whole world, and that those principles from which perfection alone derived were equally as well honoured on the banks of the Thames and beyond the wide Atlantic as on those of the Seine?

M. Paul Sédille, honorary and corresponding Member, then read the following discourse:—Messieurs et chers Confrères,—Excusez-moi tout d'abord de prendre ici la parole en français. C'est dans la langue qui vous est propre que je voudrais pouvoir m'adresser à vous pour exprimer aux

* For an illustration of this building, of which Mr. Hunt was the architect, see the *Builder* for August 8, 1891.

Membres de l'Institut Royal des Architectes Britanniques, et à mon honore confrère, M. Richard Hunt, en particulier, les sentiments de bien réelle confraternité qui m'animent. Heureusement que la plupart d'entre vous, Messieurs, sont plus savants que moi et que la langue française ne leur est pas étrangère. M. Hunt a passé d'ailleurs de longues années en France, je me plais à le rappeler en cette circonstance solennelle de sa carrière d'artiste. Il a conservé de son séjour parmi nous non seulement sa connaissance approfondie de notre langue, mais surtout de bons souvenirs qu'il ne manque jamais de rappeler avec une cordialité dont nous lui sommes profondément reconnaissants. Aussi, nous autres français, pouvons-nous être fiers de venir applaudir à Londres au grand honneur qui est fait à notre éminent confrère américain par les architectes anglais, en lui attribuant cette Médaille d'Or que notre vénérable M. César Daly recevait l'année dernière de vos mains, que, sans remonter plus haut, vous décerniez, il y a quelques années, à notre illustre maître et ami, M. Charles Garnier. Monsieur Hunt nous permettra de prendre grande part à son succès, car nous n'oublions pas, comme il le répète avec complaisance lui-même, que c'est à l'Ecole Nationale des Beaux-Arts de Paris, que c'est sous la direction de nos maîtres les plus reconnus, qu'il est venu se pénétrer des grands principes de son art. M. Hunt a gardé de ces études fondamentales une élévation de style, une distinction dans les formes qui embellissent tous les édifices, tous les monuments qu'il a élevés. Très sensible aux élégances de la Renaissance française, il a transporté au delà de l'Atlantique les délicatesses de cet art charmant, tout en l'appropriant à des besoins modernes et à un milieu nouveau. L'hommage rendu en ce jour à un confrère américain réputé touche donc intimement notre cœur de Français, car nous pouvons considérer M. Hunt comme beaucoup les nôtres et je suis certain qu'il ne me démentira pas. Mais si nous sommes heureux de voir beaucoup de jeunes artistes américains suivre l'exemple des longtemps donné par M. Hunt et venir chercher en France des leçons et des modèles, nous ne nous flatons pas que là seulement ils puissent trouver les enseignements nécessaires. L'art n'a pas une patrie restreinte, il est de tous les temps, de tous les pays, ses manifestations ne sont que différentes. Car des principes immuables gouvernent ces manifestations différentes et si les formes apparaissent dissimilables, elles sont toujours dans leur diversité, la conservation des principes de logique et de vérité qui sont la gloire de l'Architecture. La France ne saurait donc être que dépositaire d'une parcelle de cette vérité qu'elle a fait briller dans ses œuvres antiques ou modernes suivant le propre des son génie. Cette vérité nous devons la rechercher dans l'étude des monuments de tous les pays. Personnellement, je me suis fait un plaisir et un devoir de signaler les remarquables travaux exécutés en Angleterre, depuis un certain nombre d'années, travaux qui témoignent chez vous, Messieurs, de cet ardent amour de logique et de sincérité qui doivent être, je le répète, la source la plus féconde de nos inspirations. J'ai admiré vos beaux travaux si expressifs des besoins matériels comme de l'idéal qui vous sont particuliers. Je suis heureux de pouvoir dire que maintenant mon admiration est partagée par grand nombre de mes compatriotes et que, spécialement, nous venons emprunter à l'Angleterre, beaucoup de ce qui fait le charme de vos habitations à la fois si confortables et si pittoresques. Mais dans cet échange artistique d'idées, il ne faut pas oublier que ce qui convient ici ne convient pas là. A les besoins différents, il faut des formes différents. Les principes seuls sont communs aux manifestations diverses de notre art. Il faut que nous restions Français comme vous restez Anglais, et il faut que les architectes américains deviennent réellement Américains. Dans notre vieille Europe, nous disons souvent en parlant de l'Amérique: "La jeune Amérique!" Je pense que mon confrère M. Hunt ne m'en voudra pas de cette appellation. C'est si beau la jeunesse! Et M. Hunt doit être fier de la représenter si vaillamment! Or, en fait d'art, l'Amérique est encore, je crois, dans une période de tâtonnements, cherchant sa voie. Comme l'abeille, elle butine un peu partout, dans tous les pays du monde, pour faire plus tard son miel. Ce miel sera assurément exquis; de plus heureux que nous pourront y goûter dans l'avenir. On ira alors aux Etats Unis étudier les merveilles d'un art jeune et nouveau, comme on vient en Europe s'inspirer des arts du passé. Ce n'est peut-être pas un rêve que je fais là, Messieurs. Hélas! tout change, rien ne dure! Je ne dirai pas tout meurt, car l'Art et le Beau sont immortels! Je termine, Messieurs, en vous

disant combien je suis heureux d'avoir pu en ce jour me faire l'interprète de la Société Centrale des Architectes Français, en saluant dans mon éminent confrère, M. Richard Hunt, un des plus illustres représentants de l'Art aux Etats Unis d'Amérique. (M. Sédille's remarks were warmly applauded.)

The President having congratulated the Institute upon having so auspiciously concluded its Session, the company adjourned to the lower galleries, where light refreshments were provided, and the Meister Orchestra performed some selections of music.

THE LINCOLN AND NOTTS AND LEICESTERSHIRE ARCHITECTURAL SOCIETIES AT MELTON MOWBRAY.

THE Architectural Societies of Lincoln and Notts, and that of Leicestershire, members of the Associated Societies, which for more than the last quarter of a century have done so much good architectural and archeological work, held a very successful final meeting last week at Melton Mowbray. It was a matter of regret to all that the Bishop of Nottingham, who may be not unjustly styled the founder of the Association, and who with the rarest exception has taken the leading part in these pleasant and instructive gatherings, was once more prevented by the state of his health from presiding. His place was taken by Precentor Venables, who also undertook the description of the churches and other buildings visited. The excursion of the first day, Wednesday, June 7, included Oakham and several other churches in Rutland; that of Thursday, the 8th, was confined entirely to Leicestershire. With the exception of the magnificent churches of Melton and Oakham, few of the churches visited were remarkable for size or architectural grandeur, but all were interesting, and we may add, nearly all in good order and some of great beauty. The Rutland churches of Whissendine and Langham, and the Leicestershire church of Waltham-on-the-Wolds—though the last has lost much interest by a premature and drastic restoration—rose far above the ordinary level in size and stateliness. We regretted to see that so many of the churches had had their interior walls scarified, exposing the rude rubble walling. This ill-judged process has had its day, and is now seldom resorted to, though a Stamford architect, who was of the party, could tell of the difficulty he has recently had in saving the Abbey Church of Bourne and St. George's, Stamford, from having their walls denuded. We believe that it was only by a threat that he would throw up the work altogether if they attempted to force it on him that the Restoration Committee were brought to reason. The first day's excursion comprised the churches of Wymondham, Edmondthorpe, Teigh, Ashwell, Oakham, Langham, Whissendine, Stapleford, Wyfordby, and Brentingby, the Hall of the Castle, and Flores House at Oakham, Stapleford Hall, and Brentingby Manor House. That of the second day, the churches of Thorpe Arnold, Freeby, Garthorpe, Coston, Sproxton, Stonesby, Waltham-on-the-Wolds, Goadby Marwood, Croxton Kerial, Knapton, and Branstone. The family likeness of the churches visited was remarkable; nearly all were in their main features of one date, viz., the early part of the fourteenth century. Several, as Ashwell, Edmondthorpe, Freeby, Coston, Sproxton, and Thorpe Arnold, were altogether of that style—*d'un seul jet*—but the majority exhibited survivals of earlier styles in windows and doorways. There was entire absence of structural Norman, the style being only represented by one or two late fonts. At Wymondham also the inner east wall of the tower showed a blocked Norman archway above the tower arch to the north. Other examples of this opening, of different dates, were seen in other churches visited. It is supposed to have had for its object the observance by the mass for ringing the bell. Most of the churches had Perpendicular clearstoreys, of which that of Melton with its forty-eight windows in continuous line, along nave and transepts, and that of Oakham, far superior in design but wanting the lantern-like effect of Melton, are magnificent examples. Some of the churches, as Wyfordby, Edmondthorpe, and Langham, have a Decorated clearstorey. That of Langham is continued over the chancel arch; a very uncommon arrangement, but producing a very good effect and deserving of imitation. The only two churches visited which wanted a clearstorey, Ashwell and Knapton, by their comparative gloominess, showed the practical wisdom of the later

builders in making this addition to the fabric. A characteristic of this district, beginning with Melton, which we do not remember to have seen so generally prevailing elsewhere, is that the towers have been almost universally heightened by an additional story in Perpendicular times. Some, such as the very stately Decorated tower and spire of Oakham, the Early English tower and spire at Langham, the exceedingly noble Decorated tower at Whissendine, and the smaller but well-designed Perpendicular towers of Garthorpe, Freeby, and Stonesby, and the fine central tower and spire of Waltham, are of one date from the ground upwards. But in the majority of cases the lower stories are of earlier workmanship, generally Early English—that of Edmondthorpe is Transitional, and that of Goadby Marwood Decorated—and of rudish masonry of ferruginous sandstone, the belfry stage being Perpendicular, battlemented with well-designed corner pinnacles, and frequently having a band of shallow quatrefoiled panneling below the string-course which breaks the flatness of the wall in a pleasing manner. We may mention as instances Wymondham, Edmondthorpe, Wyfordby, Thorpe Arnold, Coston, Sproxton, Brentingby, and Knapton. The churches of Thorpe Arnold, Wyfordby, and Coston, have towers narrower than the nave, leaving a portion of the west wall unoccupied on either side. The singular construction of the last named, Coston, recalls the towers of Freshwater, in the Isle of Wight, and Brocklesby, in Lincolnshire. It stands half outside and half inside the nave, the west wall of the church joining it midway on each side. It is Early English below and supports a slender broach spire of Perpendicular date, and deserves notice for its oddity. That of the little manorial chapel of Brentingby—now quasi-parochial, but still destitute of a font, and with no right of interment—is charmingly picturesque. Only half as long as it is broad, with small cusped lights below, the belfry stage has tall single lights, two on the east and west faces, and a single one on the north and south faces, and is covered with a saddleback stone roof, a quaint little spirelet being seated astride the very centre of the ridge. It belongs to the fourteenth century. So did the little church originally, as the north and south doors show; but having fallen into dilapidation, it was thoroughly recast in 1649, and reduced to a mere oblong room, with a flat plaster ceiling and plain square-headed windows. There are some cumbersome old box-pews, but much of the old seating remains, interesting from its exceeding rudeness. Of spires we saw good examples at Oakham—which, well proportioned as it is in itself, is hardly tall enough for the noble tower—and at Langham, where a fine Early English broach has had Decorated gabled spirelets inserted in the fourteenth century, somewhat to the perplexity of the architectural observer. The Perpendicular spire at Waltham is of fine outline, and has the angles crocketed, which is also the case with that of Branstone. We cannot think a spire improved by these ornaments. The simple outline is more pleasing. At Melton, Waltham, and Croxton Kerial, the towers are central. In all the other churches at the west end, and almost universally disengaged, i.e., standing free of the aisles, which adds much to their dignity. Of all the western towers that of Whissendine is by far the finest. For simple dignity and beauty of proportion it has few rivals among parish church towers of its class. It is entirely of Early Decorated date, without the intrusion of any later features. As at Oakham, the west face of the tower has a tall recessed arch, richly shafted and moulded, including the west door and window. Above there are three niches, but deprived of their occupants, who still remain in their places at Oakham. The belfry stage is one of singular stateliness, with very tall windows of two lights and simple tracery, the place of the transom being taken by an ogee-headed arch. The design is repeated in blank panels on either side. The beauty of this noble tower is somewhat marred by the intrusion of the newest stur turret at the south-west angle, which throws the western and southern belfry stage out of centre. The architect's design is only seen in its integrity on the eastern and southern faces. These present coupled belfry windows, with blank panels filling the intervening spaces. The grandeur of the design is enhanced by the excellence of the masonry. Indeed, to the nearness of the admirable quarries of Ketton and Barnack the excellence of the architecture of this district is in a large degree owing. When he has such fine material to work on, an architect seems to receive fresh inspiration and to rouse himself to do his very best. Before we quit the subject of

towers we must go back to our starting-point, the Church of Melton Mowbray, conspicuous alike for magnitude and for staidness of design, of which the central tower is the crowning distinction. Though in common with the towers of the neighbourhood it is of two dates and two styles, Early English below and Perpendicular above, the harmony of the separate parts is such as to completely satisfy the eye and leave nothing to be desired. The lower stage has three beautifully proportioned Early English two-light windows, the topmost stage four windows of Perpendicular date. For simple majesty this tower would have few rivals were it not for the awkward excrescence of a clumsy staircase turret at the north-east angle. This in the north and east view sadly injures the outline, which is still further marred by the rude termination of the turret at the level of the belfry stage. It has been proposed to carry the turret up a stage higher and finish it with a spirelet. Such a course would not want precedent, and the improvement effected by the completion of an evidently unfinished design would warrant the otherwise somewhat rash venture.

The ballflower, rare in many parts of England, and most frequent in the Gloucester and Hereford districts, is here abundant, we had almost said superabundant. Pretty as it is in itself, there is a heaviness in this decoration which falls on the eye when it occurs in such profusion as in the western galleys porch of Melton—that curious and, in some of its features, unique, appendage, perhaps connected with the great Loper Hospital at Burton Lazars hard by—the porch and transept aisle of Langham, the windows of Ashwell, and other examples. When crowded into the soffits of the window arches, and encircling the hood moulds, the simplicity of outline is lost and the richness of detail becomes surfeiting. The employment of the ball-flower on a horizontal string-course or corbel table, as in the aisles of Melton and Ashwell, is certainly of unusual occurrence, if not confined to this district.

Another noteworthy feature of the churches visited is the frequent variation in northern and southern arcades. The great churches of Melton and Oakham, and that of Waltham and some others have their arcades uniform; but in the large majority of the churches we find cylindrical piers on one side, and octagonal or clustered piers on the other side of the nave, and that even when there is little if any difference of date. The arcades are almost always late Early English or Early Decorated, and the arches as a rule equilateral; but in several cases, as Garton, Coston and Branstone, though of late thirteenth or early fourteenth century date, they are semi-circular. But we have long since learnt that the form of the arch, on which so much stress was at one time laid, of itself proves nothing.

There is not much good window tracery in the district. Some of the windows exhibit pleasing Decorated work, of reticulated and geometrical design, but there is far too much of the commonplace intersecting-mullion pattern, usually without cusps, recalling the "Carpenters' Gothic" of a century ago, on which the eye can never rest with satisfaction. The grand church of Melton Mowbray, though showing some pleasing geometrical tracery in the aisles, sins grievously in this respect. The great gable windows of the nave and transepts soar no higher, though relieved of their nakedness by the addition of cusping, which is wanting in the aisle windows. Everywhere there are Perpendicular windows in plenty—many commonplace enough—but some, as in the splendid chancel aisles of Oakham, of really excellent design.

Of woodwork, the rage of the Puritans and the misdirected action of modern restorers has almost made a clean sweep. Only one chancel screen was seen in the whole of the two days' excursion, that of Edmondthorpe; the base of the screen remains hidden by pews at Freeby and elsewhere. At Croxton Kerial there are a whole set of magnificent bench-ends, the poppyheads having grotesque carving of great vigour. At the same place the inner porch door is a fine one of oak, and a low ogee-headed wicket rises up into a tabernacle for a statue, happily no longer empty.

At Edmondthorpe the former existence of a crypt or charnel house beneath the last bay of the chancel is evidenced by quatrefoil openings, now blocked, on the east, south and north walls, just above the ground, with corresponding low arches inside.

Of Domestic work the excursion included admirable specimens of Transition, in its greatest purity and beauty, in the famous castle hall at Oakham—of Early English in Flores House in the

same town, a good but much altered example of a house of a wealthy townsman of the thirteenth century—of a country manor house of large size and rich design of the first year of the sixteenth century, in the older part of Stapleford, the outer walls adorned with an array of statues in niches, and a profusion of sculptural and legendary bas-reliefs—and of a smaller manor house of the seventeenth century, picturesque with gables and porches and projecting wings of various heights at Bretnigby.

We have thought it better to give a general summary of the architecture of the district than to describe any of the churches in detail. We cannot, however, close without an expression of admiration of the magnificent church of the town, which was the starting and rallying point of our excursions, Melton Mowbray. This for its magnitude, the harmony of its proportions, the purity of its architectural design, characterised by restrained strength finding its vent in dignity of form rather than in ornamental detail, deservedly takes rank with St. Mary Redcliffe (which it resembles in having double aisles to the transepts), Newark, and Coventry as among the very finest of our purely parochial churches. A well-directed though not faultless restoration carried out by able hands now allows it to be seen in all the staidness of its proportions, uncumbered by the pews and galleries which long crowded its interior. One could wish some things other than they are, and especially that the painted glass with which it has been lavishly adorned were less crude and garish; but taken for all in all there are few grander churches, or which will better reward a lengthened visit than that of Melton Mowbray.

WOOD-WORKING MACHINERY.

Messrs. A. RANSOME & Co. have just issued a folio volume, which, although in truth no more than a trade catalogue, deserves to rank as a fairly complete work dealing with wood-working machinery. It is folio size, bound in cloth, containing over 230 pages of descriptive matter and illustrations. Messrs. Ransome naturally deal only with their own productions, but that covers pretty nearly the whole field of wood-working machinery; indeed, the firm claims that during the thirty-nine years they have been in business they have made a greater variety of wood-working machines than any other firm in the world. The whole of their patterns were destroyed by fire in December, 1854, and since that date they have had occasion to construct patterns for over 600 different machines. A good deal of interesting work has been done in Messrs. Ransome's works at Chelsea. For a long time, as our readers will doubtless remember, they made a special study of clock-making machinery, and their fine display at the Fisheries Exhibition was one of the most interesting features in the machinery in motion department. Forestry machinery has also been made a study at Chelsea; the steam tree-feller is now fairly well known in most countries from whence timber is obtained. Some time ago one of the firm made an expedition to the United States, in order to study the question of breaking up lumber, and the result has been that the band-saw has largely been introduced for this purpose in England, and amongst other illustrations in the book in question is one of the largest band-saws in the world, in the course of erection. Another illustration gives a view of the trial shop at the Stanley Works, Chelsea. It is here that an example of each of the more important wood-working tools made by the firm is erected and connected up ready for operation in order that foreigners may see the method of working. Messrs. Ransome pride themselves on having made a study of wood, as well as of the machinery by which it is worked, and they state with undoubted truth that otherwise they could not have been so successful in this special branch of manufacture. During the Colonial and Indian Exhibition of 1886 the authorities placed in their hands for the purpose of experiment, samples of the timbers exhibited by the various colonies. The experiments were carried out exhaustively; the tests extending over a period of some months. We had the pleasure at the time, of witnessing a large number of these tests, and the working up of the colonial wood in various forms, in order to arrive at the respective values of the samples. There are various other kinds of wood-working machinery, to which this firm has turned its attention, such as railway carriage and wagon machines, railway sleeper and key machines for shipbuilders, wheelwrights, &c. All these are illustrated and described in the catalogue. A feature worthy

of attention consists of the practical hints to purchasers, contained in the book. In addition to the Stanley Works, Messrs. Ransome have recently amalgamated with their Chelsea business the Battersea Foundry, which has been carried on for some time past under the style of Ransome, Josselyn, & Woods. The two firms have been for some time practically identical, although the management has been individual. The Battersea Foundry specially turned its attention to the production of difficult and complicated castings. Messrs. Ransome's catalogue is almost on a level with the best American productions of the same description. It would, we think, be quite so were a little more artistic effort expended on the production of the woodcuts. The purely mechanical details, as a rule, are fairly good, but anything outside mechanism is very crude. It may be said, however, that the descriptions are clearly and intelligibly written, which, unfortunately, is not a common virtue with trade catalogues in general.

ROYAL COMMISSION ON METROPOLITAN WATER SUPPLY.

THE Commission met on Tuesday and Wednesday for the purpose of taking further evidence.

The first witness was Dr. German Sims Woodhead, F.R.C.P. (Edinburgh), F.R.S. (Edinburgh), and now Director of the Laboratories of the Conjoint Board of the Royal College of Physicians (London) and Surgeons (England), who is the author of works on "Bacteria and their Products," and is the Editor of the "Journal of Pathology and Bacteriology."

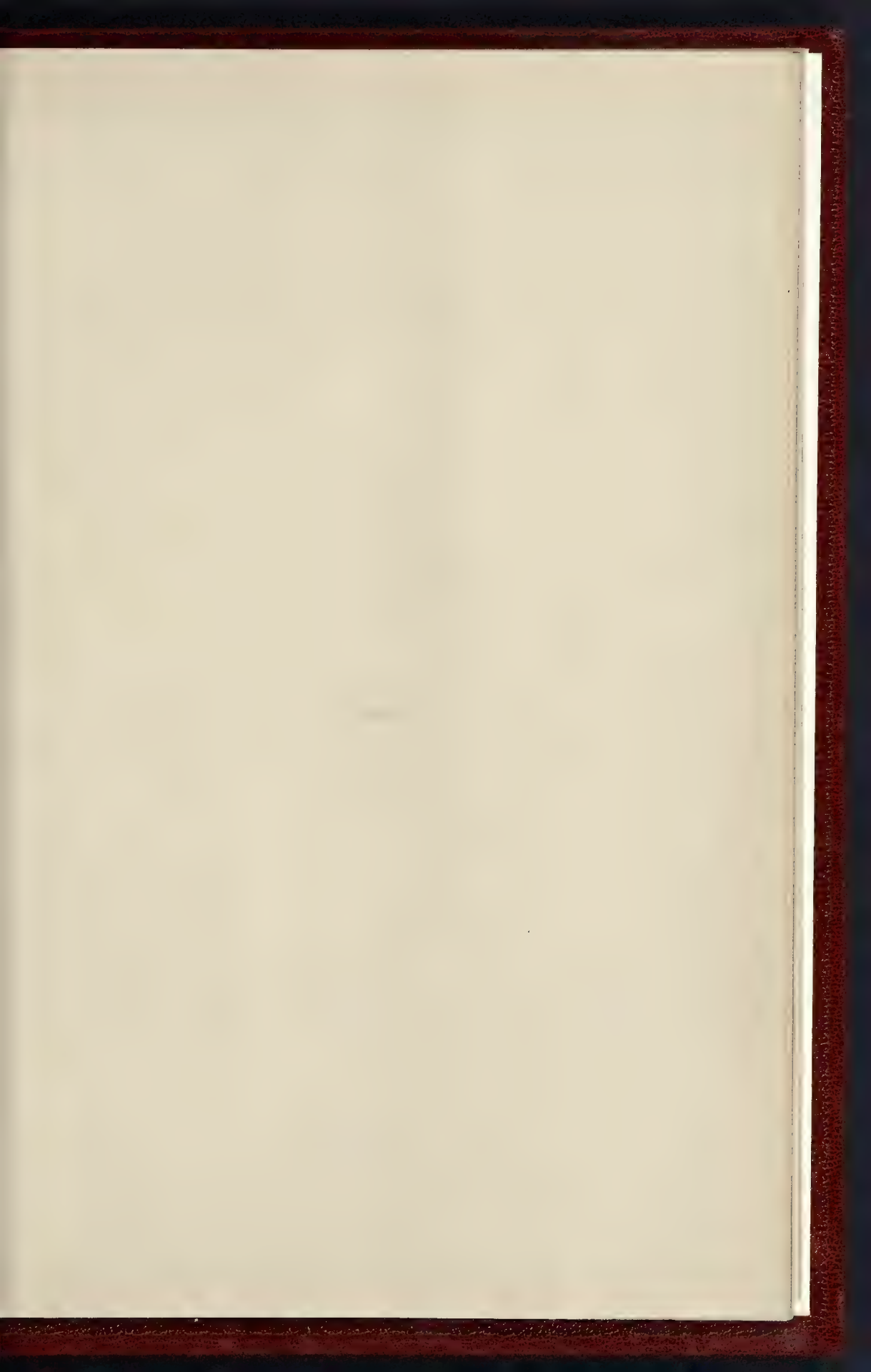
Bacteria and River Waters.

Dr. Woodhead had prepared for the Commission and was examined upon a paper embodying in a very succinct manner the results of bacteriological research as bearing upon the problem of water supply from rivers. He said in his paper that in spite of the large amount of work that has been carried on in connexion with the relation of bacteria to water and sewerage, and although we have undoubtedly gained a certain amount of information, we are still groping in the dark. He guarded himself and warned others, who were not constantly working at these questions, against placing too great reliance on the numerous experiments that have been carried out, and on any deductions that may have been drawn from the results obtained. We ought not to use water for drinking purposes (1) if it contained moulds derived from organic matter left at rest for some time, (2) if it contained spore-bearing bacilli, (3) if it contained special species of organisms usually found in the alimentary canal of man and animals, (4) if it contained numerous life-giving organisms of several different species, and (5) water in which a large number of species are found indicating numerous sources from which the organisms are derived. All such waters were probably contaminated by organic matter from highly-manured ground or from ground where putrefactive processes are going on with considerable activity. The mere number of organisms, even of those which cause liquefaction of gelatine, especially if they do not form spores, cannot in most instances be looked upon as necessarily rendering the water unfit for use; but, whenever a large number of different species of organisms and a considerable quantity of organic matter are present, the water should be looked upon as being gathered from suspicious sources. We have yet much to learn as to the conditions under which the cholera organism is capable of retaining its vitality in water and other media, and both the cholera organism and the typhoid bacillus run through a series of modifications according to the conditions under which they are placed. The typhoid bacillus had not been found in the water of the Thames, and was, therefore, not likely to be found in the water passed through filters; but relatively so little had been done that one could not be astonished that it had not been found; and in his own mind he had not the slightest doubt that many times since filtration had been brought to its present perfection typhoid bacilli had been present in both kinds of Thames and Lea waters. Dealing with filtration as of two essentially different kinds—mechanical and biological—Dr. Woodhead described the latter as the retention of micro-organisms in the superficial layers of the filter, so that the filtrate contains no micro-organisms which can cause turbidity. There is deposited on the surface of the filter after the first day or two a layer of



Mr. Richard M. Hunt,

ROYAL GOLD MEDALLIST, INSTITUTE OF ARCHITECTS, 1893.





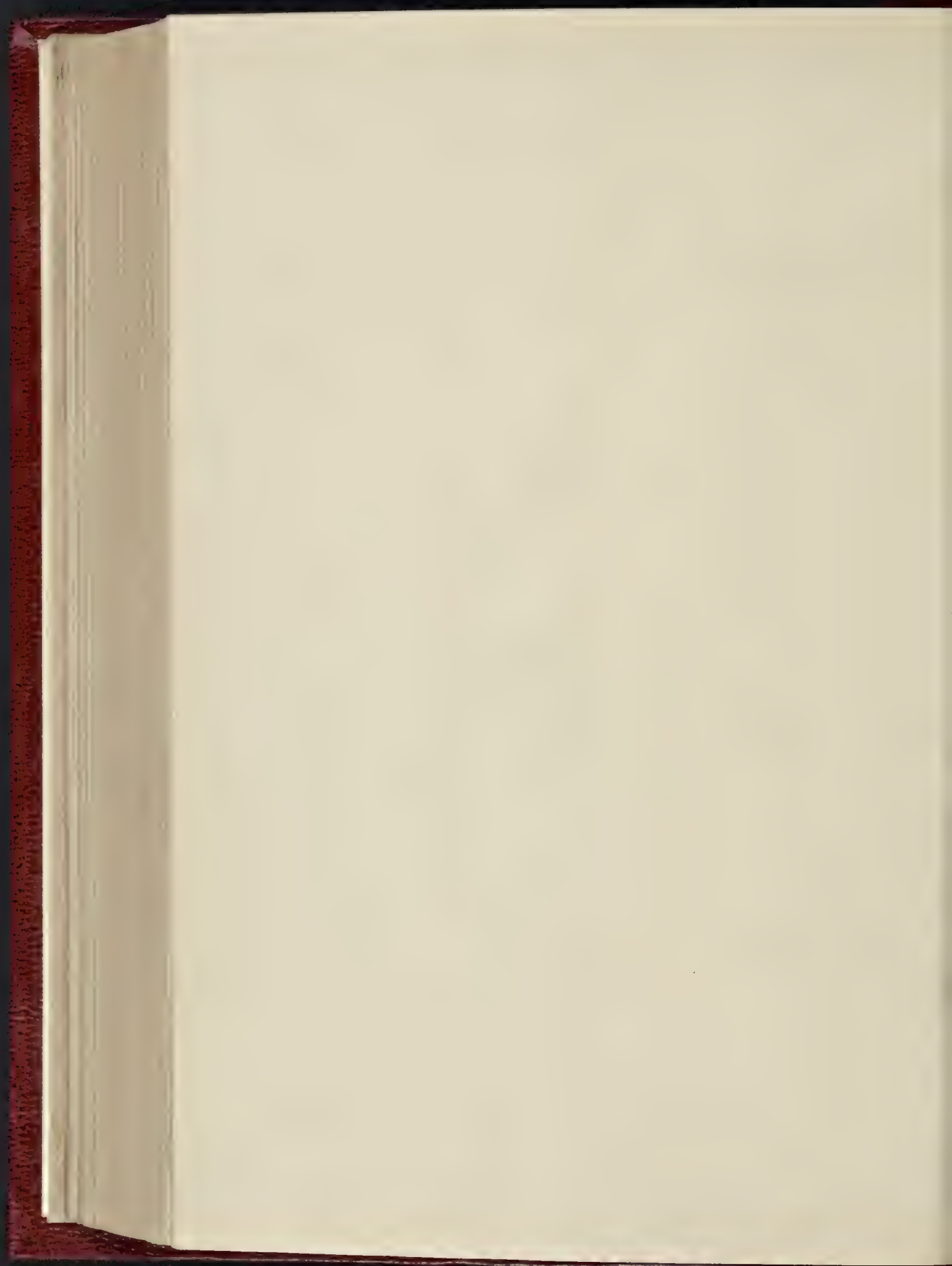
THE ELEMENTS. FIRE, AIR, EARTH AND WATER.

SCULPTURE AT THE ROYAL ACADEMY. PANELS FOR THE MU



INDUSTRY, COMMERCE AND AGRICULTURE.

L. COUNCIL CHAMBER, BATH.—MR. F. E. E. SCHENCK, SCULPTOR.



ganic matter in which micro-organisms are present in enormous quantities; these form a sort of cohesive mud through which water and substances in solution may pass, but micro-organisms are in great part kept back. So long as this film remains unbroken, and at the same time permeable to water, we have the most efficient filtration that can be devised for water taken from settling ponds or from reservoirs; but as this filter, good as it is, does not give results equal to those obtained in a good natural earth filter at is not overworked. Every additional foot of mechanical filtration must be an increased safeguard. Still, if river water must be used, every possible precaution should be taken against its using made a receptacle for unpurified sewage. It is almost impossible in periods of flood to obtain it free from large quantities of surface drainage; but it ought to be insisted that in ordinary weather there should be no surface drainage directly into the Thames or into its tributaries. Solid excreta should be collected and dug into the soil, and for liquids farms should be treated as biological filters. Sand, ashes, gravel, and similar materials, without the presence of some earth or organic matter, act merely as mechanical and not as biological filters; but they possess porosity which aids aeration. So long as accidents may happen in connexion with filtration, so long there must be danger from water that contains a large quantity of animal organic matter; and the supply of the largest city in the world ought to be above suspicion. So convinced he of the dangers lurking in the water taken from a river draining such a large area that he never drinks it unless it has been charged with carbolic acid for some time, or has been boiled or passed through a Chamberland filter at a comparatively slow rate.

Defence of Tees Water.

Mr. D. D. Wilson, manager for the Stockton and Middlesbrough Water Board, was examined upon "Observations," extending to thirty printed pages, made by him upon Dr. Barry's final report on enteric fever in the Tees Valley in 1890-91; elucidated by appendices occupying thirty pages, by thirty-nine elaborate statistical tables, and by a series of eight diagrams, some coloured, and others giving curves to exhibit the variations of fever mortality in the district, and comparisons of that district with other large towns. These details are mentioned to show the industry and completeness with which Mr. Wilson had got up and submitted his case against Dr. Barry's final report, with an advanced proof of which he had been furnished for the purpose. He was examined at great length with reference to the exceptions taken by him to the manner in which Dr. Barry has dealt with facts and figures, and the inferences he has deduced from his mode of dealing with them. Speaking generally, Mr. Wilson asserts that all the evidence, when carefully sifted with due regard to times and places, does not support the conclusion that there is any connexion between the water supply and the outbreak and spread of fever, but that it is accounted for by insanitary conditions, and that there are examples of local immunity which tell in favour of the Tees water rather than against it. Mr. Wilson says that the tenour of Dr. Barry's report suggests that the object of his inquiry was not so much to arrive at a knowledge of the real facts as to fix the responsibility for the epidemic on the Tees water. The following are the assumptions in Dr. Barry's final report which Mr. Wilson sets himself to disprove:—

- The outbreak was practically confined to the Tees water supply districts, the districts outside being practically exempt.
- The fever was epidemic in every part of the Tees water supply districts, and was simultaneous in its outbreak in each part.
- The maps demonstrate the uniform (or universal) distribution of the house invasions throughout the districts.
- That the sanitary arrangements in the several districts supplied "differed *inter se* in all variety of ways," and there was "community of circumstances" only as regards water supply.
- The time when the second outbreak was at its worst was a time of the year when enteric fever is—unless very special circumstances favour its dissemination—unapt to become epidemic in this country.
- The partial destruction in 1885 of the "Warren" at Barnard Castle, and its almost total destruction since, have changed the condition of the river so that, whilst previously there was no foreshore at Barnard Castle to admit of the accumulation of filth and excremental matter, there is now a wide foreshore, on which large

quantities collect, to be washed down on the occasion of heavy floods in the river—that such floods took place on August 12 and 23 and December 1, 1890, and that the origin of the epidemic was to be found in the excremental matter washed into the river at these dates.

In dealing with A, Mr. Wilson contends that the epidemic in September was not confined to the Tees water districts, but that it extended to other districts not so supplied. He says Dr. Barry was misled as to the comparative prevalence of fever in the different districts by valence of numbers of cases ascertained by several different methods. In the Tees water districts the numbers were ascertained by compulsory notification; in other districts, by voluntary notification or personal application to medical practitioners. The Registrar-General's returns show that up to the end of September there was no evidence of greater prevalence of fever in the Tees water district than in the adjoining districts. The death-rates were higher in Stockton and Hartlepool than in Darlington and Guisborough, and that would indicate that the epidemic in the four places had not a common origin.

In dealing with B, Mr. Wilson mentions California (162 houses) left untouched by both outbreaks, although it used to suffer greatly before it got Tees water in 1884. Also ancient Stockton (900 houses), which escaped in the first outbreak, and with few cases in the second, in spite of serious sanitary defects. Also four other places which escaped the first outbreaks, and three places which were attacked, fifty-six, sixty, and sixty-six days after the incriminated flood. All these places contain 1,016 houses—more than the places in the district not supplied with Tees water which escaped. Mr. Wilson makes a great point of the immunity amongst seamen, although ships take in the Tees water. That the outbreak was not simultaneous he shows by giving the successive dates in four weeks, in places that take Tees water and other places with other supplies, and this for both attacks. He concludes that many places that it reached others long after the first outbreak, and that many places were reached by "spreading" which was the "chief, if not the only, factor in the outbreak."

In dealing with C, Mr. Wilson contends that omissions of fever cases in some districts and of others in which there was exceptional immunity have produced in Dr. Barry's tables a misleading appearance of uniformity, while separate systems of sewers, and nuisances, such as a cesspool in the centre of a recreation ground, account for local peculiarities.

In dealing with D, Mr. Wilson refers to former outbreaks in the district which have been reported upon by Dr. Thorne, Dr. Ballard, and Dr. Barry himself, in reports which dwell upon insanitary conditions irrespective of water supply. Under the heading E, Mr. Wilson reminds Dr. Barry that he inquired into an epidemic of typhoid fever in the first quarter of 1890.

Under F, he produced a series of photographs to show that there had been no great alteration in the foreshore since 1884.

The attribution of the second outbreak to a flood in December is met by the statement that other and larger floods were not followed by outbreaks. He shows the relation of the fever mortality in Stockton to the rainfall of the district, and says when it is remembered with what quantity of the specific contagion of typhoid fever the sewers was charged at the time of various floodings and downpourings of rain there need be no surprise that disease was scattered far and wide over the area on which it had taken such firm hold.

This outline must suffice for the present to indicate the points in the controversy between Dr. Barry and Mr. Wilson.

CLAYBURY ASYLUM.

THE new Asylum at Claybury, near Woodford, was formally opened by Mr. P. M. Martineau, Chairman of the Claybury Sub-Committee of the Asylums Committee of the London County Council, on Saturday last, June 17. In the *Builder* for November 23, 1889, we gave a bird's-eye view and ground plan, with description, of this extensive group of buildings. The plan has been slightly modified in execution in one or two parts, but the plan we published on the date mentioned fairly represents the buildings as carried out.

The Asylum was commenced as a fourth Asylum for the County of Middlesex under an order of the Court of Magistrates in 1885.

Early in 1887, the design of the architect, Mr. George T. Hine, was selected in a limited competition, in which six designs were submitted. Later in the same year the work of levelling a plateau for the main building was commenced, also the erection of the entrance lodges, the contractors for these being Messrs. Higgs & Hill, of London. In 1888, the plans for the Asylum were finally passed by the Lunacy Commissioners and approved by the Home Secretary, and the foundations were commenced to be put in; the first contractors being Messrs. Howell & Son, who failed before they got very far with their work, which was afterwards completed by Mr. H. Lovatt, of Wolverhampton. In 1889, the Local Government Act having come into force, the site and foundations were transferred to the London County Council, and in the autumn of the same year the contract for the superstructure was let to Mr. Edmund Gabbott, of Liverpool.

In June of 1890, Lord Rosebery, the first Chairman of the London County Council, laid the memorial stone over the principal entrance of the official block.

The asylum is designed to accommodate 2,000 patients, 800 males and 1,200 females, and between 200 and 300 officers, attendants, and nurses. The building is constructed on the block system, the various blocks being connected by one-story corridors which communicate with the administrative centre, including the Recreation Hall and Chapel.

Provision is made for the various classes of lunatics, comprising the sick and infirm, recent cases, epileptics, and acute cases, as well as the quiet, working, and chronic patients.

On the *Male Side* are workshops for tailors, cobblers, upholsterers, carpenters, painters, plumbers, and engineers; and on the *Female Side* is a large sewing-room for female workers. Provision is made for attendants and nurses in the various patients' wards, and in addition to these there are separate blocks for attendants, comprising mess, day, and club-rooms for both male and female attendants, with bedrooms over, and a separate block for night nurses.

There is a private residence for the Medical Superintendent, another for the steward, and quarters for half-a-dozen assistant medical officers.

The *Administrative Centre* comprises a large kitchen with sculleries, larders, &c., which have been fitted up by Messrs. J. & F. May. A general store for the steward, laundry buildings with washhouses for patients, attendants, and officers, and all necessary ironing-rooms, drying presses, and receiving and delivery rooms for linen. The machinery and fittings for these having been supplied by Messrs. Bradford & Co.

There is a large Recreation Hall capable of holding 1,200 patients with a stage and dressing-rooms, the enriched plaster work having been executed by Messrs. Jackson & Sons. There is also a chapel to seat 800 people.

Outside the main Asylum will be farm buildings with accommodation for 400 head of stock, gas-works, mortuary buildings, and Pathological Laboratories, which have still to be erected, also an Isolation Hospital for infectious cases, which will accommodate ten male and ten female patients.

The old house on the estate, known as Claybury Hall, has been altered and enlarged to serve as an Asylum for fifty private patients. This is being carried out in a separate contract by Messrs. Reed, Blight & Co.

The heating of the asylum has been carried out by Messrs. Korting Bros., of London and Hanover, and consists of a system of steam batteries in the basement, from which the warm air is conveyed into the various rooms and wards by air ducts constructed in the walls of the building. The ventilation being provided for by a similar system of flues in the walls and connecting with extraction cowls in the roof.

The buildings will be lighted by electricity generated on the premises, a very complete installation of electric plant being provided in the electrical engine-house, which has been supplied by Messrs. Latimer Clark, Muirhead, & Co. The lamp fittings and wiring by Messrs. Appleton, Burbey, and Williamson, and all under the supervision of T. P. Gunyon, Esq., Chief Electrician to the London County Council.

All the heating, hot water for baths, &c., steam and hot water for use in laundry and for cooking purposes, also for electric lighting, is obtained from one central boiler house, where there are ten large boilers.

The building appears to have been constructed in a most substantial way, so as to ensure durability, and avoid expense in

maintenance. The walls in corridors, water-closet, annexes, lavatories, bath rooms, kitchens, sculleries, are lined throughout with glazed bricks. The walls of wards have pitch pine dadoes. All the internal woodwork throughout is of pitch pine stained and varnished, everything being thoroughly good and of a most durable character, and at present, being possibly in advance of the times, compared with some of the older Asylums, will not soon be liable to be condemned as out of date.

The cement pavings and staircases have been executed by Stuart's Granolithic Company and the Victoria Stone Company; the locks have been supplied by Mr. James Gibbons, of Wolverhampton. The stone used is from Drabble's Darley Dale quarries and from Lord Winchelsea's Weldon quarries. The facing bricks have been supplied by A. Wain, of Heather, Leicestershire; and the stained glass is by A. O. Hemming, of London.

The principal Clerk of Works for the whole of the work has been Mr. George Wise, who has been ably assisted by special men for the engineering, drainage works, &c. To Mr. Wise we must express our thanks for conducting our representative over the building.

The Asylum is pleasantly situated on rising ground some ten or twelve miles from the Thames, and its main *façade* faces due south, commanding pleasant views over the Lower Thames Valley in the direction of the Kentish hills.

Illustrations.

PORTRAIT OF MR. RICHARD M. HUNT.

ON former occasions, we give as an extra page illustration the portrait of the Institute Gold Medallist of the year, taken from a photograph kindly sent to us by Mr. Hunt for the purpose. The likeness is a very good one.

PANELS FOR THE DECORATION OF THE COUNCIL CHAMBER, BATH.

THESE two circular bas-reliefs, which are at present hung on opposite walls of the Lecture Room at the Royal Academy, are intended for the ceiling of the Council Chamber in the new Municipal Buildings at Bath. They are referred to more particularly in the leading article in this number. The sculptor is Mr. F. E. E. Schenck.

RESIDENCE, NEWPORT, RHODE ISLAND, U.S.A.

It was mentioned in our article on Mr. Hunt and his works last week, that his practice had been largely in domestic architecture. This illustration is from a photograph of one of his recent works of this class, and shows some originality in the application of Gothic architecture in a modern dwelling-house.

No doubt many of our readers would wish that the wrought-iron finials, &c., on the roof had been dispensed with; but it must be remembered that it is not so long since we habitually indulged in these "pleasant vices" ourselves. For the rest, the arrangement of the principal front is dignified and effective, and is an example of Mr. Hunt's treatment of Gothic, the majority of his buildings being more or less Classic in style and feeling.

DESIGNS FOR FRIEZES.

THESE friezes, designed by Mr. Arthur Gwatkin, are all hung in the Architectural Room at the Royal Academy except that lowest on the plate. The large one, which the artist calls the "Garden Frieze," is designed to produce with a raised outline, by Mr. Clement Heaton's cloisonné process, the interspaces being filled in with colour. The others are to be produced by the ordinary process employed by Messrs. Hayward, for whom the designs were made. We have noticed them before in the course of our notes on the Architectural Room, at the Royal Academy.

ST. PETER'S CHURCH, STAINES.

THE above-named new church is the generous gift of Sir Edward Clarke, Q.C., late Solicitor-General. The work was placed in the hands of Mr. Geo. H. Fellowes Pymme, F.R.I.B.A., of Westminster, some eighteen months ago, and tenders were obtained from quantities by R. Henry Hale, F.S.I. After some unforeseen

delay, the tender of Messrs. Goddard & Sons, of Farnham, for 6,000*l.* has been accepted.

The style chosen in design is a free treatment of Perpendicular, in red brick and stone. The plan shows a nave of four bays, 26 ft. wide by 80 ft. in length, having a height of 40 ft. to the apex of the wagon roof.

The chancel, which is 38 ft. 6 in. in length, is of the same width and height as the nave. Aisles, 10 ft. 6 in. wide, are thrown out on north and south side of nave. A narthex is placed at the west end with western entrance. The tower, which is placed at the south-west end of south aisle, is designed in three stages and capped with a copper covered spire. In the lower stage, on the nave floor level, a baptistry is formed. In the upper stages, which are ornamented externally with panelled work in brick and stone, are arranged the belfry and bell-ringers' floor respectively. A southern transept with separate entrance, forms the nave of a small chapel on the south side of chancel. Clergy and choir vestries, and organ chambers, are placed on the north side of chancel, and passages are left on the north and south of chancel. The altar is elevated by steps from the nave floor level, and ample space and height are left above and behind the altar for a baldachin or reredos.

One of the main features of the church is the constructional rood screen, which is carried right up into the chancel arch, the upper portion enriched with tracery. The central figure and cross are designed to be cut out of the solid stonework of the tracery, and the side figures placed on corbels formed in the panels of the tracery.

The site of the church, facing, as it does, directly upon the river Thames, is most picturesque, but owing to the prevalence of floods, the nave floor has been kept higher than the level of any known flood. The illustration of the interior is from a drawing exhibited in the Royal Academy this year.

The foundation-stone is to be laid on July 15.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon last at Spring Gardens, the Chairman, Mr. John Hutton, presiding.

The Proposed Strand Improvement.—The adjourned report of the Improvements Committee again came up for discussion. The Committee recommended, with regard to the Strand to Holborn proposal ("Council Broadway"):

"That the application to Parliament for powers to form the new street from Holborn to the Strand and subsidiary streets be renewed in the next session, but that the scheme be not further proceeded with unless satisfactory provisions are made as to payment for it."

On the motion to adopt this recommendation at a previous meeting of the Council, the following amendment was moved and carried:

"That the further application to Parliament be postponed until after relief shall have been secured to the occupying ratepayers of London by the provision of some new source of revenue which can be applied by the Council for the purposes of metropolitan improvements."

On the motion of Mr. Westcott, it was now resolved, by 55 votes to 49, on a division, to refer the matter back to the Committee for further consideration.

The Bowser's Court Improvement.—The Improvements Committee also made a report as to the removal of the block of building at the south end of Tottenham Court-road, and recommended:

"That the Council do apply in the next session of Parliament for powers to widen Tottenham Court-road at Bowser's Court as shown upon the plan submitted herewith, provision being made in the Bill that the owners of property benefited shall contribute to the cost of the improvement by means of an improvement rate, to be secured on such persons and interests and in such manner as the Council may hereafter determine when approving the draft Bill."

It was urged, in support of this recommendation, that the proposed improvement was one in which the principle of betterment was capable of just and easy application, but the following amendment was moved by Mr. Leon:

"That the recommendation be referred back, as the Council, having regard to the heavy burdens now imposed upon the occupiers of houses in London, especially in the poorer districts, is not prepared to undertake other than very urgent improvements until an alteration is made in the incidence of taxation."

Mr. Lloyd seconded this amendment, which was carried, on a division, by a majority of two votes, 54 members voting for it, and 52 against.

Southern Approach to Vauxhall Bridge.—An adjourned joint report of the Bridges and Improvements Committees on this subject was, after some discussion, referred back for further consideration.

Claybury Asylum.—The Asylums Committee reported as follows:—

"In view of the fact that the farm buildings and mortuary are to be erected by the Works Department, it becomes necessary to make arrangements for the payment of commission to the architect, Mr. G. T. Hine, and the quantity surveyor, Mr. H. Smith."

The estimate of the Works Department for these buildings is 14,200*l.*, which includes the payment to the quantity surveyor of 1*l.* per cent. for commission in printing and lithographing bills of quantities. It is customary for the contractor to pay the quantity surveyor out of the first payment made to him in respect of his contract. We therefore recommend—

"(a) That Mr. H. Smith be forthwith paid his agreed commission of 1*l.* per cent. upon the estimate of 14,200*l.* of the Works Department for the farm buildings, &c."

It has been the practice for the architect to be paid his commission upon the certificates he makes from time to time to the contractor. We consider that the architect should in respect of this work issue certificates as to the amount done by the works department, and that his commission of 4 per cent. should be paid upon such certificates. We recommend—

"(b) That this course be approved."

Both recommendations were agreed to without discussion.

The Blackwall Tunnel.—The Bridges Committee reported as follows as to the progress of these works:—

"We have to report that the fire-proof galvanised iron fence and the approach road at Ordnance wharf are completed, and nearly all the concrete river-wall at Northumberland-wharf is executed. The caissons for Nos. 1 and 2 shafts are riveted and sunk to a depth of 8 ft. 6 in., and the caisson for No. 3 shaft is down 36 ft. 6 in., and riveted for 14 ft. above the surface of the ground, and the concrete filled in between the skins to a depth of 30 ft. No. 4 caisson is finished with the exception of a small quantity of concrete being placed between the skins. The shield, which is now complete and in working order, is in position in the tunnel opening in No. 4 shaft. On the north side nothing has been done to the cut-and-cover work during the past month; but on the south side the excavation is completed, the brickwork built up for a length of 153 ft. to the road level, and the concrete advanced to springing level for a distance of 170 ft. The progress of this portion of the work has been considerably hindered by the strike of the bricklayers. The first permanent cast-iron ring was inserted in the tunnel on the 9th inst. The total approximate cost of the work executed up to date is 111,103*l.*, of which the sum of 10,057*l.* is due to the progress made during the past month."

Appointment of an Assistant-Engineer.—The Main Drainage Committee reported as follows as to filling up the vacancy caused by the resignation of Mr. W. Santo Crimp:—

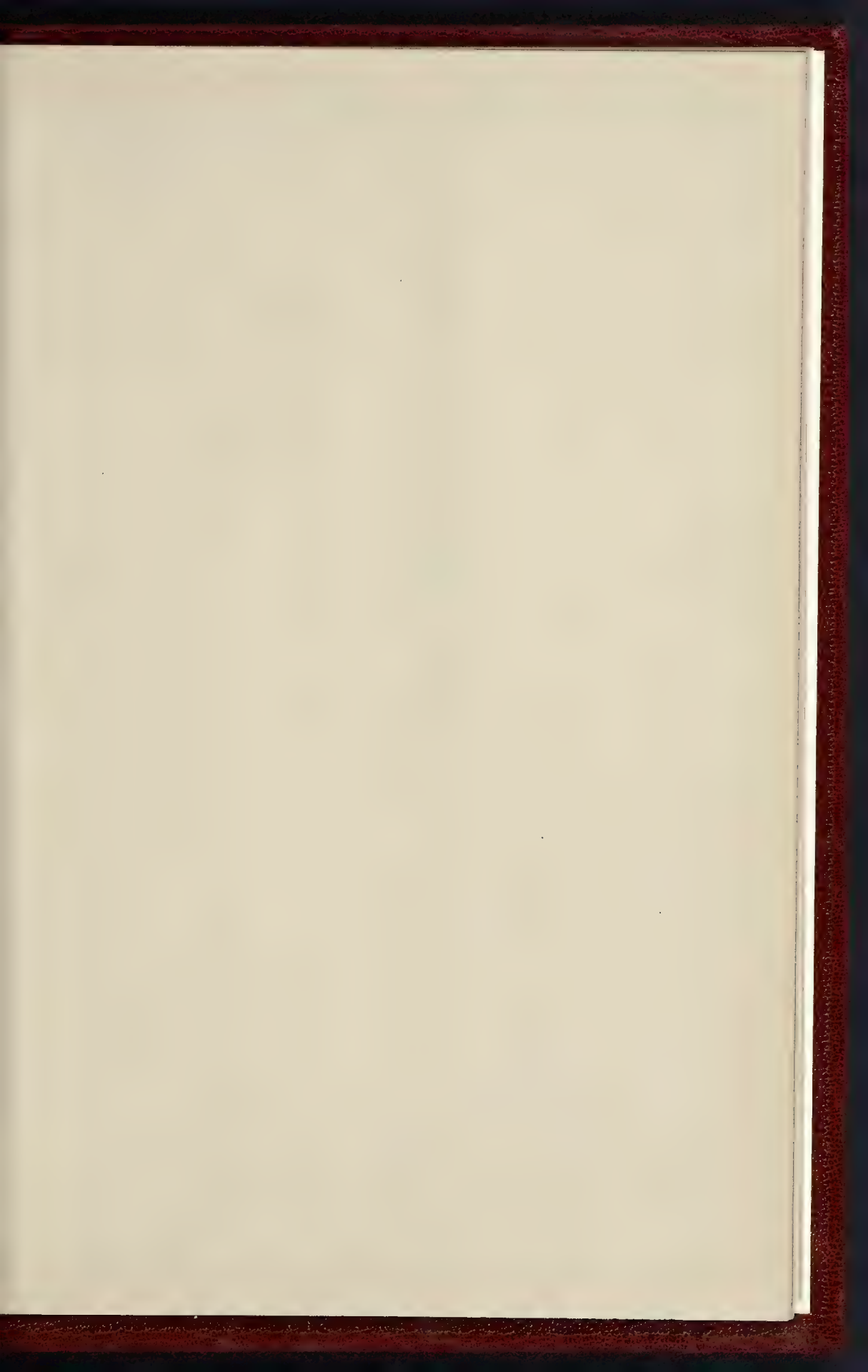
"In accordance with the resolution of the Council of the 16th of May last, referring to us the question of the appointment of an engineer of the north main drainage district at a commencing salary of 600*l.* a year, an advertisement was issued inviting applications for the post. Forty-seven applications were received, and they were referred to a sub-committee, who selected twelve candidates as being best qualified for the appointment. These twelve applicants we have seen, and having very carefully considered their respective merits and qualifications, we submit to the Council the names of three of them in the following order:—Mr. J. E. Worth, Mr. D. Cameron, and Mr. W. Fairley. We recommend—

"That Mr. John Edward Worth be, subject to a certificate of fitness by the Council's medical examiner, appointed engineer to take charge, under the direction of the Chief Engineer, of the sewerage and other engineering works of the Council in that part of London north of the Thames, including the outfall at Barking Creek, at a commencing salary of 600*l.* a year, and upon the following conditions, viz., that he do hold his office during the pleasure of the Council; that he be required to give his whole time to the duties of his office and be not allowed to take any private business; that any fees received by him either as a witness or in any other capacity be paid to the Council; and further, that on retirement, he shall not be entitled and shall not make any claim to any retiring allowance under the Superannuations Act, 1866, and that he will submit to any general scheme which the Council may adopt with respect to insurance for pensions or superannuation."

This was unanimously agreed to, after a few words of explanation from Mr. McDougall, the Chairman of the Committee.

Having transacted other business, the Council adjourned at seven o'clock.

"HOLY WOMEN OF THE NEW TESTAMENT."—Mr. Westlake writes to us to point out that this drawing, which we illustrated last week, is in the Architectural Room at the Royal Academy; as he says, "hung very high up, because it is a delicate drawing." It was this out-of-the-way position of the drawing, no doubt, coupled with the fact that the companion work last year was hung in the Black and White room, that led us into the mistake of saying it was not in the Architectural Room.

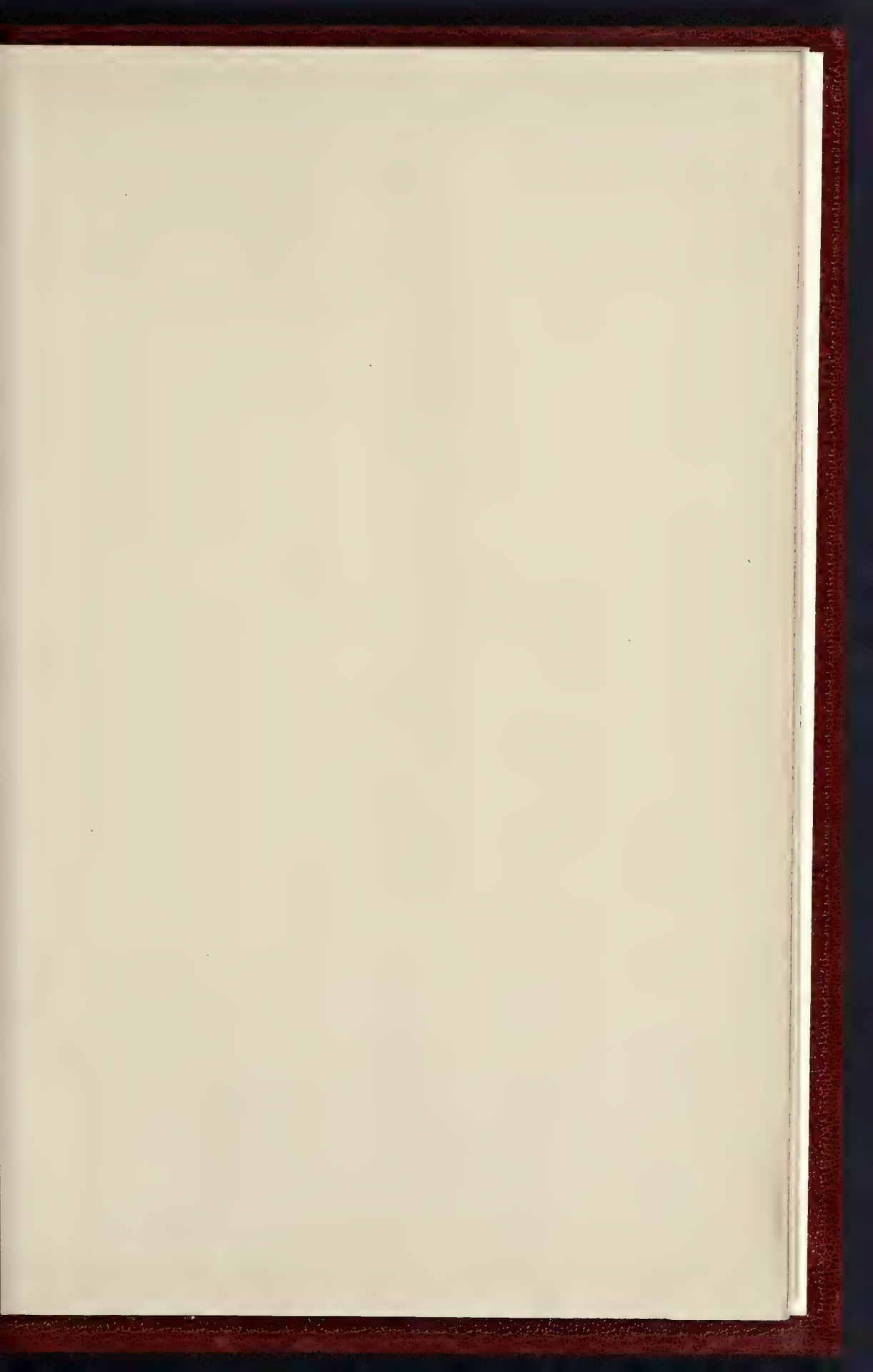




RESIDENCE, NEWPORT, RHODE ISLAND

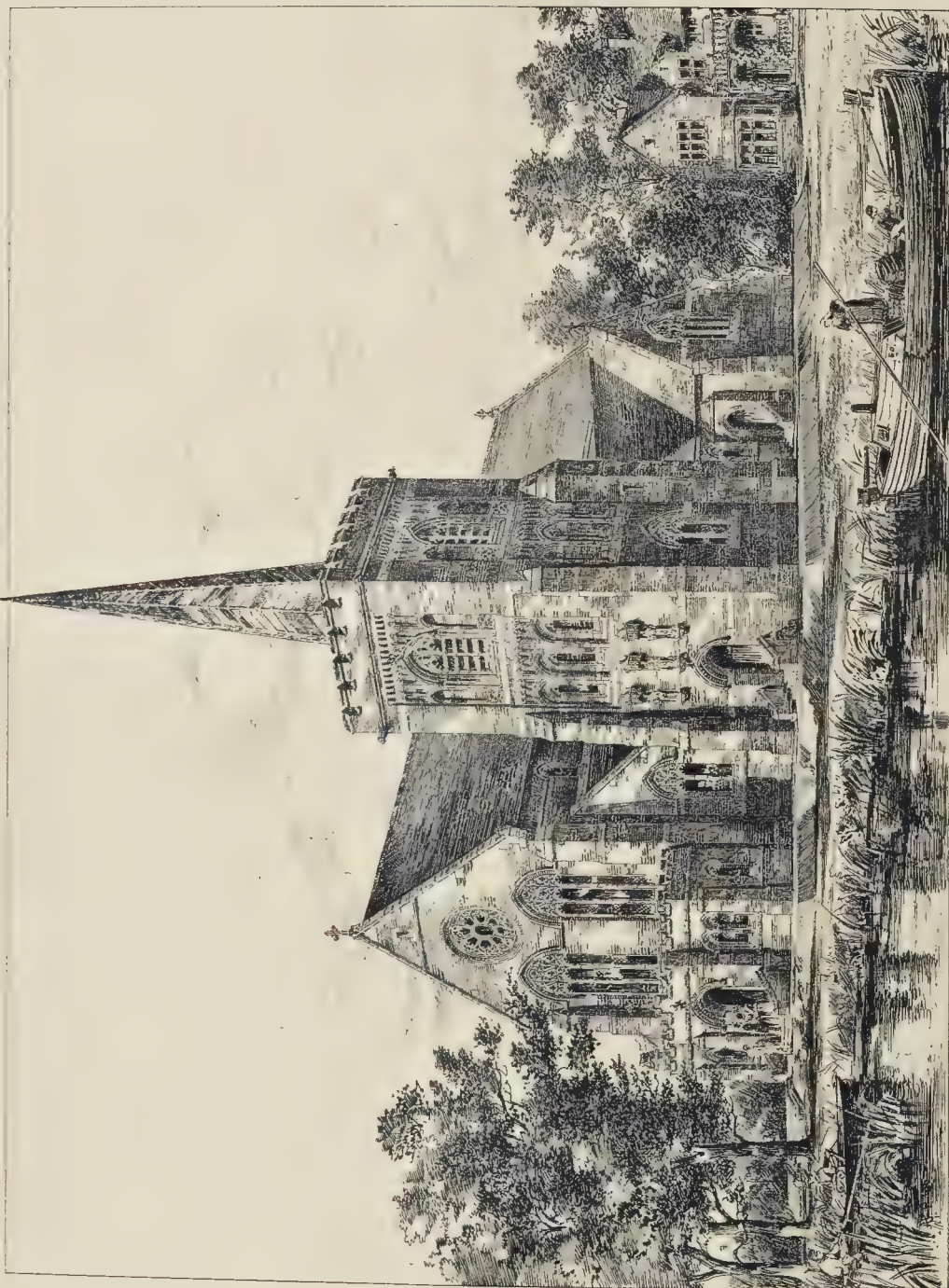


—MR. R. MORRIS HUNT, ARCHITECT



THE BUILDER.

JUNE 24 1893



NEW CHURCH, STAINES. VIEW FROM NORTH-WEST.—MR. G. H. FELLOWS PRYNN, F.R.I.B.A., ARCHITECT.

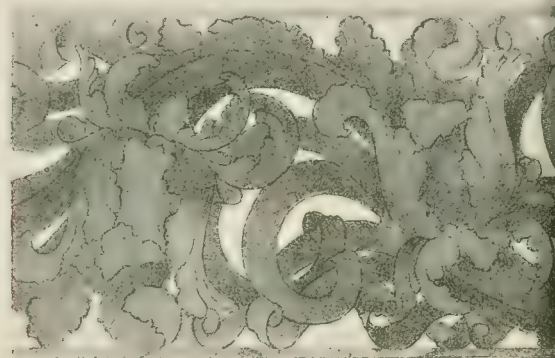
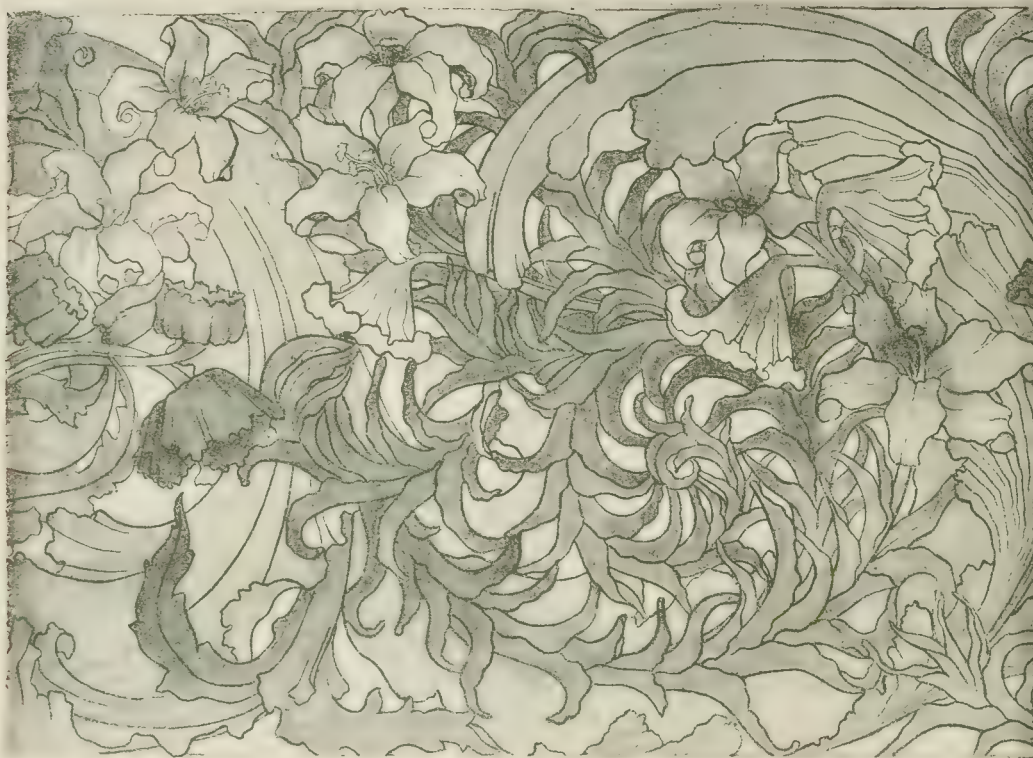
WIND & LIGHT, 105 & 107, GREAT MARSH, NORTH, LONDON, E.C. 4

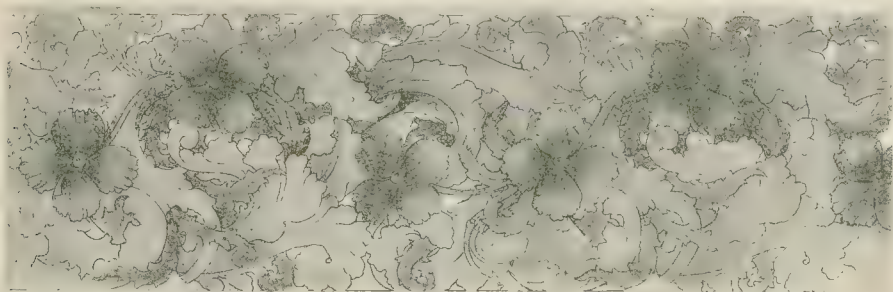


NEW CHURCH, STAINES: INTERIOR LOOKING EAST.—MR. G. H. FELLOWES PRYNNE, F.R.I.B.A., ARCHITECT.

Royal Academy Exhibition, 1893.







MUNICIPAL ENGINEERS AT BURY
ST. EDMUNDS:

WATER METERS.

WE now conclude our report* of the meeting held at Bury St. Edmunds on the 10th inst. in connexion with the Eastern Counties District of the Incorporated Association of Municipal and County Engineers.

In the discussion which followed the reading of the paper by Mr. J. Campbell Smith, the sanitary and other work carried out in Bury St. Edmunds was spoken of as generally commendable, but Mr. Walslow (Peterborough), and other speakers, deprecated the practice of charging a water rate of 10s. per annum for a water-closet.

Mr. Silcock (King's Lynn) next read an interesting paper on "Lighting the Lynn Ship Channel." After this had been discussed,

Mr. B. Godfrey (Droitwich) read a paper on "Water Meters for Municipal Purposes," from which we extract the following passages:—

The present meters in the market differ widely in their construction, and may be divided into the three classes—the Inferential, Rotary Piston, and Absolute. The "Inferential," as its name implies, only "infers" the quantity passed through it, and is far from a measure of capacity, acting by the rotation of a plate carrying three tubular arms set at a direction pointing to the rear of the apsis of the plate. Down a hollow centre spindle carrying the plate the water passes through these arms, causing the plate to rotate according to the velocity of the water passing through it, the plate and spindle gearing into almost the ordinary counter gear, except that it is remarkable for its clumsiness and the difficulty of reading, the whole dial revolving in the case of one well-known class of meter.

The Inferential meter is costly in maintenance, as it appears from one maker's catalogue that the sum charged for maintenance is about 10 per cent. on the cost. In the first cost it appears to be the cheapest meter in the market, and this is the only reason one can give for its adoption in various towns. Upon looking into the cost, however, as compared with that of other meters, it appears that, taking a 1-in. meter as the standard, the quantity delivered at an effective head of 150 ft., per hour, is 2,500 gals., while with another representative type of meter of the Rotary Piston class, the quantity passed is 3,000 gallons, while with $\frac{3}{4}$ -in. meters of the same class the quantity passed, per hour, is 500 and 1,800 gals., respectively, thus showing that although the Inferential only appears to be about two-thirds of the cost of the Rotary Piston meter, it is in reality quite as high in price for the effective work done. The author's experience of the Inferential class of meter is very unsatisfactory, and he is not replacing any of them as they stop.

The water-ways of an Inferential meter, $\frac{3}{4}$ -in. size, are equal to an area of 0.03029685 of an inch, or about one-sixth the area of a $\frac{3}{4}$ -in. circle. Upon these reduced openings, to gain an increase in the velocity of the water, the working of an Inferential meter chiefly depends. These openings are liable to get further choked and reduced by oxidation and other causes, thereby giving a high velocity, causing considerable over-registration, while an increase in the friction of the counter or training gear causes under-registration.

The Rotary Piston meter is the meter most used at present, two representative types being Kent's and the London Meter Company's. In this class the water is measured in a chamber which expands and contracts alternately, but with a circular motion, so that there is no concussion. In Kent's meter the piston is of vulcanite, working in a very accurately made chamber of Delta metal, fitting loosely into a cast-iron case, from which it is easily removed for exchange, examination, or cleaning, without uncoupling the body of the meter. The water entering under the movable chamber passes through a large strainer, which very effectually removes grit from the water.

The London Meter Company's meter consists of a gun-metal chamber containing a vertical hub, with four vanes made of vulcanite set at each end of two circular spindles diametrically opposite to one another. The spindles, revolving horizontally through the hub, alternately stand on end, and form a measuring chamber in the form of a quadrant of a circle, or lie flat to empty opposite to the port holes.

In both these meters, the working parts being made of a very light material, running in water, will work with a minimum of friction, and are

suitable for high velocities, but should not be used on old mains, or near dead ends, where the water is liable to contain iron oxide or grit, as a very slight furring in the working chamber is liable to cause them to stop entirely, owing to the accuracy with which they have to be made.

Absolute or Packed Reciprocating Piston meters are well known. They may be sub-divided into two classes, the single-cylinder and the double-cylinder. The former is best represented by a well-known meter of high repute, and consists of a cylinder having its passages in connexion with a four-way cock, which is controlled by a tumbling weight in connexion with a rack worked by the piston-rod. By this means the inlet and outlet are alternately placed in connexion with opposite ends of the cylinder at the completion of each stroke. In all single-cylinder meters the valve movement is actuated by auxiliary means. Some meters of this class simply record the number of strokes made, whether long or short, thereby causing the registration to be greater per quantity passed at a high speed than at a low. There are many two-cylinder meters in the market at the present time. In this class of meter the movement is all made under water, the general principle being that each piston, at the end of its stroke, actuates the valves of the other; considerable pressure is required to move some meters of this class, but this is compensated for by the area of the piston upon which the water acts. Meters of this class run fairly well in a hard water, or one carrying with it slight deposits, as each stroke of the piston scours the interior of the cylinder, but if left for several days without use they are rather liable to "stick up," owing to the piston adhering to the cylinder walls. Cylinder meters working at a high speed are liable to cause concussion.

The Kennedy meter possesses a great advantage in being constructed so that it can be fitted with a clock working a cylinder carrying a narrow strip of paper, upon which the piston of the meter moves a pencil causing a succession of lines, varying, according to the rate of flow, from vertical when much water is passing, to horizontal when no water is being used. This will be found very useful for station meters, as it shows any unusual demand on the supply. The quantity represented by each vertical line being known, according to the size of the meter, the number of lines per hour can be counted, and the quantity per hour ascertained—of course this is in addition to the ordinary dial.

Another type of cylinder meter is the Schoneyder, in which three loose gun-metal cylinders are contained in an outer case, with three pistons radiating from one centre, which works on a flat plate affixed to the bottom of the case. The centre and plate form a valve, with three ports for the admission of the water to the cylinder, and one large outlet port. The water is admitted alternately to the cylinders through these ports; at the same time that one cylinder is filling another is over the outlet port and discharging the water, which causes a semi-rotary movement to the pistons, thereby driving the counter gear. There is a considerable concussion to this meter when running at high speeds, and it is very bulky as compared with two-cylinder meters. Owing to the cast iron forming the interior having no protection, the first water passed after the meter has stood for a night or so is very dirty and unfit for use. In the author's experience the first cost of this meter is high, and the attention required afterwards very considerable. When running afterwards, with a high back pressure, the meter is liable to short-stroke, thereby causing over registration.

One other meter comes under notice, the Deacon Waste Water meter, which is so well known as to scarcely need description.

It is impossible to select one particular meter and use it as a standard pattern to be rigidly adhered to in any town or district, as at present there is no meter suitable for trade and domestic purposes alike, the demand for water being under such varying conditions.

For domestic purposes a Reciprocating Piston meter is the most suitable, as the water is very frequently taken at a very slow rate, such as the filling of a tank in a w.c., which towards the finish goes so slow that an Inferential or Rotary Piston would hardly be actuated by it.

For trade purposes, such as supplying boilers, hotels, innkeepers, &c., the water is taken intermittently at a much higher rate of flow, such as would cause concussion in a Reciprocating Piston meter, unless of a large size. It is therefore best to use a meter of the Rotary Piston class, which will permit of the flow of water at high speeds, and also register with comparative accuracy a

small flow, which is sometimes required on the same premises.

A boiler should never be permitted to be supplied direct from the service, no matter how high the pressure on the main may be, as there is always a risk of the pressure being taken off the main, when the hot water from the boiler may be forced back into the meter, and injure the working parts, especially when they consist of vulcanite.

For road watering purposes or swimming baths, the Inferential meter may be used, as it is then working under the most favourable conditions, the water being all passed at full bore without back pressure, while their small size enables them to be fixed under the footpaths, or in the base of a stand-post.

The supply to urinals is the reverse of the one first considered, the supply being taken very slowly during the 24 hours, and in this case the Reciprocating Piston meters should be used.

For hydraulic lifts the Rotary Piston meter is the most suitable, and should be of the full size of the main. Rotary Piston meters of this class can be had tested up to 2,500 lbs. pressure if necessary.

For waterworks station meters the Rotary Piston is suitable, as also the Kennedy meter, which, when fitted with a clock and diagram, is especially suitable, but in this case care should be taken that the meter is sufficiently large for its work to prevent concussion.

The author has at present in use at the waterworks a Kennedy meter which has supplied the whole town for fourteen years, and has not cost more than 5s. for repairs during that time, being still in perfect working order.

Before putting a new meter to work, or one that has been repaired, it is advisable to give it a short run, both at high and low velocities, in the testing-shop of the waterworks, or if there be no testing room, to connect it to a service pipe and ascertain that it registers when passing water.

It may be mentioned that it has never been found to answer to couple up half-a-dozen meters or so, and pass water through them as a test, as there will be a considerable discrepancy in the registration.

A 100-gallon tank with a gauge glass will be found sufficient for testing most meters, the gallons being marked on the glass with a file, and can be made cheaply. A long tank will be found the most accurate, and should be fitted with a large cock to allow of being emptied quickly.

In conclusion, the author has to acknowledge the valuable assistance given to him by Mr. Walter G. Kent, and would recommend any one wishing to go more fully into the subject of water meters to consult his book, published by E. & F. N. Spon; also the "Minutes of Proceedings of the Institution of Civil Engineers," vol. civ.

After some discussion, the members were entertained at luncheon by the Mayor, and afterwards visited the sewage farm at West Stow. A description of this farm was given in Mr. Campbell Smith's paper published by us last week.

THE GLASS-PAINTING TRADE.

A MEETING of the Glass-Painters' Union was held at the "Goat and Compasses," 60, Euston-road, on the 19th inst., Mr. T. P. Underhill, President of the Union, occupying the chair.

According to the circular convening the meeting, it had been convoked "for the purpose of considering the method of piecework adopted by Mr. T. Curtis (of the firm of Messrs. Ward & Hughes, Soho-square), both at his own firm and at the firm of Messrs. Cox, Buckley, & Co., Southampton-street, Strand. Also to hear a statement as to the amount of wages earned by the workmen under this system at the latter firm, and to consider the best means of acquainting the clergy and architects of the United Kingdom of the way in which their work is executed by these two firms."

The Chairman, in opening the proceedings, said the history of the matter which brought them together that evening began on January 9 when a complaint was made about the wages the men were earning at certain firms, and after two or three letters had passed between the Committee of the Union, and the firm of Messrs. Cox, Sons, Buckley, & Co., the committee asked Mr. Thompson of that firm to receive a deputation from the Union. The request having been acceded to, a deputation waited upon Mr. Thompson in February, and their case was promised serious consideration. They received a most favourable reply and thought the matter was practically settled. Nothing being done for sometime, however, the committee wrote again on March 17

* See last week's Builder, p. 471.

asking for a reason for the delay, and calling attention to another reduction in wages, and in reply they were informed that the matter was still under consideration. As was mentioned at the last quarterly meeting, the price which was being paid by these firms was, for ornament, 4s. a foot, but on May 25 a Mr. Bowden, one of Messrs. Cox, Sons, Buckley, & Co.'s workmen, received some work to do. After it was partly done he was told that there would be a slight reduction in the price to be paid, owing to the work having been under-estimated. Mr. Bowden, believing that the slight reduction would not amount to more than a few pence, continued the work, but at the end of the week he received a ticket for 1*l.*, instead of 1*l.* 16s., being therefore paid at the rate of 2s. 3d. per foot, instead of 4s. The committee thereupon wrote to Mr. Thompson, calling his attention to the matter, as well as to a case of reduction in figure work from 9s. to 6s. per foot, in both cases the price being reduced after the work was executed. Their Union having just been affiliated with the London Trades Council, a deputation visited Mr. Shipton for the purpose of obtaining his advice as to how far the Union might proceed in the matter, and they were advised by him to make another effort in the direction of peace. Acting upon this advice, the committee wrote to Mr. Thompson again, asking him to grant another interview with their deputation for the purpose of removing any misapprehension which existed. As a result, Mr. Bowden and a Mr. Taylor received instant dismissal, and the day following the dismissal of these men a letter was received from Mr. Thompson intimating that he would be unable to see the proposed deputation, but that he would write an answer to their letter. On the 16th inst. Mr. Thompson received a copy of the circular convening that meeting, and the day following he expressed his wish to meet the proposed deputation. The deputation, therefore, waited upon him, but the only suggestion that he had to make, was that they should see Mr. Curtis, his manager, and talk the matter over with him, after which, he (Mr. Thompson) would judge between the parties. In concluding his remarks the chairman called upon Mr. Taylor, one of Messrs. Cox, Buckley, & Co.'s discharged workmen, to move the first resolution.

Mr. Taylor said that, until the advent of Mr. Curtis at Messrs. Cox, Buckley, & Co.'s the work at that firm was carried on as day work, and very good wages were paid, but for some reason or other the late manager left the firm and Mr. Curtis took his place. The work went on as before for a time, until all the work in hand was nearly finished, when the new manager notified to the foreman of each separate room that he intended to change the system of work and adopt the piece-work system. He (Mr. Curtis) said it was his desire that every man in his employ should earn a good week's wage, and he thought that under his system that would be possible. They had no alternative and had to accept the alteration. The first work they received under the new system was for a small three-light Perpendicular window, full of work, with angels in the centre of each canopy, with Perpendicular shaftings, &c. He informed the manager that the price would be 6s. a foot, but Mr. Curtis told him that he could get it done for 4s., and it was only after some argument that he got the work at 5s. 6d. a foot, which was at the rate of 7*½*d. an hour. He complained to the manager, but was told that if they did not like the new system they could leave their work, for there were many more men to fill their places, and even if that were not so, he (the manager) could get the work done as cheaply at Frith-street (Messrs. Ward & Hughes's). The next work they received was a seven-light grisaille window, for which they received 8*½*d. an hour. The next was a three-light Perpendicular window, and the manager offered them 4s. a foot for it, but they refused to do it at that price. He (the speaker) pointed out to the manager that that was at the rate of 2*l.* 7s. for each window, whereupon another 1*l.* was offered. That brought the price up to 5s. 10*½*d. a foot, or 7*½*d. an hour. It was not as though they had to work from straight-forward drawings; many of them were very old drawings, on which rough changes were made, and the drawing was then traced. The window last referred to was 18 in. wide, and the drawing they had to work from was 2 ft. wide, and working from drawings like that took a much longer time. The next work they had to do was a three-light Renaissance window, with fourteen circles in each light, containing the signs of the Zodiac. It took 260 hours to work, and the price which they were offered came to 8d. an hour. He told the manager that, considering

that the work was full of difficulties, he thought more ought to be paid for it. The manager said he thought so too, and gave 5s. more. That brought the price up to 9*½*d. or 8*½*d. an hour. After that 4s. a foot came to be the recognised price for all Perpendicular ornament and all figure backgrounds. They had never made a full week's wage since, and the average wage was from 1*l.* to 1*l.* 10s. a week. The prices remained at 4s. per foot until May 25, when Mr. Bowden had the background of an "Ascension" to do, and, as had been previously stated, he received 1*l.* for the work, or at the rate of 6d. an hour. Another job which Mr. Bowden carried out consisted of figure background work, and the manager struck off 4s. from his ticket, saying that it was only boys' work to put in clouds.

Mr. Bowden having corroborated the statements made by the last speaker, the following resolution was moved and seconded, and unanimously agreed to:—

"That this meeting, after hearing a full account of the system of piece-work adopted by the firms of Ward & Hughes, and Cox, Sons, Buckley, & Co., under the same management, utterly condemns the system as being grossly unfair to both the workman and the client, and further declares that art work cannot be satisfactorily produced under any such conditions."

The following resolution, having been moved and seconded, was also agreed to, viz.:—

"That this meeting instructs the Committee of Management to at once prepare a circular setting forth the system of work adopted at the firms of Ward & Hughes, and Cox, Sons, Buckley, & Co., showing the injustice caused by this system to the art workmen and the deleterious effects of piece-work upon art work generally. Such circular to be sent to the clergy and architects of the United Kingdom."

Some discussion having taken place upon this resolution, during which it was contended that no firm could have much love for art which could allow work to go out which was done under the piece-work system, a further resolution was agreed to, as follows:—

"That until further notice no members of this Union are to apply for work to Messrs. Cox, Sons, Buckley, & Co."

It was also agreed to levy 2d. a week in the workshops on behalf of Mr. Bowden, one of the discharged workmen.

The meeting then terminated.

Correspondence.

To the Editor of THE BUILDER.

COUNTY SURVEYORSHIPS, IRELAND.

SIR,—I notice in the public papers that advertisements have been issued inviting candidates for the above office.

That this examination is one of the most severe held by the Civil Service Commissioners can be seen either from the programme of subjects, or the last published questions of the examination.

It might be well if those intending to compete asked for (and if possible obtained) some guarantee from the Government authorities that the holders of such offices would have their existing or prospective rights preserved in the present Irish Home Rule Bill.

As these offices are left open for public competition amongst qualified engineers of the United Kingdom, the matter is not a private one, nor has it any political bearing, but is simply that when the authorities invite competition some guarantee should be given that any political party, or new political arrangements, should not alter the status, for the worse, of any who take service under the principle of open competition.

It is true the County Surveyors have a certain status under the Grand Jury Acts, and under Pensions Acts, their salaries varying from 400*l.* to 600*l.* per annum, just as the county or division may happen to be a poor or a rich one, but this salary is reduced by travelling and incidental expenses which often exceed 100*l.* per annum, and this all County Surveyors incur, so that the principle of the "more work the less pay" holds good.

In other official appointments such as those of the Board of Works, &c., travelling expenses are allowed, but as the Grand Jury Acts were passed in 1838, modern ideas regarding frequent inspections of works were not thought of then, nor had any county so many requirements on the time and skill of the surveyor who had then only the main roads to look after, and not the ever-increasing amount of inspections for roads and works of construction which are his lot at present.

County surveyors are not mentioned in the Home Rule Bill, and even if they had a guarantee of tenure of office during good behaviour, there would still remain the doubt as to their salaries having the same regularity of payment as at present, and also the chance of their duties (under a new system of Government) being rendered more conflicting with those in authority than such duties were when the

holders were tempted to assume the office under the guise of "Open Competition" and "Imperial authority."

The matter is not to me a personal one, as I am not a County Surveyor, nor a candidate for the office; but I raise the matter on behalf of the right of "Open Competition" and wish it to be seen under true colours.

Should those already implicated in the matter require the aid of their professional brethren in England and Scotland to maintain their present rights, I trust that they will get it as far as pressure on Parliamentary representatives can be brought to bear, otherwise the principle of open competition (one of the bygone mementoes of Liberal minds) might suffer a serious reverse, and probably be abolished altogether as far as Ireland is concerned, for should candidates from England or Scotland (during the "better government of Ireland") be debarred from competing for any Irish appointments, then, doubtless, Irish applicants will be kept from English and Scotch appointments in return.

"OPEN COMPETITION."

SOIL-PIPES AND WASTE-PIPES.

SIR,—Mr. Buchan does not appear to have fully comprehended my letter. I did not state, as he says, that the water-trap on a short waste is always unnecessary and objectionable; but what I do contend is that wastes fixed in the manner I have described not only do not require a trap but are better without.

No one will dispute that a trap will, if properly fixed, "fully protect the substance beyond the trap," but to use Mr. Buchan's own words, "the water in a trap is foul and full of microbes." Even being the case, surely the presence of the trap is, though perhaps in some cases the lesser of two evils, itself highly objectionable.

Certainly in a waste-pipe as ordinarily fixed with the pipe larger than the outgo of the receptacle a trap becomes a necessity, as the pipe is always foul; but a waste-pipe fixed as I have described is kept perfectly clean and sweet without a trap. Personally I prefer a short, clean, direct waste without trap, to a long foul waste trapped off by a trap itself, full and full of microbes."

During the last few days I have had an opportunity of inspecting several wastes fixed, in the manner I am advocating, in a house erected by me some time ago, and I found them as clean and sweet as on the day they were fixed."

My object in writing was to draw attention to the superiority of small waste and soil pipes, particularly to the latter, which I note that you, Sir, endorse on page 450 in your review of Dr. Cameron's book, and you there give an argument in their favour that I did not touch upon.

Mr. Dalton gives no reason for thinking that I have fixed the size too small at 3 in. I would ask him to consider that is the advantage of making his soil-pipe larger than the outlet of the w.c.; anything that will pass the w.c. will also pass the pipe of the same size, and the smaller the pipe the better the flush. I am not the originator of 3-in. soil pipes, they have long been used with perfect success by many. Of course, good plumbing is a necessity, and junctions, when they are all used, must be perfectly smooth inside, but the fewer junctions the better, and the straighter the soil-pipe the better. Bad plumbing will ruin any system, and would cause a stoppage in a 4-in. pipe more readily than in a 3-in.

I would remind Mr. Dalton that I was referring to house wastes, and not complicated ranges of lavatories with a labyrinth of wastes, itself an objectionable arrangement, though sometimes unavoidable. I would also remind him that if a lavatory be used as a urinal by schoolboys or others, it will soon become foul, whether trapped or not; the only remedy is to fix the lavatory too high to be conveniently used for that purpose.

Notwithstanding Mr. Dalton's letter, I shall, from my own practical experience, continue to maintain that the outgo of the receptacle should always be of greater area than the waste-pipe itself.

BERNARD DICKSEE.

♦ ♦ ♦ ♦ ♦
MEDALS, SOCIETY OF ARTS.—The Council have awarded the Society's Silver Medal to the following amongst other readers of Papers during the Session 1892-93:—To Mr. James Douglas, for his paper on "The Copper Resources of the United States"; to Mr. William Key, for his paper on "The Purification of the Air Supply to Public Buildings and Dwellings"; to Mr. Gishel Knapp, for his paper on "Some Economic Points in connexion with Electric Supply"; to Mr. H. Van Der Weyde, for his paper on "The Pictorial Modification of Photographic Perspective by the use of the Photo-Corrector or Visual Lenses in Portraiture and Landscape"; to Sir Juland Danvers, K.C.S.I., for his paper on "Indian Manufactures: their Present State and Prospects"; to Mr. Hugh Stannus, F.R.I.B.A., for his paper on "The Theory of 'Stratification' in Art"; to Mr. Wilton P. Rix, for his paper on "Pottery Glazes: their Classification and Decorative Value in Ceramic Designs"; to Professor W. M. Flinders Petrif, for his paper on "Primitive Art in Egypt."

* This is not our experience; and considering what sort of things go down the waste-pipe of a sink, we should consider the probabilities quite against such a pipe remaining clean for any length of time.—Ed.

The Student's Column.

CHEMISTRY.—XXV.

Timber.

THE chemical composition of timber is of little interest to the carpenter or builder, inasmuch as two samples of timber, the one excellent and the other worthless, may appear by chemical analyses to be identically the same. All timber consists essentially of cellulose, $C_6H_{10}O_5$, but also contains more or less water and resinous matter.

If timber is not properly dried, the sap in it is apt to putrefy and cause the wood to decay or decompose. The process of destroying the ferment spores and drying the timber is termed *seasoning*. It is most commonly performed by stacking the planks for many months in such a manner that fresh air can readily circulate round each piece. The timber gradually becomes dry, but oxidation no doubt plays an important part in destroying ferments and drying resinous matter. If the wood is confined in moderately moist air, and especially warm air, instead of being allowed ample ventilation, it is likely to develop *dry rot* and decompose; the products of decomposition being hydrogen and carbonic acid. Dry rot shows itself in the form of a fungus which gradually spreads itself over the surface of the timber, and often causes it to emit a musty odour. By making chemical analyses of woods which have undergone dry rot, it has been found that the longer the period in which the decay has been allowed to operate, the greater is the proportion of carbon in the remaining wood; in other words, the hydrogen is oxidised in larger proportion than the carbon.

Wet rot is produced in wood that is repeatedly soaked in water—usually rain—and exposed to the extremely slow drying action of the almost saturated air surrounding it. It may sometimes be seen upon growing trees. It appears that in the case of wet rot the products of decomposition are somewhat different to those produced by dry rot, but in both cases carbonic acid is evolved.

Timber is sometimes seasoned by soaking it under water for a week or two and then carefully drying it and exposing it to fresh air as in ordinary seasoning. In order to quicken the process of seasoning the timber is sometimes immersed in boiling water or subjected to the action of steam. *McNeil's process* consists in exposing the timber at a moderate heat in a brick chamber to the action of water vapour and the gaseous products of burning fuel. Seasoning by *smoke drying* consists in drying the timber over the hot "smoke" from a large wood fire.

When timber is seasoned, it of course loses weight, on account of the evaporation of the sap. According to Tredgold, *seasoned* timber which is used for ordinary carpenter's work is wood that has lost one-fifth of its weight; while *dry* timber, used for joiners' work, has lost one-third of its weight.

In addition to dry rot and wet rot, timber is liable to be attacked by certain worms and insects. Many processes have been introduced for preserving wood from these attacks and from the diseases to which it is liable, but by far the most successful is the *creosoting* treatment. By Bethell's creosoting process, the air and moisture are sucked from the pores of the timber by placing it in a closed wrought-iron cylinder connected with a suction-pump, then the hot creosoting liquor (120 deg. F.) is forced in the cylinder and into the pores of the wood under great pressure. Several other disinfectants, notably corrosive sublimate, could be used with almost equal effect in place of creosoting liquor, but are no better and are mostly more expensive.

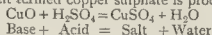
CONCLUSION.

Analytical Chemistry.

Qualitative Inorganic Analysis.—Occasionally the chief constituents of a mineral or other inorganic substance may be discovered by the application of a few chemical tests, but frequently the presence of one element conceals that of another which should be shown by the same test; in the presence of several elements, and especially of a little organic colouring matter, mere testing in a haphazard manner is apt to give misleading results. To discover the composition of an unknown compound, the substance should be subjected to a *systematic* analysis. It is a good plan to make a preliminary examination of the substance in a *dry way*—e.g., its behaviour when heated in the blow-pipe flame, its behaviour when heated with a borax bead, &c. The indications

obtained by this examination should then be confirmed by making a complete systematic analysis of the substance by the *wet* process, which consists in adding to the solution of the substance certain other solutions and observing the effect produced.

For convenience sake the wet analysis is divided into (1) an examination for the base or bases, and (2) an examination for the acid or acids. A *base* is a compound which is capable of decomposing an acid to form a *salt*. Thus, when the base, copper oxide, is treated with sulphuric acid, a salt termed copper sulphate is produced.



By a qualitative analysis it is possible to find the metal from which the base is formed and the acid which neutralised the base. Thus in the case of copper sulphate in the examination for the base, copper would be found, and in the examination for the acid, the radicle SO_4 would be detected. Hence there could be little doubt that the substance under examination was copper sulphate. It is usual to say that the analysis showed the presence of copper as the base, and of sulphuric acid as the acid. This is not strictly correct, for in copper sulphate and other neutral salts there is no acid, and copper by itself is not a base. For the terms "base" and "acid" it has been proposed to substitute the expressions *positive radicle* and *negative radicle*. Copper oxide, CuO , would be a positive radicle, and SO_4 (from H_2SO_4) a negative radicle.

Dry examination.—The compounds of certain metals when heated on charcoal with a flux are reduced to a metallic state. This reduction may be performed by the aid of a mouth blowpipe and



FIG. 18.

a piece of hard charcoal, say 4 in. long and 2 in. in diameter.

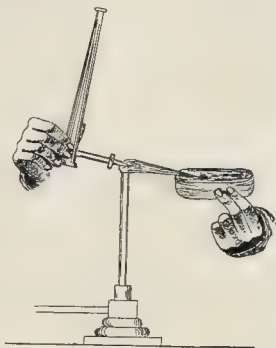


FIG. 19

To use the blowpipe, close the holes at the bottom of the Bunsen burner. A luminous flame is obtained. Place the nozzle of the blowpipe in the centre of the flame and blow a moderately strong, continuous blast through the mouthpiece. A blue non-luminous flame may be thus obtained which contains a large excess of air, and consequently of oxygen. It is termed the *oxidising* flame, and if its tip or apex is applied to certain substances it oxidises them. For instance, if a lead bead is placed upon charcoal and heated in the tip of this flame, a yellow crust of litharge, PbO , is produced. If instead of placing the nozzle of the blowpipe in the gas-flame it is held on the border of it and a gentle blast is sent through it, a flame which is partially luminous is formed. The luminous portion of the flame contains solid carbon particles which require oxygen to convert them into gaseous CO and finally into CO_2 . Certain substances containing oxygen when held in the luminous portion of the flame yield their oxygen and are reduced to the metallic state. For example, the PbO obtained by heating metallic lead in the oxidising flame may be again

obtained in the metallic state by heating it with a little sodium carbonate in this *reducing* flame. The sodium carbonate merely renders the oxide more readily fusible—i.e., it acts as a flux. It is probable that the charcoal upon which the oxide is heated, aids in its reduction. Compounds of the following elements are reduced to metallic beads when heated with dry sodium carbonate upon charcoal in the *reducing* flame.

Silver	} Soft malleable beads.
Lead	
Bismuth	} Hard brittle beads.
Antimony	

If in addition to sodium carbonate, potassium cyanide is mixed with the substance, compounds of

Tin
and
Copper

may also be reduced to the metallic state. The copper beads may be recognised by its red colour. Compounds of zinc and cadmium are also reduced to metal when heated in charcoal with reducing agents, but are almost simultaneously converted into oxides by the atmospheric oxygen. Zinc forms a white oxide, cadmium a brown oxide.

Coloured flames.—Compounds of certain metals when held in a non-luminous flame impart a characteristic colour to it. Moisten a clean platinum wire with HCl , dip the wire in the powdered substance, hold it in the non-luminous Bunsen flame, and observe if any particular colour is imparted to the flame.

Compounds of

Barium	give a	Green	flame.
Calcium	"	Red	"
Copper	"	Bluish green	"
Potassium	"	Violet	"
Sodium	"	Yellow	"
Strontium	"	Crimson	"

Arsenic imparts a livid blue colour to the flame, which somewhat resembles that produced by potassium compounds; but when arsenic is burnt it produces at the same time a dense white smoke of arsenious oxide.

Borax beads.—If a platinum wire with a loop in it (fig. 20) is heated, dipped while hot in



FIG. 20

powdered borax, and reheated in the non-luminous Bunsen flame, a colourless, glassy-looking bead is formed in the loop of the wire. If this glass bead is dipped in certain compounds of the metals and heated in the Bunsen flame, it dissolves them, and at the same time assumes a characteristic colour. In some instances the colour of the bead is not the same when hot as when cold. Only a *very small* quantity of the compound under examination should be taken upon the borax bead; if too much is taken, the bead, when heated, becomes black, or nearly so, and is no longer transparent. The bead may easily be removed by heating it and cooling it suddenly in water.

Compounds of the following metals may sometimes be detected by means of the borax bead:—
Colour imparted to borax bead in the—

	Oxidising flame.	Reducing flame.
Chromium...	Yellowish green	Emerald green.
Cobalt	Blue	Blue.
Copper	Blue	Blue, brown in presence of trace of tin.

Iron	Yellow	Green.
Manganese...	Pink or amethyst	Colourless.
Nickel	Reddish yellow	Dirty grey.

The foregoing are the most important of the dry tests.

Systematic Analysis.

The first process is to obtain the substance—if solid—in solution. If possible, it should be obtained in solution by the aid of distilled water only. If the substance is insoluble in boiling HCl or in aqua regia, it is probably a clay, and should be analysed by the process described under experiments Group 9 and 10. Sulphate of barium would also be insoluble in HCl or aqua regia, but is soluble in hot concentrated sulphuric acid. In the following scheme, it is taken for granted that only the common elements are present.

Examination for the Metal of the Base or Positive Radicle.

The metals are divided into five groups, the grouping being arranged with regard to their behaviour when brought into contact with certain compounds termed *group re-agents*.

Metals.	Group re-agent.
Group I.—Silver, mercury, lead	HCl.
Group II.—Mercury, lead, copper, bismuth, antimony, tin, cadmium.	H ₂ S in the presence of HCl.
Group III.—Aluminium, chromium, cobalt, iron, manganese, nickel, zinc.	Ammonium sulphide in the presence of ammonium hydrate and ammonium chloride.
Group IV.—Barium, strontium, calcium, magnesium.	Ammonium carbonate in the presence of ammonium hydrate and ammonium chloride.
Group V.—Sodium, potassium (ammonium).	—

There is no re-agent which will precipitate two or more members of Group V.; they are distinguished from one another by tests characteristic to each.

Group I.—Is a solution of the substance. To a solution of the substance add a slight excess of HCl. If a white precipitate is formed, it may be caused by the presence of Pb, Ag, or Hg, or all three together. The white insoluble compound obtained is, of course, *chloride* of lead, silver, or mercury, as the case may be. Filter off the pp., and treat the clear filtrate as described below for the metals of Group II. To ascertain what the white pp. is composed of, transfer some of it to a test-tube, boil with distilled water, and filter while still hot. PbCl₂ is soluble in boiling water, but almost insoluble in cold water. If white crystals deposit out in the filtrate upon cooling, they will be found to consist of PbCl₂, but a small quantity of the filtrate should be treated separately with dilute H₂SO₄, when, if lead was present, a white pp. of lead sulphate will be formed. Another portion of the same filtrate should be treated with potassium chromate solution; a yellow pp. of lead chromate will be produced in the presence of lead. If neither H₂SO₄ nor K₂CrO₄ cause any precipitation in the filtrate, lead is not present in it. The portion of the white precipitate which was not soluble in boiling water should be placed in a test-tube and shaken with ammonia solution (NH₄OH). If the white pp. is blackened, it indicates the presence of mercury, the mercurous chloride being oxidised to black mercurous oxide. Dilute the contents of the test-tube and filter off any insoluble mercurous salt. If any silver was present it will be in the filtrate now obtained, and may be detected by an excess of dilute HNO₃. Ammonium nitrate solution and an insoluble white curdy pp. of AgCl will be formed.

Group II.—Through the solution from which the metals of Group I., if present, have been removed, pass excess of H₂S gas. (The solution should be distinctly, but not strongly, acid with HCl; if much HNO₃ is present, the H₂S will be decomposed by it and the experiment spoiled.) The gas should be passed through the solution until it smells strongly of the gas.

If no precipitate is produced, the solution may be treated for the metals of Group III.

If a precipitate is produced, filter and treat filtrate for metals of Group III. The precipitate may be due to the presence of mercury as a mercuric salt, or lead which was not precipitated by HCl in Group I. Sb, Cu, Bi, Sn, As, and Cd would also be precipitated as sulphides in an acid solution. The sulphides of copper, bismuth, mercury, lead, are black; that of tin yellow or brown, whilst arsenic sulphide is yellow and sulphide of antimony orange in colour. The precipitate having been collected on a filter should be well washed with hot water, transferred to a beaker and warmed for about fifteen minutes with ammonium sulphide, and filtered. The filtrate may contain Sn, Sb, or As, the sulphides of these metals being soluble in ammonium sulphide (NH₄)₂S. To this filtrate add HCl in slight excess. If only a slight white or yellowish white precipitate is produced, it is probably only sulphur, and the solution may be considered as free from Sn, Sb, or As. If a yellow, brown, or orange-coloured pp. is formed, it should be collected on a filter, washed, transferred to a test-tube or beaker, and boiled for about a quarter of an hour with strong ammonium carbonate solution. Filter. The filtrate may contain arsenic. Add HCl until the filtrate is acid, pass H₂S through it, and collect the pp. on filter; then dissolve it in HCl, add a few crystals of KClO₃, test the solution for arsenic by Reinsch's test or Marsh's test. The residue which was not soluble in ammonium carbonate solution may contain Sb or Sn. It should be washed and dissolved by boiling in strong HCl. Dilute, filter if necessary, and divide filtrate into two portions. In one portion immerse a piece of platinum foil and a piece of zinc, the two metals being so placed as to touch one another. If antimony is present in the solution, a black

stain will appear upon the platinum. Boil the other portion for five or ten minutes with some clean metallic copper. Decant off the solution, and add to it some mercuric chloride (HgCl₂). The production of a white or grey precipitate indicates the presence of tin.

Examination of the residue insoluble in ammonium sulphide, which may contain sulphide of lead, copper, bismuth, cadmium, or mercury. Boil it with strong HNO₃, dilute with water, and filter.

Residue. May contain Hg or Pb. Dissolve in aqua regia, evaporate nearly to dryness to expel most of the acid, dilute and add SnCl₂. White pp. (mercurous chloride) changing to grey (metallic mercury) indicates the presence of mercury.

Filtrate. May contain Pb, Bi, Cu, or Cd. Evaporate the solution to expel most of the acid, and add dilute H₂SO₄; a white pp. indicates lead. Filter, if necessary, and add excess NH₄OH. A white pp. indicates Bi. Filter. The residue should be dissolved in HCl, evaporated to small bulk, and largely diluted with water, when the reappearance of a white pp. confirms the presence of Bi. The ammoniacal filtrate from the first bismuth pp. should be acidified with HCl, and treated with H₂S gas. The pp. should be collected on filter, washed, and boiled with dilute H₂SO₄. Again filtered. Black insoluble residue indicates Cu. Through filtrate pass H₂S. Yellow pp. indicates cadmium.

Group III.—To the solution from which the metals of Groups I. and II., if present, have been removed, add excess of NH₄OH, and then NH₄Cl and ammonium sulphide. If no pp. is produced, proceed at once to examine the solution for the metals of Group IV.

If a pp. is produced, it may be caused by the presence of Fe, Ni, Co, Al, Mn, Cr, or Zn. Collect pp. on filter, wash with water containing (NH₄)₂S, and finally with water alone. Examine filtrate for metals of Group IV. Treat the pp. with cold dilute HCl, and filter if any residue remains insoluble. If such a residue remains, it will be black, and due to nickel or cobalt, or both; it may be tested on charcoal in the blow-pipe flame, also by means of the borax bead. To the filtrate is added excess of KHO solution. Boil, dilute, and filter while hot.

Filtrate. Divide filtrate into two portions. To one add NH₄Cl, and allow to stand for some time. The formation of a gelatinous white pp. indicates the presence of aluminium. Through the other portion pass excess of H₂S. White pp. (ZnS) indicates presence of zinc.

Residue. Dissolve a portion of the residue in HCl, and add potassium ferrocyanide solution. If iron was present, a blue pp. will be obtained. Take a very small further portion of the residue and fuse it with pure nitrate of potassium; if chromium was present, a bright yellow mass of potassium chromate will be obtained. Fuse a further portion of the residue with Na₂CO₃ and KNO₃ on platinum foil. If manganese was present, the mass will assume a bright green colour.

If phosphate of lime or other phosphate was present in the original substance, it will have been precipitated in this group when KHO was added to the acid solution. A small quantity of the pp. should therefore be redissolved in HCl, mixed with excess of ammonium acetate and tested with a drop of perchloride of iron solution. A white or light brown pp. indicates the presence of a phosphate. If this pp. is filtered off and the filtrate treated with a small quantity of NH₄OH to remove any excess of iron, and again filtered, the filtrate may be examined for the metals of Group IV.

Group IV.—To the solution from which all the metals that were present of Groups I., II., and III., if any, have been removed, add an excess of ammonium carbonate. A white pp. indicates the presence of Ca, Ba, Sr, or Mg. Dissolve pp. in acetic acid, and add excess of potassium chromate solution; a pale yellow pp. indicates the presence of barium. Filter, to filtrate add excess of dilute H₂SO₄; if strontium was present, a white precipitate, insoluble in HCl, will be at once produced. Filter and make filtrate just alkaline with NH₄OH, boil and add excess of ammonium oxalate. A white powdery pp. indicates presence of calcium. Filter if necessary, and to filtrate add NH₄OH and sodium phosphate solution; the formation of a white crystalline pp. indicates the presence of magnesium.

Group V.—The alkalis comprising Group V. are searched for in a fresh portion of the original solution. Ammonium compounds are easily detected through the fact that when boiled with caustic soda or potash solution they decompose and evolve ammonia, which may be recognised by its odour and by its action upon red litmus paper. Soda salts are soluble in water. They are not precipitated by any known re-agent, but are usually obtained by evaporating their solution to dryness. Small quantities of sodium salts

suffice to impart an intensely yellow colour to a non-luminous flame. Potash salts impart a violet colour to a non-luminous flame, which is, however, frequently concealed by the yellow sodium colouration. If the flame is viewed through a piece of blue glass, the potassium flame appears of a reddish violet colour, and may be distinguished even in the presence of sodium. PtCl₄ produces a yellow pp. in solution of potassium salts, if they are not too dilute.

Detection of the common inorganic Acids or of the common Negative radicals.

For the detection of the acids no such systematic process is known as that employed in the case of metals. The following are the tests most commonly used:—

Acid.	Negative radical.	Test.
Hydrochloric. Cl (chlorides)	Acidify the solution with HNO ₃ , and add excess of AgNO ₃ solution. A white curdy pp. indicates the presence of Cl.	
Sulphuric SO ₄ (sulphates) ..	Acidify with HCl, and add BaCl ₂ ; a dense white pp. indicates SO ₄ .	
Sulphurous .. SO ₂ (sulphites) ..	Add HCl, and observe the odour of SO ₂ evolved.	
Nitric NO ₃ (nitrates) ..	(a) Add strong H ₂ SO ₄ and some copper turnings, heat gently. Evolution of ruddy fumes indicates HNO ₃ or HNO ₂ , or NO ₂ ; or (b) Add to the solution some strong sulphate of iron solution, hold the test-tube in a slanting position and pour down it some strong H ₂ SO ₄ . In the presence of nitric acid or nitrates a brown ring appears at the junction of the two liquids, which, however, disappears on heating.	
Phosphoric .. PO ₄ (phosphates).	Add dilute HNO ₃ , then ammonium molybdate solution and boil. A finely divided yellow pp. is produced upon standing in the presence of phosphoric acid.	
Boracic BO ₃ (borates)	Evaporate the solution (from which copper, if present, has been removed) to dryness, add few drops strong H ₂ SO ₄ , mix with alcohol, and ignite. If a green colour is imparted to the alcohol flame it indicates presence of boracic acid.	
Arsenious AsO ₃ (arsenites) ..	(a) Add excess of acetic acid and AgNO ₃ ; a yellow pp. is produced in the presence of arsenious acid. (b) Add CuSO ₄ solution. A pp. of Scheele's green is obtained.	
Arsenic AsO ₅ (arsenates).	Gives a red pp. upon addition of nitric acid and AgNO ₃ in excess. Chromic acid gives a very similar precipitate, but an acid solution of the latter will give a yellow pp. with lead acetate; arsenic acid will not.	
Carbonic CO ₂ (carbonates).	All carbonates effervesce upon the addition of acid, and give off CO ₂ , which, when passed into lime or baryta water, produces a white pp.	
Hydrosulphuric S or S ₂ (sulphides) or Sulphuretted Hydrogen.	(a) HCl, or H ₂ SO ₄ , decomposes most sulphides, causing SH ₂ to be evolved. A black pp. is produced in a solution of a sulphide upon the addition of AgNO ₃ solution.	

With this we conclude our notes on Chemistry for the architectural student, which we hope will be found useful in enabling students, without going too far into the detail of chemistry, to understand the chemical actions and conditions of substances used in building.

SURVEYORSHIPS.

ARNOLD (NOTTS).—At the monthly meeting of the Arnold Local Board of Health, held on the 12th inst., Mr. F. W. Jackson, F.S.I., of Nottingham, was appointed their Surveyor, in the place of his father, Mr. F. Jackson, C.E., F.S.I., lately deceased, who for a period of thirty-five years held the appointment.

GENERAL BUILDING NEWS.

THE CAPITAL AND COUNTIES BANK, LIMITED.
HEAD OFFICES. The head offices of the Capital and Counties Bank, Limited, situated at the corner of Threadneedle-street and Bishopsgate-street Within, E.C., have been reopened in their entirety after undergoing extensive alterations, additions, and entire refitting. The original premises occupied the old site of the Church of St. Martin Outwich, demolished some years ago, but they have been extended to include the two adjoining properties Nos. 37 and 38 Threadneedle-street, the whole now forming one building. The basement, ground floor, and portion of the first floor are occupied by the bank; the remainder of the premises is arranged for separate tenancy, good accommodation for caretakers being also provided. The original building had been considerably restricted by surrounding rights of light, and while these have been modified by negotiation their influence has still been felt to a great extent in the present operations. The entire work has been carried out by Messrs. Patman & Fotheringham, under the direction of the architects, Messrs. Kidner & Berriery.

RESTORATION OF HEMINGBROUGH PARISH CHURCH, YORKSHIRE.—On the 7th inst. the Parish Church of Hemingbrough was reopened, after partial restoration, by the Bishop of Beverley. The work was divided into four sections, two of which have now been completed, and consist of the removal of the old galleries, seats, &c., the removal of the old roof, a thorough repair of the old beams, the re-casting and re-covering of the roof with lead, &c. The ceiling of the nave has been panelled with English oak, and a new panelled oak ceiling has been placed under the tower. The walls have been cleaned and repaired, and a new window erected in the clerestory. Kerpston, the masonry has been carried out, whilst a new floor has been put down in the belfry. New oak has been put in at the west entrance, but care has been taken to preserve the old ironwork, which has been made use of on the new doors. The old brick floor has been taken up in the nave, transepts, and aisles, the whole of which have been refloored with polished Pateley Bridge flags on a bed of concrete, that portion reserved for the seating of the congregation being laid with Lowe's patent wood block flooring. The architect was Mr. W. H. Brierley (Messrs. Demaine & Brierley), York, and the contractor, Mr. Thos. S. Ullathorne, builder, of Selby.

PROPOSED INFECTIOUS DISEASES HOSPITAL, BIRKENHEAD.—At the monthly meeting of the Birkenhead Town Council on the 7th inst., the Health, Baths, and Parks Committee recommended the erection of a fever hospital, containing an isolation ward, administrative block, and three wards of twelve beds each, at a total cost of 14,000l., exclusive of the amount already expended on the site and walls, or about 15,000l. altogether. Mr. Cook moved, as an amendment:—"That the Health Committee be authorised to obtain plans and estimates for an infectious diseases hospital, to be erected on Playbrick Hill site, such hospital to consist of three pavilions, each to contain twelve beds; or thirty-six beds; one isolation or reception ward; eight beds; total, forty-four beds, together with suitable administrative block (capable of future extension), porter's lodge, laundry, and disinfecting block, mortuary, &c., at a total outlay, including the enclosing the site, and upon the plans, quantities, and all other costs up to date not exceeding 13,000l." He contended that the scheme which he proposed would better meet the needs of the case than did the committee's proposal. Mr. E. P. Smith seconded. Upon the vote being taken, it resulted in the resolution being carried by 30 votes to 11, and the minutes were then confirmed.

NEW POLICE BUILDINGS, SOUTH SHIELDS.—On the 6th inst. the new police buildings at South Shields were opened by the Mayor (Ald. Rennoldson, J.P.). The new buildings occupy a site between the present police station in Waterloo Vale and the North-Eastern Railway. They are faced with red pressed bricks and stone dressings, the roof being covered with red tiles. In the centre of the front there is a tower, beneath which, in Kippel-street, is the entrance to the principal floor. Here there are courts for Police and County Court business, with adjoining rooms for magistrates and their clerks, solicitors, male and female witnesses, and the Chief Constable, and police clerks. A suite of offices has also been provided for the Town waiting room for prisoners, &c. From the latter prisoners will be taken up a stairway leading direct into the dock in the police court. An airing yard and a fire-proof munition room are also provided. The whole of the prisoners' department is faced with ivory-white glazed bricks. To the rear of the main building there is a drill yard, on the west side of which are fire brigade buildings, containing engine-house and other necessary departments. The first and second floors of the main building and fire brigade depot are

arranged in suites of rooms for married police-constables, and there is a laundry and wash-house attached. A house for the Chief Constable is built upon an adjoining site. The courts, corridors, and cellars are heated by hot-water pipes and coils, and the ventilation is mechanical, having a Blackman fan, driven by a gas-engine, for the extraction of foul air. Gas fittings have been arranged throughout the buildings, and provision has also been made for lighting them by electricity. Out of a large number of plans sent in for competition, those of the reference (Mr. G. G. Hoskins, of Darlington), and from these the new premises have been erected, the general contractors for the works being Messrs. Armistead & Hodgson, of Leeds. The sub-contractors were Messrs. Watson, Workshop, & Co., of Leeds, slating and tiling; Lazenby & Co., Leeds, slubbing and glazing, &c.; J. P. Mount, Leeds, plastering; T. Cranston, Leeds, painting; T. H. Churton, Leeds, wiring for electric light and electric bells; Robert Middleton, Leeds, hydraulic and hand hoists; Henry Holmes & Co., Leeds, iron girders and railing gates, &c.; Dunning & Cooke, Newcastle, heating and ventilation; John Clarke, Fyall, & Co., Hall & Co., South Shields, grates and metal work; Bainbridge & Crimmon, South Shields, metal-work, &c. Mr. Isaac Graham, of Manchester, has been clerk of the works. The total cost of the new buildings has been about 22,000l.

RESTORATION OF ST. JOHN'S CHURCH, PERTH.—On the 1st inst. St. John's East Parish Church, Perth, which has been internally restored at a cost of considerably over 2,000l., was re-opened. The church, which occupies, says the *Glasgow Herald*, the choir and sanctuary of the original building, has been in the hands of tradesmen for more than six months, the object being to restore it as far as possible to its former appearance. The galleries, which occupy two sides and the end of the church, have been removed, and the stone work of the walls, pillars, and arches cleaned, so as to show the fine masonry long concealed by successive coats of paint and whitewash. The floor has been relaid in pitch-pine blocks in herring-bone pattern, oak being applied in the passages and laid on asphalt. The church has been re-seated with benches, the choir stalls on the dais at the east end of the church have moulded and carved ends, and the magistrates are accommodated at the west end in stalls having carved and enriched canopies. A new pulpit of red Corshill stone has been erected against the first pillar of the north-west bay, and a communion-table of similar stone, with Devonshire marble top, is placed in the centre of the dais under the east window. The organ has been removed from the east window and placed in the east bay of the north aisle. For the first time the building has been lighted with gas, and a low-pressure hot-water heating apparatus has been fitted up. The work of removing the windows, which were erected to light the galleries; the substitution of a wooden ceiling for the plaster one that now exists, and the filling of the east and other windows with stained glass of proper design has not yet been undertaken. The work was executed from designs, and under the superintendence of Messrs. Heiton & Granger, architects, Perth.

SCHOOLS, &c., SOUTHWICK, DURHAM.—New day schools, parishioners' hall, and other buildings attached to St. Columba's Church, Southwick, Sunderland, were opened and dedicated by Dr. Westcott, the Bishop of Durham, on the 10th inst. The total cost of the buildings, including the furnishings, which have been made by Messrs. D. & J. Ranken, the general contractors for the work, is a little over 4,000l. Mr. Frank Caws, of Sunderland, is the architect. The buildings, which are built of brick, comprise two blocks which are separated by a playground. The main school block has two entrances, and is planned on the central hall principle. The central hall, with platform, is 74 ft. 6 in. long, by 42 ft. wide, and 30 ft. high, the interior being rendered similar to the church architecturally by means of arched side walls, the arches of which are grouped with red terra-cotta moulded brick bands. The whole of the main building is under one roof, with a span of 93 ft. There are class-rooms and other modern arrangements.

CONGREGATIONAL CHURCH, MANCHESTER.—The new Octagon Church, Stockport-road, Manchester, has just been opened. The building occupies a site in front of the old school chapel, which will now serve as an enlarged schoolroom. The cost of the undertaking has amounted to about 5,000l. The architect of the building is Mr. F. W. Simons, Edinburgh, and the builder was Mr. Henry Matthews, Manchester.

RESTORATION OF KINLET CHURCH, SHROPSHIRE.—On the 9th inst. the ancient church of Kinlet, situate between Bewdley and Clebury, Martine, was reopened, after restoration. The cost of the work has been about 3,000l., and it has been carried out under the direction of the vicar of the parish (the Rev. J. Case), from plans by Mr. Oldrid Scott.

NEW CO-OPERATIVE STORE AT WEST HARTLEPOOL.—The block of buildings recently erected on a site opposite the Catholic Schools, at the corner of Whitby and Lamb-streets, West Hartlepool, by the Hartlepool Co-operative Society, was opened on the 7th inst. The building, which includes an

assembly room capable of holding nearly 1,000 persons, has been built of Gnosmont brick with stone facings, from the designs of Mr. W. Young, architect, West Hartlepool, and extends to an elevation of 63 ft.

SHOPS, WEST HARTLEPOOL.—On the 31st ult. the foundation-stone of the new shops being built by the West Hartlepool Council on the Lyme-street frontage of the market, was laid by the Mayor (Ald. J. Robinson). The shops are designed by the Borough Surveyor (Mr. Brown), and between them will be three entrances to the market behind, the total cost being estimated at about 6,000l.

BUILDINGS IN ABERDEEN.—Contract for the first instalment of the University extension scheme—the new graduation hall and anatomical department at Marischal College buildings—have now been settled, the aggregate of the accepted offers being 18,631l. 16s. 6d. This is exclusive of the new tower, a feature in the arrangements, which will be subsequently estimated for. The details of the rest of the scheme, which are somewhat complicated, have not yet been finally adjusted. Mr. A. Marshall Mackenzie, A.R.S.A. (of Messrs. Matthews & Mackenzie), Aberdeen, is architect. To meet the Government requirements as to cost, the plans of the new City police buildings to be erected on the site of the old county prison, Lodge Walk were amended, the provision for a barracks being omitted. Contracts for the works have now been accepted, amounting in all (including painting) to 10,187l. The designs are by Mr. John Rust, junior, City Architect and Town's Superintendent of Works, Aberdeen.

CATHOLIC CHURCH AND SCHOOLS AT FELLING, DURHAM.—Plans have recently been approved by the Felling Local Board for a new Catholic Church, near the railway station, to seat 1,000 persons, with meeting room in a basement under part of the church, and with double sacristies adjoining the altar end, connected by a covered corridor with the Presbytery, which is already built. Stone buildings have been purchased for Catholic Schools. They have been added to and fitted to modern requirements. The designs for both church and schools are by Mr. Charles Walker, architect, Newcastle.

CHURCH, MOSLEY, LANCASHIRE.—On the 10th inst. the foundation-stone of a new church, which is being erected in Micklehurst, Mosley, was laid by the Bishop of Chester. The new church has been named All Saints', and it is estimated that it will cost over 6,000l. Sitting accommodation will be provided for about 400 persons. Messrs. Potts, Son, & Pickup (Oldham and Manchester) are the architects.

UNITARIAN CHAPEL, MIDDLETON, LANCASHIRE.—On the 17th inst. the new Unitarian Chapel at Middleton was opened. It has been erected from the designs of Mr. Edgar Wood, occupies the site of the old structure in Manchester Old-road, and consists of two stories and a basement, the second story to be used for chapel purposes and the ground floor as Sunday school and lecture hall. The cost of the erection is about 1,800l.

CHAPEL AND SUNDAY-SCHOOL, AT OSSETT, YORKSHIRE.—On the 17th inst. the foundation-stone of new premises for the United Methodist Free Church, Ossett, were laid by Councillor H. Wormald. The building is to be erected from the plans of Mr. Reuben Castle, architect, Cleckheaton, and will cost nearly 3,000l. The basement is allotted to the Sunday-school, with eight class-rooms and three separate entrances. The chapel will provide sitting for 400 persons on the ground floor and go in the galleries. The outer walls will be of Delph stone.

ADDITIONS TO YEADON PARISH CHURCH, YORKSHIRE.—A new chancel and vestries, added to the parish church at Yeadon, were consecrated by the Bishop of Ripon on the 5th inst. The chancel opens into the nave by a moulded arch, supported by clustered columns, and at the east end there is a large five-light window, with Geometrical tracery in the head. To the north of the chancel, and opening into it by an arch of a similar character, is the organ chamber, and to the south are the choir and clergy vestries, each about 17 ft. in length. Sedilia and credence table are fixed into the main wall of the chancel, the floor of which is tiled marble, whilst the choir stalls are polished walnut. The nave of the church has been re-seated with pews of similar material; a new floor has been put down, and the walls have been replastered and coloured. The plans were drawn by Messrs. T. H. & F. Healey, architects, of Bradford, and the whole of the work has been done by Mr. James Tivoler, of Yeadon.

RESTORATION OF BRISTOL CATHEDRAL.—According to the *Bristol Times and Mirror*, the Executive Committee met in the Chapter-room, Bristol, on the 14th inst. A report was made of the progress in the restoration of the Tower and Lady Chapel. The former necessitates very cautious handling and the careful removal of stone by stone, preserving all that is possible of the ancient work. So far, commencing from the base of the tower, the renovation now extends some 6 ft. upwards, and as it goes on will soon become visible from below. The interior walls and roof of the Lady Chapel are nearly completed; but upon the recommendation of Mr. Pearson, the architect, it has been found necessary to build a new buttress to the wall of the north transept, at its north-eastern angle, in order

DOCK EXTENSION, NEWPORT, MONMOUTH.—The new southern extension of the Alexandra Docks, Newport, was opened on the 6th inst. The extension is 1,500 ft. long and 550 ft. wide, and covers 20 acres. The original plan provided for a water space of 28 acres, and this will be carried out when circumstances justify such action. The dock is 503 ft. long and 72 ft. wide. In order to economise water a pair of gates is provided, two-thirds of the distance up the lock. The economy of the plan is obvious. It was necessary to excavate about 20,000 cubic yards, and 11,000 cubic yards of concrete and masonry were used in the construction of the passage, which is spanned by a wrought iron swing bridge, built by Messrs. Handiside & Co., Derby. The bridge carries both railway and road traffic, is 122 ft. long

and 16 ft. wide, and the span is 66 ft. The pipes for the hydraulic apparatus were supplied by Messrs. T. Spittle, Limited, Newport. The total cost of the dock and appliances is over 500,000. The engineer was Mr. W. Stopford Smyth.

FOREIGN AND COLONIAL.

FRANCE.—The Spitzer sale, which has just concluded, has realised a total of 9,107,931 francs. The Académie des Beaux-Arts has awarded the following prizes: the Bizard prize (sea-painting) to M. Rudeaux for his picture in the old Salon, "L'Escaadre du Nord"; the Maxime David prize (miniatures) to Mlle. Jeanne Coutal; the Desprez prize (sculpture) to M. Larche; the Bordin prize to M. Rosin for his study on the evolution of architecture from the Gallo-Roman epoch to the present day; the Piot prize (for a nude study of a child) to M. Jouve.—An art exhibition is to open at Fontenay-sous-Bois (Seine), from the 6th to the 13th of August. The Art Society of Roubaix-Tour-coing will open its tenth annual exhibition at Roubaix from the 17th of September to the 3rd of October.

The small town of Pézenas (Hérault) has resolved to raise a monument to the memory of Molière, who in 1656 represented several of his pieces at the theatre of that town. The execution of the monument will be entrusted to M. Injalbert.—There is to be a public burning of the Trocadero of the designs sent in for the monument to be erected to Doudart de Lagrée.—There has been found, in a field near Perpignan, a vase containing some curious coins of the ancient Kingdom of Majorca, struck at Barcelona in 1212.—M. Falcigère has completed the model of the monument to be erected to the memory of Biot. The monument is composed of a stele supporting a bust. Behind the bust is a violin scattering flowers, and a figure symbolising Carmen is seated on the base.—The Minister of Public Instruction inaugurated last Sunday the new Hotel de Ville of Château Thierry.—A committee has been formed to raise a monument at Bordeaux to the memory of M. Alexandre Dumas; it is to be executed by M. Pierre Granet, sculptor.

Last Sunday there was inaugurated, at Nancy, the monument to the celebrated caricaturist T. T. Grandville. The monument, the work of M. Bussière (sculptor) and M. Jasson (architect), is composed of a column of rose-coloured Vosges granite surmounted by a bust of the artist. A statue symbolising "Caricature" is placed against the lower part of the column. On the occasion the Association des Artistes Lorrains held an exhibition of about 600 drawings by Grandville.—The jury of architecture at the Ecole des Beaux-Arts, commissioned to judge the competition of the first prize in architecture, has awarded a first medal to M. Bigot (pupil of M. Laloux), and second medals to MM. Chessel, Rochefrette, Auburtin, Murier, and Delaunay. The subject was "The entrance of a great Theatre."

General Loignon, who has succeeded M. de Freycinet as War Minister, is said to be very favourable to the project of the suppression of the Paris fortifications, which has been so long demanded by the inhabitants of Paris.—The monument which was erected a few weeks ago, near the Observatory, to the memory of François Arago, was executed, as far as the sculpture is concerned, by the late M. Olive, and the pedestal designed by the architect M. Joannis.

BERLIN.—The Emperor, whose decision is final in such matters, has given his consent to the construction of the proposed electric elevated railroad as designed by Messrs. Siemens & Halske.—The Minister of Commerce has called together a special committee to devise suitable means to protect Berlin against the smoke nuisance. Berlin of late has been prone to mists and minor fogs under certain atmospheric conditions.—The municipal authorities have voted 5,000l. for the encouragement of art by purchase of works by young painters and sculptors. A committee of fifteen will make the purchases. The sum is to be voted annually.—The question of extending the boundaries of Berlin has again been taken in hand by the municipal authorities, and a special commission has been elected to advise on the subject. The authorities wish the extension to be a limited one. The extension of Vienna is not to be initiated.—Mr. Walter Crane's works, which are being exhibited at the Kunstgewerbe Museum continue to attract many visitors, and are being much commented on in the local press.

VIENNA.—Two important international architectural competitions have been decided in the East—the one at Bucharest, the other at Esseg. The Bucharest competition was for the design of a large terminus station and an extensive block of offices for the railway administration. The first premium of 10,000 francs (together with a commission of 100,000 francs for a set of working drawings) has been awarded to Messrs. D. Mariel of Paris and Blanc of Bucharest, the second premium (30,000 francs) has been taken by M. Farge of Paris, and the third by Messrs. G. Magni and G. Parisi of Rome. Fifty-one designs had been sent in. The Esseg competition was for the design of a large church. In this case Germany, represented by Herr Lagenberg of Bonn, took the first premium, and Herr August Kirstein of Vienna the second.

RUSSIA.—The Moscow Society of Amateur Artists have decided to arrange an international gathering of artists which is to be known as an "Art Congress." The meetings will be held in January next. The "Congress" will be officially recognised and subsidised. The question of art education is to be thoroughly threshed out and special care given to the chemistry of pigments. Russian gatherings of this kind are generally excellently managed and of practical use.—Riga is now to have a new civic museum. A million francs and some fine collections have been bequeathed to the city.—The municipality of Riga has opened an international competition for designs of a new children's hospital. Sending in day is in September. There will be seven assessors.

MISCELLANEOUS.

CONSISTORY COURT OF LONDON.—In a "Note" on March 4 we adverted to the faculty for removing the remains from beneath the floor of St. Michael's, Bassishaw. At a sitting of the Court on the 5th inst., Dr. Tristram, Q.C., Chancellor, made an order to suspend proceedings under the faculty he had previously granted, it being found that further excavations—already carried deeper than 7 ft.—would endanger the stability of the fabric. The church, it appears, is in an insecure condition. The Vestry at a recent meeting resolved that the parish should be united to another adjoining, inasmuch as a sum computed at from 5,000l. to 6,000l. would be necessary for putting the structure into good order—an expense that would fall upon about seventy ratepayers of the small parish. Dr. Tristram undertook to report to the Bishop of London that it is desirable, in the circumstances, to carry out the resolution for union, and was of opinion that the Ecclesiastical Commissioners, who would take the purchase-money on sale of the site, should, in return, be charged with the cost of the charges already incurred and to be incurred. Meanwhile the church is to be properly propped up.

ROBERTS' ROOF WASHINGS TANK.—This tank is designed for obtaining pure rain-water from the roofs of cottages and other buildings that are too small for the patentee's rain-water separator. The Washings Tank is intended to hold the dirty water that first comes from the roof, and to direct the



Fig. 1.

clean water that comes down afterwards into the storage tank, without letting it mingle at all with the dirty water. The amount of washing is easily regulated by the zinc collars shown in fig. 1 below the outlet. When two collars are used, as in fig. 1, 6 gallons will be taken before any water runs into the storage; with one collar 13 gallons, and with no collar 3 gallons only. Fig. 2 gives a side view of the tank arranged to take water from a pipe coming down directly from the roof. Fig. 3 gives an end view of the same tank arranged to take water from a horizontal pipe that may be either above or below the surface of the ground. When used for a horizontal pipe, a zinc elbow will be required for the inlet; this should be ordered as extra.

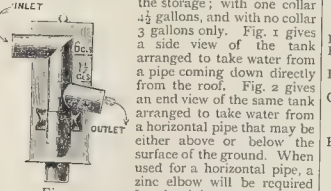


Fig. 2.

with the tank. The dirty water should be drawn off from the washings tank within a few days of each shower by lifting the handle of the valve, shown by dotted lines in fig. 1.

EFFECTS OF SEA-WATER ON CEMENT MORTARS.—According to some experiments recently made in France, and quoted in the last issue of volume of "Transactions of the Institution of Civil Engineers," it is shown that mortars immersed in sea-water increase in weight; first rapidly, afterwards more slowly. When exposed to the air, the weight first diminishes, then gradually increases. In some experiments, with cubes of neat cement, the sides of which measured 2.75 in. (7 centimetres), the increase of weight was found to be six per cent. after two years immersion in sea-water. With smaller masses, such as briquettes for testing the tensile strength, the augmentation in the same time was about ten per cent. The weight increases in salt water to a greater extent than in fresh. The proportion of water retained in a mortar, after drying was found not to be proportional to the percentage of cement, but was also influenced by the nature of the sand. The quantity of water used in

gauging also effected the amount retained. From recent experiments made by M. Teret to ascertain the action of sea-water upon cement mortar, it appears that in two stalagmitic excrecences which were formed on the surface of concrete immersed in the sea, the percentage of magnesia was about 30. A number of experiments were undertaken to throw light upon the variation of permeability in one and the same mortar, the action of the infiltrating liquid, the influence of the nature of the aggregate, of the proportion of cement, the composition of the sand, and various other points. A number of tensile tests were made with mortars composed of a great variety of substances mixed with cement. The highest result was obtained after the lapse of one year, with a variety of marble.

FRENCH COLONIAL BUILDINGS.—Some interesting details are given in *Le Génie Civil*, of buildings which have been recently approved by the Colonial Administration of France. The designs have been got out for a series of types of colonial buildings: for governors' residences, hospitals, prisons, &c. The special conditions governing the design are principally those of a want of skilled labour, and often of suitable material at the site of the buildings, the requirement for protection against tropical heat, and the rapid destruction of wood by insects, such as the white ant. The system of construction adopted is to make the main frame-work of the building, carrying the roof, of iron, and to fill in between the columns with double walls of brick. The outer wall is 44 in. thick, and the inner 9 in. The space between the walls is 20 in., and is readily accessible, so as to prevent the roof becoming a home for snakes and insects. It is open to the air at the top and bottom, so as to secure good ventilation. The roof is of corrugated iron, on iron rafters and principals, with an inner roof of plaster. The floors are on iron joists, and are made by setting tee-section secondary joists transversely to the main joists at 20 in. apart. Through the secondary joists are threaded a series of iron wires, forming a net-work of 4-in. squares. This net-work of iron wire is embedded in and binds together the concrete forming the floor itself. The partition walls stop short several feet below the ceiling for better ventilation. The rooms are 11 ft. 6 in. to 13 ft. in height. Verandahs about 10 ft. wide are carried along both faces of the building. The buildings are raised 5 or 6 ft. above the ground.

IMPORTATION OF CEMENT INTO RUSSIA.—The Russian cement manufacturers have petitioned the Government only to permit the importation into Russia of cement barrels weighing not less than 11 poond gross (1 poond=25 lbs.). The action is due to the circumstance that at present the Russian cement barrels weigh 11 poond but foreign ones only 9 poond, which causes consumers to prefer the latter.

FIRE AT MESSRS. CUBITT'S.—We regret to observe that a very serious fire occurred in Messrs. Cubitt & Co.'s joiner's shops, Gray's Inn-road, on Saturday last.

THE ARTISTS' BENEVOLENT FUND.—The 84th annual dinner in aid of this Fund was held on Wednesday evening last at the Holborn Restaurant, Mr. Henry Irving in the chair. During the evening Mr. Lambton Young, the Secretary, announced donations to the amount of over 800l.

MEETINGS.

SATURDAY, JUNE 24.

Architectural Association.—Visit to the Greenwich Royal Naval College, Hospital, &c. Meet at Old Swan Pier at 1.45 p.m.

S. Paul's Ecclesiastical Society.—Visit to the Church of Horton Kirby, under the guidance of Mr. John P. Seddon. Glasgow Architectural Association.—Visit to Duntrath Castle, &c.

WEDNESDAY, JUNE 28.

Builders' Foremen and Clerks of Works' Institution.—Half-Yearly Meeting of the Directors. 8 p.m.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

10,341.—WALL DECORATION: H. R. and E. Sankey.—This invention relates to improvements in decorating walls, and is especially applicable to unsightly exterior walls. It consists in covering the wall with tiles, some being flat or of ordinary construction, and some being of special design. The latter are provided with bowls, cups, or receptacles for plants, or pots of flowers, so that the wall may be more or less concealed by plants as desired. The tiles may be fixed to the wall by screws, or otherwise.

10,953.—DRAINAGE PIPES: J. Day.—The chief objects of this invention are to improve the shape of the sockets for jointing with plain ends of pipes, so that the use of rope yarn may be dispensed with, and that none of the jointing material employed may find its way into the bore of the line of piping; to ensure that the end of one pipe shall always be concentric with the socket of the next pipe, and to provide a means of securing the jointing material within which it is jointed; and to combine with these advantages that of making a joint with equal facility as perfectly with a shortened as with an unshortened pipe. These objects are effected by having the sockets formed each with an inner portion of a diameter to just evenly receive the plain end of a pipe, and with a portion of enlarged interior diameter to receive the jointing material.

11,422.—NUT CRAMP: T. Auld.—This patent refers to an improved nut cramp for use in picture-framing and other mitres. The invention consists of an angle plate with a screw, to which is attached a nut and spring with two loose shoes. The construction of the spring and loose

13,725, C. Wenner, Centrifugal Ventilators and Pumps
 13,946, M. Syer, Syphon Flushing Tank.—14,085, I.
 Hubber, Baths and Cisterns therefor.—16,556, W. Dearl
 Cows or Tops for Chimneys and Ventilating Shafts.—2,16
 W. Albert and W. Scherer, Paints.—5,754, W. Richard
 Ladders or other Similar Structures.—6,731, J. Pettigae
 Covering or Hangings, Cornices, Mouldings, &c.,

LONDON.—For the erection of a Nurses' Block at the St. Pancras Infirmary, Regent-st., for the Guardians of the Poor of St. Pancras, Messrs. A. & C. Harston, Architects, 19, Leadenhall-street, E.C. Quantities by Messrs. Corderoy & Selby and Mr. W. T. Farthing.

Wall & Co.	£7,845	W. Johnson & Co.	£2,996
Lancelotti & Co.	2,615	Shinton & Son	1,375
Leslie & Co.	6,447	C. Miskin, St. Albans	6,160
Turner, Ltd.	6,440		Accepted.

LONDON.—For the construction of an underground convenience at Kensal Green, for the Guardians of the Poor of St. Pancras, Messrs. G. R. W. Wheeler, Surveyor, Quantities supplied by Mr. Walter H. Hewish, 66, Victoria-street, Westminster, S.W.

Neave	£2,329	Jennings	2,166
Charrett	2,145	Finch	1,271
Moslem & Co.	2,150	Douglas & Co.	1,271
Ballard	1,271		Accepted.

[Quantity Surveyor's estimate, £1,975.]

LONDON.—For the erection of a new Park View, road, for the Haverhill Local Board, Mr. S. Barnes, Surveyor, Board's Offices, Haverhill. Quantities by Mr. E. J. Reynolds.

H. Hill	£2,871	J. Ball	£2,698
H. Morecroft	722	0	0
Geo. Wimpey & Co.	702	0	0
Nowell & Robson	699	15	9
Moslem & Co.	693	0	4

* Accepted.

LONDON.—For rebuilding No. 15, Garlick Hill, E.C., for Mr. Deputy P.M. Professor Banister Fletcher, architect, 29, New Bridge-street, Ludgate, E.C.

H. J. Williams (two lots)	£2,674	J. Greenwood	£2,571
E. A. Roome	2,674	C. R. Blyden (accepted)	1,717

LONDON.—For providing and fitting heating apparatus on the low-pressure hot-water system, with the necessary boiler, for the enlargement of the Columbia-road School, Bethnal-green, which is now in course of erection; and also for extending the new apparatus to the existing portion of the building, for the School Board for London, Mr. T. J. Bailey, Architect.

The Wilson Engineering Company, Limited	£6,005	Purcell & Nobbs	£4,115
J. & F. May	2,179	Maguire & Son	3
Z. D. Berry & Sons	495	0	0

* Recommended by the Works Committee for acceptance.

LONDON.—For exterior and interior painting and cleaning at Mackford-road Pupil Teachers' Centre, for the School Board for London.

Mallett	£2,571	Holloway Bros.	£2,567
Co-operative Builders' Co.	258	Maxwell Bros. Ltd.	254
Lidl	258	Leck & Hooker	258
F. & T. H. Hughes	257	Star & Son, 140, Brixton	257
Holliday & Greenwood	257	road (accepted)	257

LONDON.—For exterior painting at Galleymall-road School, for the School Board for London.

Williams	£2,150	Garrett & Son	£175
Leck & Hooker	190	10	0
Holliday & Greenwood	183	0	0

road (accepted) 150 15

LONDON.—For exterior painting at St. Paul's-road School, for the School Board for London.

Manland	£2,528	Trigg	£165
Leck & Hooker	200	Star & Son, 140, Brixton	200
Rice & Son	177	road (accepted)	150

LONDON.—For providing a bakery in connexion with the Upton House Industrial School, Uxbridge-road, Honerton, and for carrying out other improvements at the school including the re-arrangement of the rooms for Manual Training and Tailoring, for the School Board for London, Mr. T. J. Bailey, Architect.

J. N. Galan & Co.	£2,143	W. Grear & Son	£394
Charles Cox	426	0	0
J. T. Robey	397	15	0

* Recommended for acceptance by the Works Committee.

LONDON.—For alterations and additions to "The Golden Lion" Public-house, W.C. Mr. C. H. H. Plank, architect.

Holloway J. Williams	£1,658	Eddie	£1,498
Volter	1,649	Worsley & Co.	1,497
Evans	1,648	Edwards & Medway	1,440
Fatman & Fotheringham	1,510	J. Allen & Son	1,275

LONDON.—For sanitary work at Oxford-court, E.C., for the National Telephone Co. Mr. W. E. Deane, architect.

Douglas & Co.	£2,131	Maxwell Bros.	£280
Beattie	298	15	0

LONDON.—Accepted for the erection of new stable, and cottage for horsekeeper at Deptford Wharf, for the London, Brighton, and South Coast Railway Company, Mr. F. D. Banister, Engineer.

J. R. Lamb, N. E. Lamb, S. E. Lamb	£2,849	0	0
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LONDON.—For the erection and completion of new church hall and infant's class room, at additions to the Presbyterian Church, Brockley, S.E. Mr. R. P. Whellock, architect. Quantities supplied by Mr. W. H. Whellock, 44, Newcourt-street, Stoke Newington, N.

Multon & Wallis	£1,800	Mullin & Sons	£1,612
Young & Lonsdale	1,790	Balaam Bros.	1,615
Fred. Farran	1,692	H. L. Holloway	1,600
Chessum & Sons	1,679	Jas. Chapman	1,540

MARKET WEIGHTON.—For the erection of a brick and iron girder bridge at Kilton, for the East Riding County Council, Mr. A. Beaumont, County Surveyor, County Hall, Beverley.

Charles Farby	£2,264	0	0
John Keswick	348	0	0
Sussex & Chance	205	5	4
John Hudson	275	0	0

Hull (accepted) 950 12 0

NEVILLS CROSS (Durham).—Accepted for the erection of a villa residence at Nevills Cross, Durham, for Mrs. M. Simpson, Mr. George Ord, architect, 16, The Avenue, Durham.

Reid & Co., Main & Co., Durham	£497	14	0
William Lodge & Son, Flaworth, Durham	55	10	0
Flanher, Heron Bros., Durham	33	10	0
Slater, W. T. Blakey, Durham	33	10	0
Painter and Glazier, T. H. Dodd	16	17	6

NEW AYLESFORD.—For the erection of a new stable and cottage for horsekeeper at Deptford Wharf, for the London, Brighton, and South Coast Railway Company, Mr. F. D. Banister, Engineer.

J. L. Miller	£2,264	0	0
Ed. Weatherley	2,238	7	0
Thos. Hunter	2,263	18	0
K. W. Robinson & Co.	2,265	11	0
L. W. W. W. W.	2,265	11	0
K. W. W. W.	2,265	11	0
J. & W. W. W.	2,265	11	0

* Accepted.

NEWBURY.—Accepted for additions to "Snelsmore Lodge," Newbury, for Mr. R. H. Cook, Mr. J. H. Money, architect.

Adey, Newbury	£480	0	0
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OXFORD.—For the erection of a church, Long Handborough, for Mr. E. H. Lingen Barker, architect, 146, St. Owen's-street, Hereford.

Runnicle & Son	£1,541	0	0
Kingfield	1,245	0	0
Chesman & Sons	1,271	0	0
Clavering & Bloxham	1,288	0	0
Hobbs	1,271	0	0
Kimberley	1,285	0	0

* Accepted, with an offer to take certain shares.

PAIGNTON (Devon).—For the erection of shops and premises, Palace-avenue, for the Y. M. C. A. Mr. W. G. Coudrey, architect, Paignton. Quantities by Mr. C. Pinn, surveyor, Exeter.

W. Webber	£1,800	H. Webber	£1,886
R. F. Yeo	1,975	Rabich & Brown	1,871
E. Westlake	1,010	S. Blackford	1,618
	1,085	Drew Bros., Falmouth	1,604

PORT FOLIO.—For the erection of two cottages on the Hockford Road, for Mr. Richard George Carter, Mr. H. F. J. Barnes, architect.

Robt. Halgood	£515	John Riger & Arthur Saunders	£400
Foreman & Grant	410		Accepted.

ROCHDALE.—For the erection of school chapel, Edmund-street, Mr. E. Wood, architect, 15, Queen-street, Oldham.

Robert Kay, Bury-road, Rochdale (accepted)	£275	0	0
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ROCHESTER.—For additions and alterations to school buildings 100-street, Wurburg, for the School Board, Hon. Mr. John Drake, architect, High-street, Rochester, Kent.

Turner	£273	17	0
West Bros.	135	0	0

* Accepted.

SHEFFIELD.—For the erection of school buildings and caretaker's house, Cambridge-street, for the Trustees of the Sheffield Primitive Methodist Chapel, Mr. W. J. Taylor, architect, 38, Bank-street, Sheffield.

J. F. Duke	£5,585	0	0
H. V. Breckingham	2,475	0	0
John Chambers & Sons	2,080	0	0
D. O'Neill & Co.	2,238	0	0
Poyser & Crossley	2,042	0	0
P. Saul & Son	2,032	10	0
C. Farrow (accepted)	1,991	0	0

[All of Sheffield.]

SOUTHAMPTON.—For the extension of the town quay and erection of warehouse, for the Harbour Board, Mr. E. Cooper Poole, Engineer, 2, Portland-street, Southampton.

Reed, Blyth, & Co.	£31,645		
Reed, Blyth, & Co.	30,590		
A. Thorne	27,000		
Thorne	26,466		
Thorne	26,466		
K. K. & R. N. N.	26,466		
L. Naper & Son	26,475		
Roe & Grace	26,475		
H. J. Sanders, Southampton	26,475		

* Accepted.

SOUTHAMPTON.—For the erection of a stable, Bargate-street, for the Corporation, Mr. W. B. G. Bennett, Borough Surveyor, Municipal Offices, Southampton. Quantities by Mr. H. J. F. Osman.

C. Crook & Son	£1,590	0	0
W. W. Harvey	140	0	0
Koe & Grace	144	0	0

* Recommended for acceptance.

STOKE-UPON-TRENT.—For alterations to the Central Schools, for the Stoke Church School Board, Messrs. R. Scrivener & Sons, architects, Hanley, Staffs.

Breeze	£2,013	T. R. Vokal, Stoke	£740
H. R. Embrey	867	T. Godwin	740

* Accepted.

TRING.—For alterations and additions to St. Leonard's National Schools, Mr. W. Huckle, architect, Tring.

Honour & Son	£668	10	0
E. Smith & Son	682	0	0

* Accepted.

WATFORD.—For levelling, paving, metalling, &c., Market-street, for the Local Board, Mr. D. Waterhouse, Engineer, 14, High-street, Watford.

W. Judge	£270	C. Brightman	£739
F. Bracey	779	A. T. Cattle, Lloyd-square	779
F. Dupont	779	London, W.C. (accepted)	688

WELLINGBOROUGH.—For the erection of a villa residence and four houses, Finsford, for Mr. Barnwell, Mr. H. H. Packer, architect, Silver-street, Wellingborough. Quantities by the architect.

W. Stevens	£1,321	0	0
H. D. Smith	1,293	0	0
W. Stevens	1,291	10	0

* Accepted.

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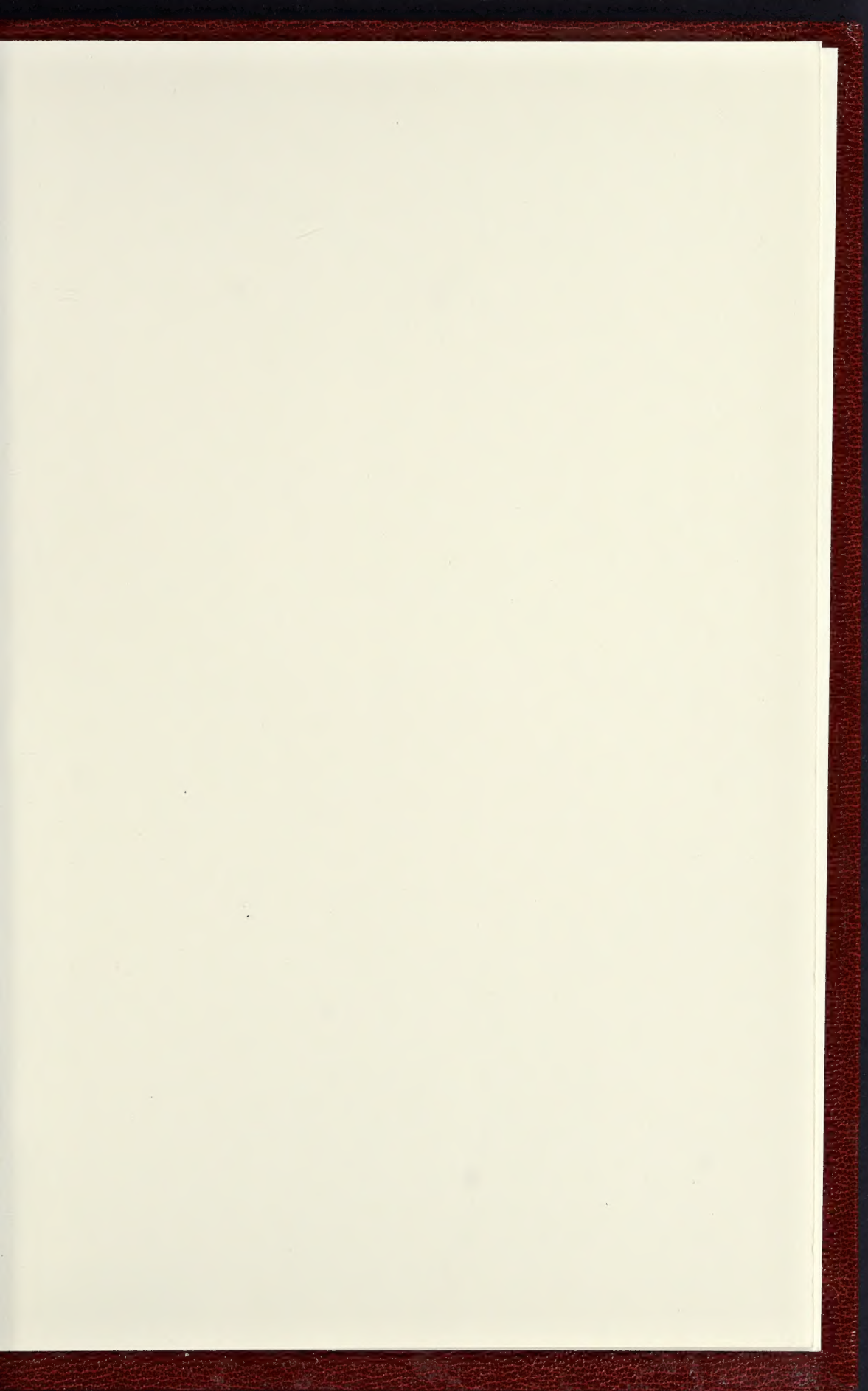
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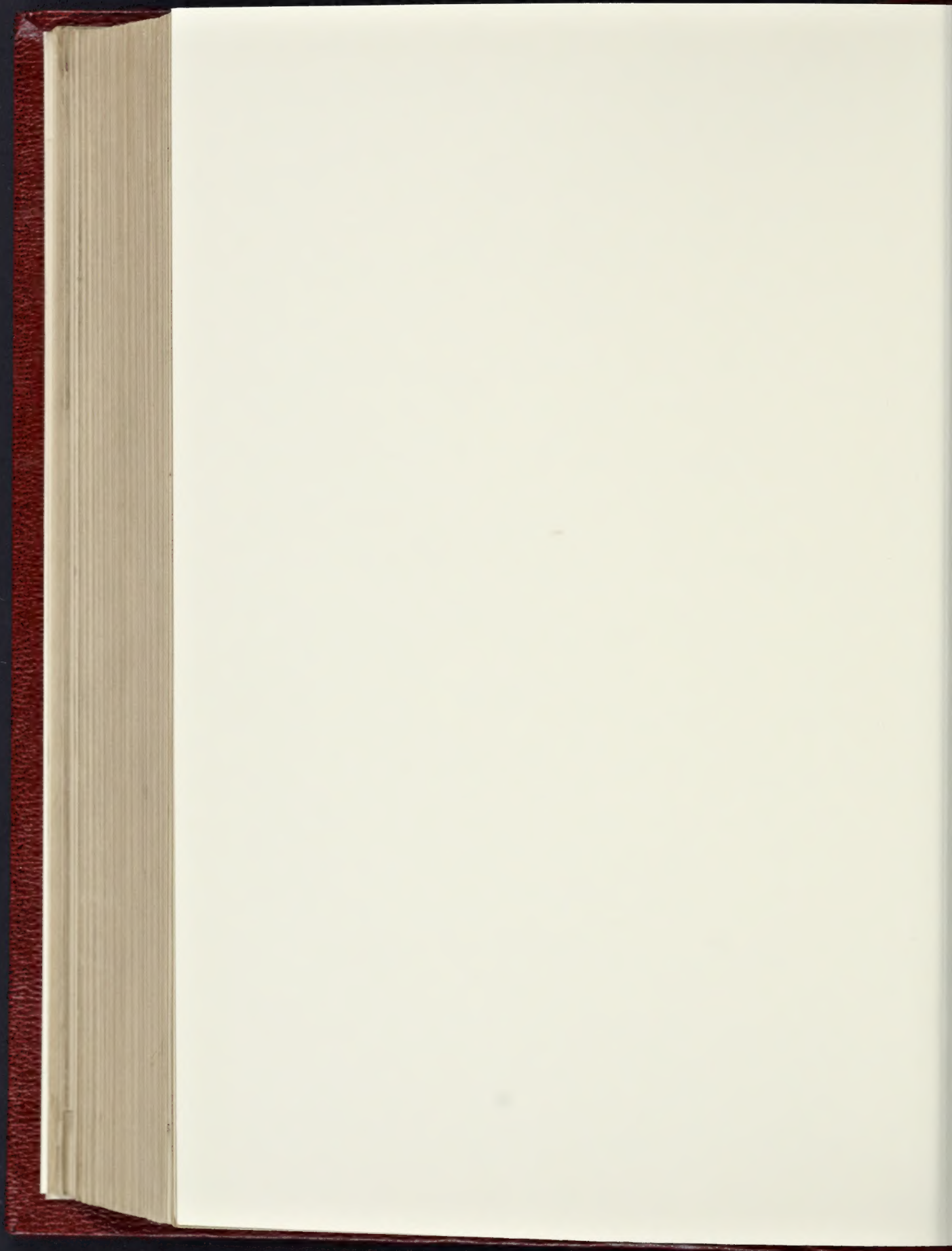
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